

**REMOTE MEMORY ADMINISTRATION  
POSITION (RMAP)  
DESCRIPTION**

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A. Clerical Features . . . . .	3	1. GENERAL
B. Administrative Features . . . . .	3	1.01 The RMAP is a microcomputer based position used to aid in the administration of the recent change memory of local Electronic Switching Systems (ESSs).
4. ESS INTERFACE . . . . .	4	1.02 Whenever this section is reissued, the reasons for reissue will be listed in this paragraph.
A. Operational Overview . . . . .	4	1.03 The RMAP is a Digital Equipment Corporation (DEC) PDP*-11V03 configuration consisting of an LSI-11/2 microcomputer, two dual density floppy disk drives, and a VT100 terminal. A TELETYPE† model 43 receive-only printer is added as a system printer.
B. No. 1 and No. 1A ESS . . . . .	4	2. POSITION EQUIPMENT
C. No. 2 and No. 2B ESS . . . . .	4	2.01 The hardware devices which make up the RMAP are standard DEC devices except for the printer which is a Teletype Corporation product. A split-shelf desk which attaches to the RMAP cabinet is optional and also may be ordered. An RMAP system block diagram is shown in Fig. 1.
D. No. 3 ESS . . . . .	4	*Registered trademark of Digital Equipment Corporation.
5. MAINTENANCE . . . . .	5	†Trademark of Teletype.
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### A. DEC Provided Equipment

**2.02** The DEC hardware includes a PDP-11/03-LK microcomputer and associated devices, a dual density dual floppy disk drive, and a VT100 cathode ray tube (CRT) terminal (Fig. 2). The optional desk is also from DEC.

#### Microprocessor and Associated Parts

**2.03** The PDP-11/03-LK microcomputer (Fig. 3) is an LSI-11/2 processor equipped with 30K usable words of memory, an extended arithmetic option, and a read-only memory (ROM) containing the bootstrap and diagnostic programs. The DLV11-J 4-port serial line interface connects the microcomputer system to the CRT and printer. The DLV11-E serial line interface with programmable transmission rates and full modem control connects to the ESS offices. These units and the floppy disk unit described in paragraph 2.04 are housed in a 30-inch high cabinet equipped with an 871-A power controller.

#### RX-02 Floppy Disk Unit

**2.04** The floppy disk unit (Fig. 3) is a random access mass memory device that stores data in fixed length blocks on flexible disks. The disk drive unit is dual density and contains two drives, each with a maximum storage of 0.5 megabytes per disk. This storage device is used to keep pending and history files along with the various programs to run the system. Disks of Data Center quality (such as DEC RX-01K or IBM\* 2305830) should be ordered for the RMAP.

#### Video Display Terminal

**2.05** The video display terminal (DEC VT100) (Fig. 4) is a CRT screen with a detached typewriter-like keyboard. The CRT is used to display different masks and formatting for data entry. A nonglare screen which attaches to the CRT screen is also provided.

#### Cables

**2.06** Cables are provided to connect the microcomputer system to the CRT and printer, and the data set to the ESS. One cable provides 30 feet of cabling between the microcomputer and the

VT100 CRT. One cable provides up to 10 feet of cabling between the microprocessor and the printer. Another cable provides up to 25 feet of cabling between the microcomputer and the data set to the ESS. A 25-foot M25A cord may be added to provide a maximum of 50 cable feet to the data set.

#### Optional Hardware

**2.07** An optional desk may be ordered to attach to the system cabinet. The desk comes with a split-level shelf that puts the CRT at eye level and the detached keyboard at a lower level for a more comfortable hand position. If the optional desk from DEC is not provided, another desk must be provided for the VT100 terminal and work space for the operator.

### B. Operating Telephone Company Provided Equipment

#### Receive-Only Printer

**2.08** The RMAP requires a 300 baud printer which is tractor fed, has a full ASCII character set, and an EIA (RS-232) interface. The TELETYPE model 4310AAG (Fig. 5) is recommended. The TELETYPE 4320AAK is the only other printer that will be supported. The printer records the communications with the ESS, produces paginated listings of recent changes, and prints disk labels and mask definitions.

#### Data Sets

**2.09** The RMAP can connect to the ESS office either by using a dial-up arrangement or by using a switching arrangement with dedicated lines. Each RMAP should have the capability of reaching all ESS offices served.

