SYSTEM REFERENCE MANUAL

MDTS

MODULAR DATA TRANSACTION SYSTEM

SINGER
FRIDEN DIVISION

No._____

DATE ISSUED_____

NAME_____

to: Systems Engineering

from: C. S. Martin

bject: MDTS System Reference Manual

SAN LEANDRO, CALIFORNIA

refer to:

date: June 30, 1970

Primarily written for system analysts, the MDTS Reference Manual also serves management as a system summary.

Designed and written by Carter Wells, this document is the most complete description of the Modular Data Transaction System.

Recognition for major contributions to this manual go to:

Harold Martin - for technical review and suggestions on content.

Sid Fernandez - for illustration and layout.

Marjorie Folck - for text entry on the terminal.

Danny Stepps - for illustrations and layout.

This manual represents the completion of the MDTS hardware documentation assigned to Systems Design and Development.

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Section 1

INTRODUCTION

Use Of This Manual
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MDTS

INTRODUCTION

PURPOSE OF THIS MANUAL

This manual describes the Modular Data Transaction System Point-of-Sale Data Terminal. It is directed to the System Analyst and provides the information he needs to most effectively integrate the Point-of-Sale Data Terminal with MDTS.

FORMAT

Single side printing, except for section headings and special illustrations, simplifies the incorporation of additions/revisions.

Left page printing provides quick and easy location of specific headings and sub-headings. The open right-hand pages provide areas for notes, sketches, references and similar memoranda.

MDTS APPLICATIONS

Use of the MDTS to provide Management Information and Control for the retailing industry is illustrated in the flow chart on the opposite page.

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Sales Check — Audit Tape — [cash register] — Credit Authorization

General Accounting and Statistical Sales Analysis

Data Processing Department

Accounts Receivable

Statements

Dunning Notices

Aging Analysis

General Financial Reports

Ledger Reports

Departmental Operating Statement

Payroll

Paychecks

Labor Distribution

Economic Factors

Management Planning

Merchandise Management

Fashion

Staples

Big Ticket

Sales Audit

Sales Audit Reports

Flash Sales

Accounts Payable

Vendor Invoice

Projected Merchandise Plan

Price Change

Sales Analysis

Classification and Price Line Reports

Vendor Payments

Vendor Analysis

Stock Status Reports

Buying

Purchase Orders

Supplier

Management Information & Control Flowchart
For The Retailing Industry Using MDTS.

Section 2

GENERAL SYSTEM DESCRIPTION

GENERAL SYSTEM DESCRIPTION

DESIGN

The Modular Data Transaction System (MDTS) is designed primarily for use in retail stores. The MDTS is capable of handling all data requirements necessary for store operation, such as cash flow, credit checking, other accounting functions, and inventory control. The MDTS accepts data and stores it until the transaction is terminated and the Line Concentrator (LC) or the Individual Store & Forward (ISF) has accepted the data or a "time-out" has occurred.

MODULAR COMPONENTS

A system is assembled from combinations of five units according to the needs of the particular user. The five units are shown on the opposite page and identified in the line drawing below:

MAGNETIC TAPE DRIVE
Model 45 900265

LINE CONCENTRATOR
Model 20 9001400 Processor

DISC DRIVE
Model 45 9002650

DATA TERMINAL
Model 900 7011032

INDIVIDUAL STORE AND FORWARD (ISF)
Model 800 9001000

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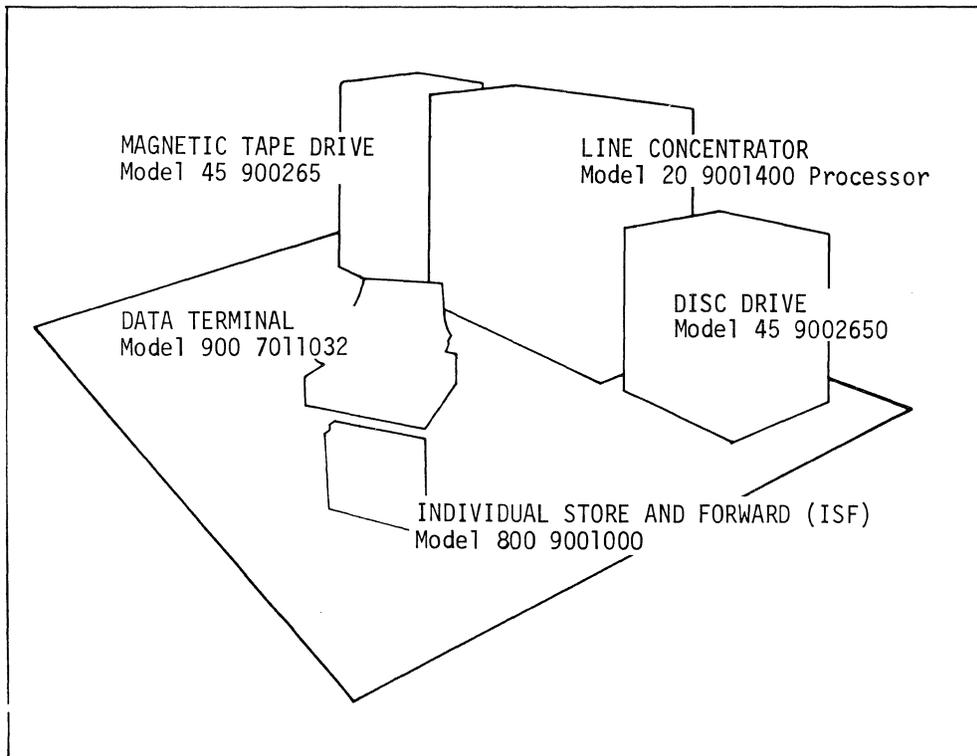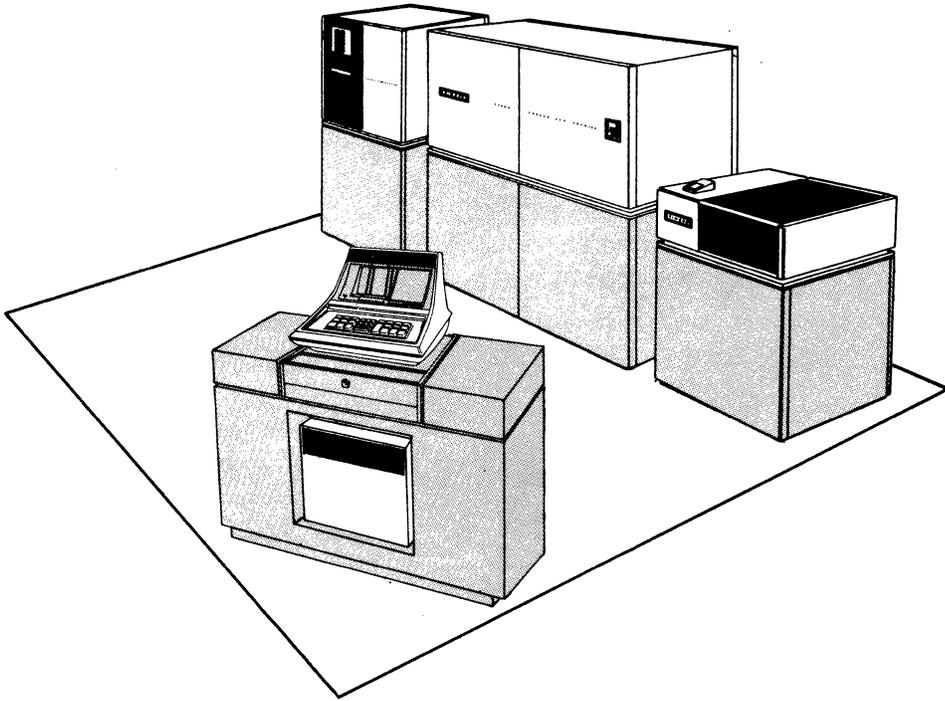
Modular Components · Proportional Sizes

GENERAL SYSTEM DESCRIPTION

SINGLE TERMINAL OFF-LINE INSTALLATION

A basic MDTS (Modular Data Transaction System) at a customer's facility can include several Data Terminals, an Individual Store & Forward unit for each Data Terminal, and a 202E type Data Set (or equivalent).

Storage of Transaction Records

At the conclusion of each transaction, the data entered at the Data Terminal is transmitted to the Individual Store & Forward unit where it is recorded on magnetic tape.

Computer Input

Individual Store & Forward records of transactions are transmitted through the 202E type Data Set to the servicing computer upon the request of the computer (usually during the Data Terminal's non-business hours).

The Individual Store & Forward unit is automatically re-set to start recording a new group of transactions after the stored records of transactions have been transmitted to the computer. A group of transactions can include more than a day's transactions but cannot exceed 50,000 characters.

ASTA - Asynchronous to Synchronous Transmission Adapter

The Asynchronous to Synchronous Transmission Adapter (ASTA) acts as a data transmission interface between the Individual Store & Forward (ISF) and the host computer system (e.g. the IBM System 360). Data transfer between ASTA and the host computer is synchronous seven-bit USASCII with "odd parity" at 4800 bps.

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Data Terminal

Individual Store
and Forward Module (Master)

Data Terminal

Individual Store
and Forward Module (Slave)

AT&T 202E
Dataphone or
Equivalent

AT&T 202C
Dataphone or
Equivalent

Computer
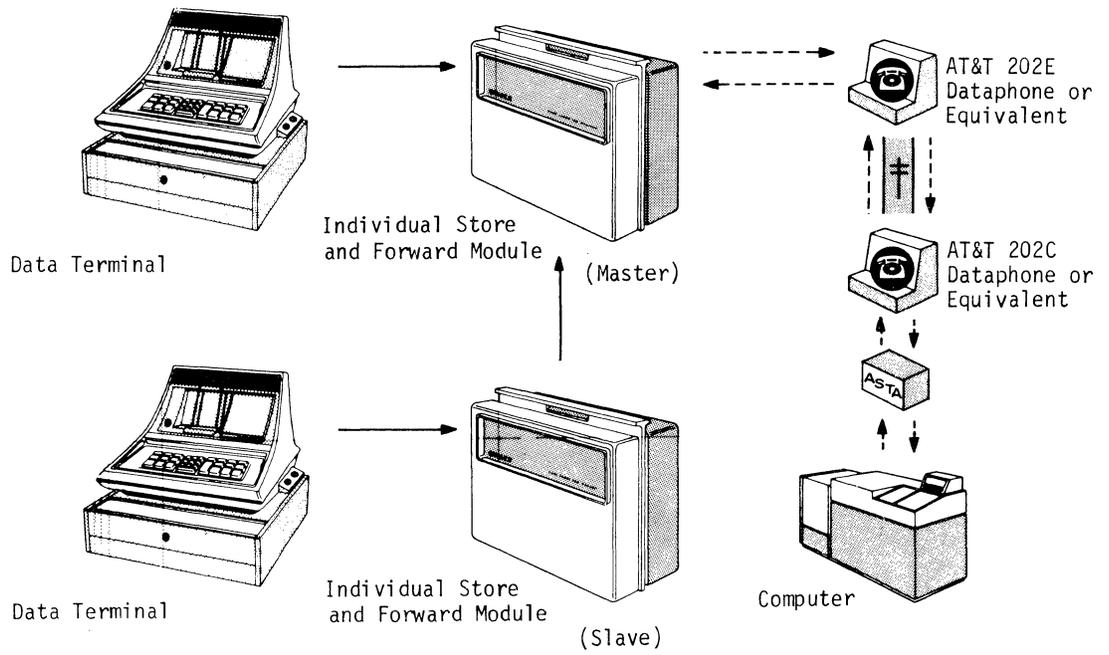
'Single Terminal' Store & Forward Installation

GENERAL SYSTEM DESCRIPTION

MULTI-TERMINAL OFF-LINE INSTALLATION

The off-line multi-terminal installation includes several Data Terminals and at least one each of the following:

Line Concentrator (one for each 180 Data Terminals)

Disc Drive

201B type Data Set (or equivalent)

Radius of Installation

The Data Terminals (limited to 180 or less) can be eight (8) wire miles from the Line Concentrator.

Credit Checking Capability

The Disc Drive can be used to provide credit checking capability in the off-line multi-terminal installation. The Magnetic Tape Drive can be used to provide back-up storage of the transactions.

Credit Checking Routine

The credit checking routine with the Disc Drive includes the following steps:

1---Data Terminal transmits an account number to the Line Concentrator.

2---Line Concentrator searches the Disc Drive for the account number.