**2.10** If a dial-up arrangement is used to connect to the ESS office, a 212A data set and telephone must be provided with each RMAP. This sets on the desk.

**2.11** If a dedicated line arrangement is used, the existing data set arrangement may be used. However, the data sets must be within 50 cable feet of the RMAP.

\*Registered trademark of International Business Machines.

### 3. POSITION FEATURES

**3.01** The RMAP is configured to handle any type of ESS office. However, at a given time, the floppy disk unit holds a pair of disks which are dedicated to a given ESS control group. One of the disks contains messages which have been formulated but not yet accepted by the ESS office (the pending disk). The other disk (the history disk) stores the recent change messages which have been accepted by the ESS. These disks also contain the generic program and the masks required to define the recent change message.

#### A. Clerical Features

**3.02** When a Recent Change (RC) input clerk is to formulate or release RCs to an office, the clerk inserts the disks for that control group into the disk unit. If the disks are for the same control group, the RMAP displays the label and status information for each disk (eg, name of control group) for verification by the clerk and a "start-up complete" message. If the disks do not match, the label and disk status information is still displayed, but a "start-up failure" message is displayed.

**3.03** The clerk then uses the keyboard and CRT screen to compose and enter RCs onto the pending disk. Predefined masks are displayed on the screen to prompt the clerk and reduce the volume of typing. Validation checks are executed on the data as it is entered to decrease input errors. The system allows the clerk, with a single keystroke, to recall the data entered on the previous RC for use in the current RC. In addition, some fields can be recalled and incremented with only a single keystroke.

**3.04** After connection has been established to the appropriate ESS office, RCs can be released singly or in batches. RCs can be released by specifying either the service order number, service order and item number, release date, or release date and time. An RC can also be released immediately after formulation without specifying any argument. Messages accepted by the ESS are automatically transferred from the pending file to the history file in the sequence they were accepted. RMAP will stop sending RC messages to an ESS if a message is rejected. This gives the clerk an opportunity to correct the RC and either release it, or continue releasing the current batch of RC messages.

**3.05** Any process, including the release process, may be stopped by the user at any time by using the delete key. This feature is used, for example, to insert urgent messages while releasing a long string of messages. The interrupt of the communications process with the ESS occurs only when the release of the current message is completed, regardless of when the interrupt was requested. Another less desirable abort can be accomplished by typing (CTRL)/(Backslash). This key will cause the abort to be effected which may cause an ESS rejection or loss of the ESS response. This should be used only with discretion.

**3.06** The clerk can display entire recent change messages, 1-line summaries of messages, masks, a list of all masks, or the disk status information. The messages to be included in the display or printout are specified by the file (pending, failure, history) and by the same keywords and keyword values that control the release of messages. In addition, messages can be retrieved by specifying a telephone number.

**3.07** The on-line mode allows the clerk to communicate with an ESS control group in the same manner as an RC TTY. The clerk can also move and delete RC messages. The MOVE command allows the clerk to move RC messages from one status to another. The DELETE command is used to remove RC messages from the pending and history files.

#### B. Administrative Features

**3.08** Administrative features are provided to set up new RMAP systems, administer disks, generate and update masks, and restore the RC area of ESS offices. Although a standard set of masks will be delivered with each RMAP, the capability is provided for creating new masks and modifying existing masks to adapt them to local needs. Simple procedures are used to generate and edit masks and to assign validity checks to data fields.

**3.09** ESS master disks are created for each ESS type from the generic disk by retrieving relevant masks, completing label information and copying software from the generic disks to the ESS master disks. Control group master disks are created from ESS masters by copying programs and masks from the ESS master disk and adding masks specifically designed for the control group.

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Disks for the input clerks are prepared by copying the control group master disks.

**3.10** To restore the recent change memory of an office, the messages on the appropriate history disk are released. Entire disks may be released or the first and last dates and times may be specified. An administrative feature also permits editing messages in the history file if necessary.

### 4. ESS INTERFACE

#### A. Operational Overview

**4.01** When a release command is executed at an RMAP, the release process checks the data link for carrier. If carrier is not present, the clerk is prompted to connect to the ESS. Connection may be implemented as a dial-up facility or through some switching arrangement. The release program then attempts to establish communication with the connected ESS by requesting the date and time. When the date and time message is received, it is used to set the RMAP local clock. The local clock is used when stamping accepted RC messages when they are placed in the history file. On most ESSs, the identification check is requested to see if it matches the identification on the disk. The release of the RC messages in the release queue is then initiated.

**4.02** The general strategy for ESS communication for any release (batch, single, or immediate) is for the RMAP to simulate the TELETYPE Model 35 paper tape reader. The common link between ESS types is the fact that all ESS machines accept RC messages sent via a paper tape interface. No. 1A ESS generally uses magnetic tape to batch release RC messages; however, with the exception of the transmission rate, the interface is analogous to the one used for paper tape. Also, while in the paper tape mode, all ESS machines return an XON character if the RC message is accepted. The receipt of XON from the ESS guarantees that the RC message was accepted and, in the case of a batch release, the next message on the release queue can be sent.

**4.03** If an ESS detects an error in the RC message, an error message is returned, but the XON character is not. This indicates a failure to RMAP, and the RC message is marked as failed. The RC message and the first 256 characters of the error message from the ESS are saved on disk

in the failure file. Another occurrence which will cause an RC to be placed in the failed state is a time-out. Each ESS type has an associated time-out which is contained in the disk parameter file. If the ESS does not respond to an input message within the time-out period, it is assumed to have failed and such indication is stored in the failure file. Regardless of the actual cause, when an RC message fails, the release process comes to a halt and the clerk must decide how to proceed.

**4.04** The RC message clerk is shielded from any control characters which must be appended to ESS messages in the normal release environment, ie, a batch, single, or immediate release. These control sequences are contained along with the communication link speed (baud rate) in the disk parameter file for the type of ESS for which the given disk is designated.

#### B. No. 1 and No. 1A ESS

**4.05** Recent change messages are entered over the service order channel. In the case of No. 1A ESS, it is not currently possible to obtain the ESS identification. However, there is an input message which obtains the date and time required to set the RMAP local clock.

**4.06** Communication over the service order channel of the No. 1 ESS is at 110 bits per second, and generally, the No. 1A runs at 1200 bits per second even though it does have the ability of configuring the channel to run at 110 baud.

#### C. No. 2 and No. 2B ESS

**4.07** The RC messages are entered over the service order channel. With both No. 2 and No. 2B ESS, it is possible to get an office identification as part of the time output message. Two 3-character fields are available for the ID. Therefore, because validation of disk header with office ID is required, it is possible only if the data supplied with the output message is listed in the disk label.

**4.08** Communication over the service order channel is at 110 bits per second.

#### D. No. 3 ESS

**4.09** The No. 3 ESS offices have the smallest amount of recent change activity of any of

the machines served by RMAP. Due to this low activity, No. 3 ESS handles its service order channel differently than the other ESS machines.

**4.10** The recent change messages are normally implemented through a dialup call-back arrangement. This presents no problem for RMAP; however, if a restricted centrex arrangement is used for an ESS connection arrangement (per recommendations in SD-5P021-01) to allow connection with No. 3 ESS, up to four buttons on each key telephone set are used for line appearances of a standard hunt group. An incoming call can reach any of the four lines by the use of one listed directory number. An incoming call can be answered by a key telephone at any RMAP. These lines have standard treatment for outgoing traffic but have a rate treatment other than the dedicated rate treatment and cannot access the selected incoming restricted lines.

With the auto-connect arrangement, the ESS machine responds with a logon message after the call-back is answered.

**4.11** The office ID for No. 3 ESS machines is part of the time request provided the same name in this 12-character field must be defined in the disk label. In addition to making disk/ESS verification, this facility provides the ability for setting the RMAP local clock.

**4.12** Communication over the miscellaneous TTY channel is at 110 bits per second with other speeds available when a dedicated TTY controller is used.

## **5. MAINTENANCE**

### **A. Preventive Maintenance**

**5.01** Preventive maintenance is required once every 90 days on the DEC portion of the RMAP, requiring about 3 hours of scheduled outage.

### **B. Corrective Maintenance**

**5.02** The mean time between failure (MTBF) for the DEC components of RMAP is 820 hours (about 34 days). The mean time to repair (MTTR) is 3.67 hours. For assistance in isolating the trouble to a particular component of the RMAP, see Section 190-521-202.

## **6. ENVIRONMENTAL REQUIREMENTS**

### **A. Power Considerations**

**6.01** The total power requirements are for one receptacle rated at 104-126 Vac,  $60 \pm 0.5$  Hz at 20 amps. The receptacle must be located within 10 feet of the RMAP. The CRT, printer, and/or data set plug into the microcomputer cabinet; thus only a single receptacle is required. The equipment including the printer uses approximately 1392 watts per hour.