3---When the search fails to locate the account number, the Line Concentrator transmits a code to release the Data Terminal and the account number is printed on the sales form.

NOTE----This credit check reports an account number's modified credit as it has been stored in the Magnetic Disc Drive. Periodic updating of the Disc Drive can be scheduled to meet business requirements.

4---When the search locates the account number, the Line Concentrator transmits to the Data Terminal the credit code stored with the account number.

5---The Data Terminal displays this credit code and illuminates the CREDIT CHECK key. (The clerk can then notify the Department Manager.)

6---When the CREDIT CHECK key is touched, the account number and the credit code are printed.
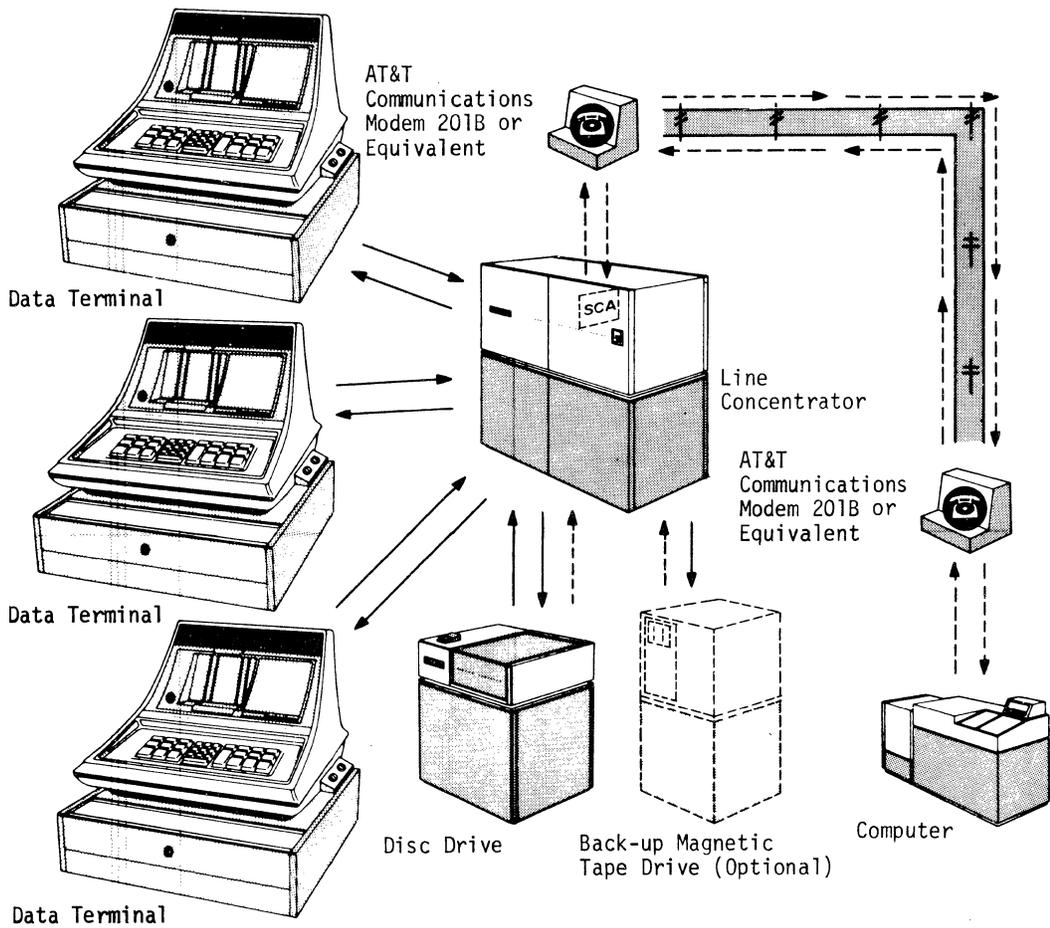
AT&T
Communications
Modem 201B or
Equivalent

Data Terminal

Data Terminal

Data Terminal

SCA

Line
Concentrator

AT&T
Communications
Modem 201B or
Equivalent

Disc Drive

Back-up Magnetic
Tape Drive (Optional)

Computer

Multi-Terminal Collective Store & Forward Installation

ON-LINE MULTI-TERMINAL INSTALLATION

The on-line multi-terminal installation includes more than five Data Terminals and at least one each of the following:

Line Concentrator (one for each 140* Data Terminals)

201B type Data Set (or equivalent)

* Not more than 140 Data Terminals can be linked to each Line Concentrator that is on-line to the computer due to the inherent time requirements for computer service.

Real-Time Credit Checking

An On-Line Communications Adapter (OLCA*) can be fitted into the Line Concentrator to provide real-time credit checking when the Line Concentrator is linked directly to the host computer without using Data Sets.

A Synchronous Communications Adapter (SCA) is used for Real-time Credit Checking when the Line Concentrator is linked through Data Sets to the computer.

* OLCA is available only from Friden.

REFERENCE---Section 10, Data Transmission Guide, details the linkage requirements of the basic systems.

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AT&T
Communications
Modem 201B or
Equivalent

Data Terminal

Data Terminal

Data Terminal

SCA   OLCA

Line
Concentrator

AT&T
Communications
Modem 201B or
Equivalent

Computer
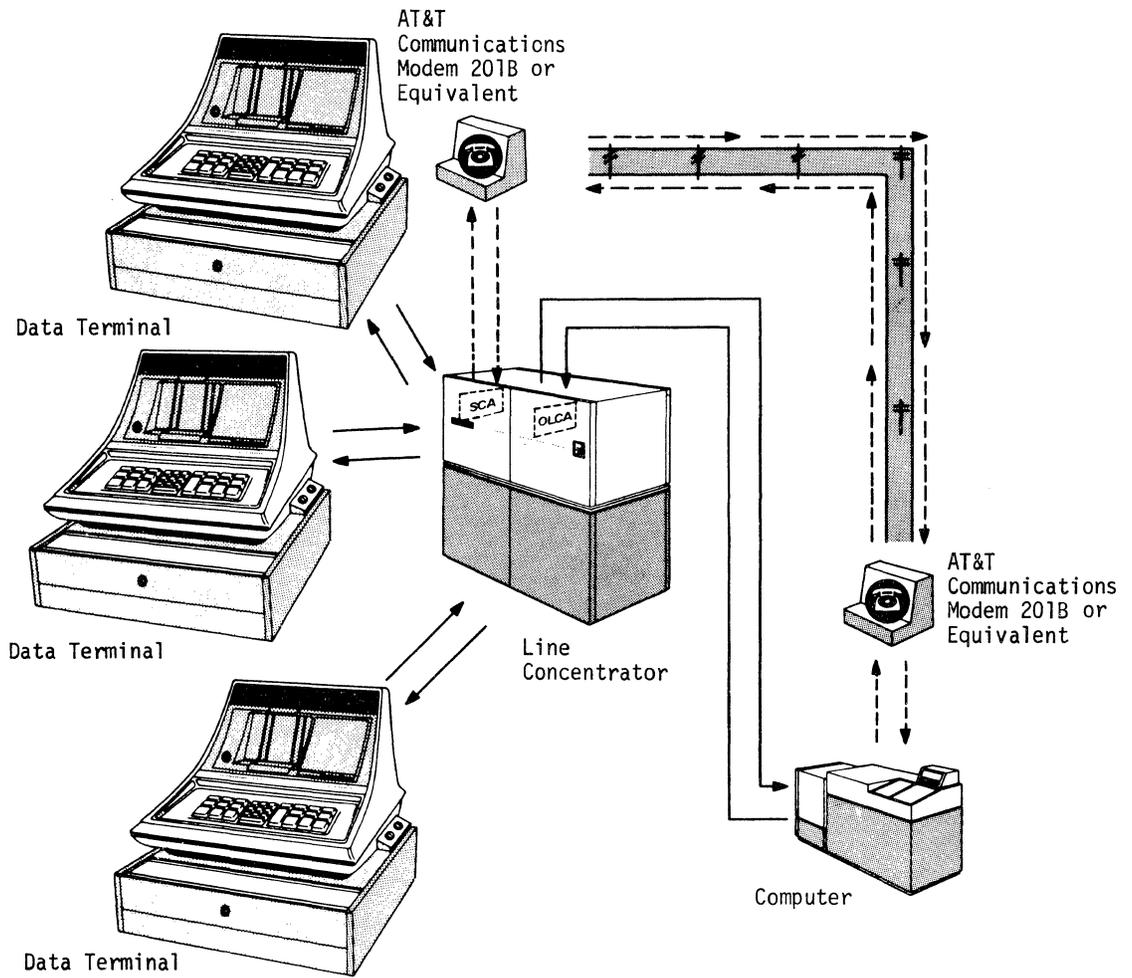
On-Line Multi-Terminal Installation