### **B. Air Conditioning**

**6.02** The recommended ranges of temperature and relative humidity for operation of the RMAP are 59°F to 85°F and 40 percent to 60 percent, respectively. The RMAP is operational to 90°F and within a 20 to 80 percent humidity range. However, operation above 85°F shall be only for a period of time to accomplish a graceful shutdown. The RMAP should be shut down as soon as possible after exceeding 85°F. In addition, with operation below 40 percent humidity, specific attention must be given to static electricity effects.

**6.03** The heat dissipation of the RMAP is approximately 4750 BTU per hour.

### **C. Floor Space**

**6.04** The size of the RMAP including the optional desk is 60 by 30 inches. The RMAP is approximately 30 inches high. The size of the microcomputer cabinet is 21.25 by 30 inches. The CRT is about 18 by 15 by 15 inches and the keyboard is 18 by 8 inches.

## **7. ASSOCIATED DOCUMENTS**

**7.01** The documents covering the operation, maintenance, and administration of the RMAP are as follows:

- Section 190-521-201 Operating Procedures
- Section 190-521-202 Trouble Sectionalizing
- SD-5P021-01
- J1P044A
- J1P044BA

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- FPD824-100-106-1
- Section 824-100-106-1
- PG-5P360
- PA-5P360, 5P361
- IM-5P360, 5P361
- OM-5P360, 5P361
- PD-5P360

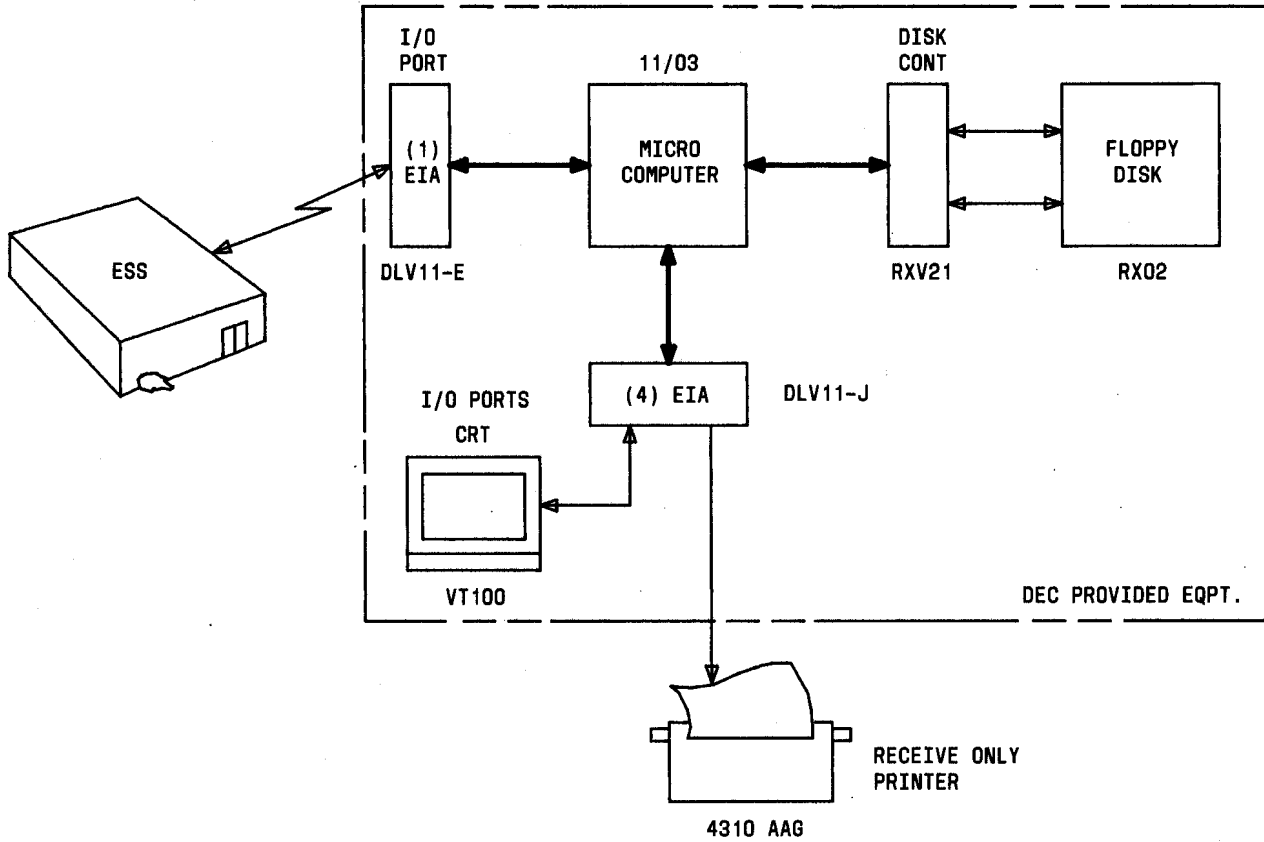


Fig. 1—RMAP System Block Diagram



Fig. 2—RMAP

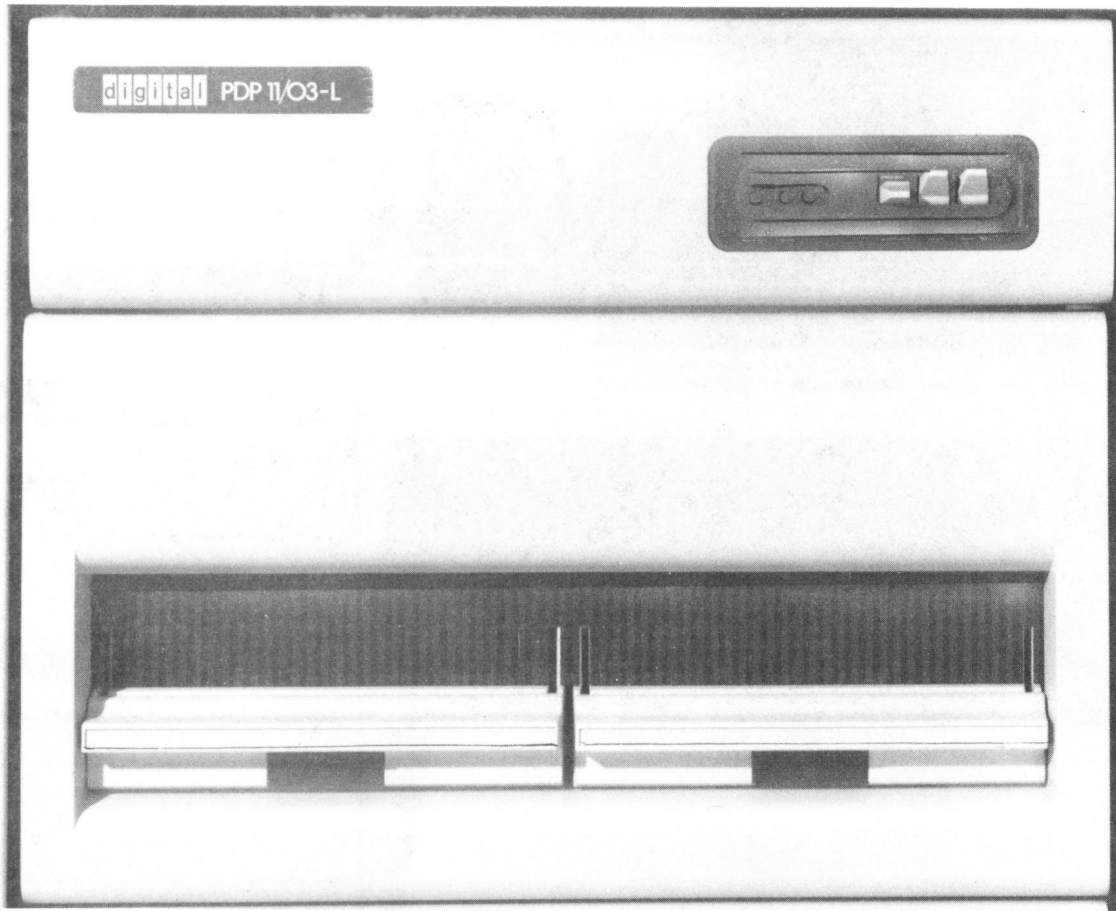


Fig. 3—Microcomputer and Floppy Disk Unit





Fig. 4—Video Display Terminal



Fig. 5—Receive Only Printer