Section 3

DATA TERMINAL COMPONENTS

Keyboard
Digital Display
Printer
Optional Sales Form
Cash Drawer
Terminal Logic
Cash Drawer Lock
Paper Supply Lock
Mode Lock
Program Lock

DATA TERMINAL COMPONENTS

KEYBOARD

The keyboard consists of thirty keys. Ten are digit-entry keys arranged like a touch tone telephone keyboard and twenty are function keys. Two additional keys and one indicator, not a part of the keyboard proper, provide for paper handling and data transmission indication.
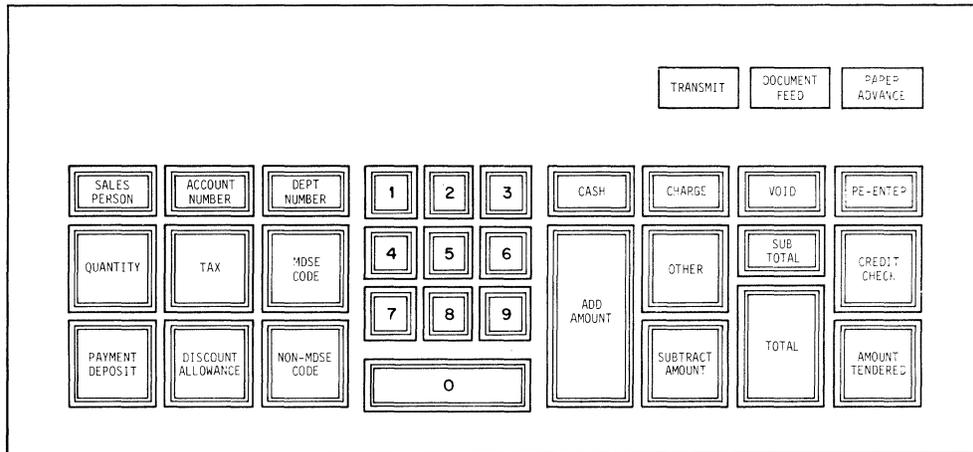
Sequential Illumination

Most of the function keys can be illuminated in a programmed sequence to guide the operator in the correct order of data entry.

Interlocks

The keyboard design limits functional response to <u>one</u> key at a time; when two or more keys are touched simultaneously, the key travel is limited and none of the touched keys is functional. In addition, there are other interlocks to help guard against an improper sequencing of operations.

REFERENCE---Section 5-6, Programming the Function Keys, and Section 6-2, Data Terminal Operation – Re-Entry key.

DATA TERMINAL COMPONENTS

DIGITAL DISPLAY

The Data Terminal has a thirteen-digit display to show keyboard entries and arithmetic results. Each digit module consists of a seven bar matrix to form the digits (0-9) and a minus sign.
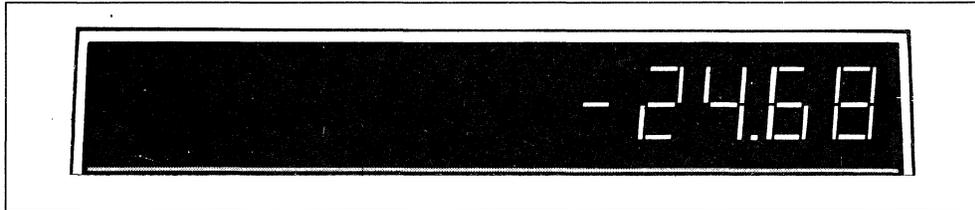
The minus sign will appear in the third or higher position after touching the SUBTRACT AMOUNT key or when a transaction results in a negative subtotal or total.

A decimal is displayed between the second and third digits of monetary amounts after touching the ADD AMOUNT, SUBTRACT AMOUNT, SUBTOTAL, TOTAL, or AMOUNT TENDERED key.

A second digital display is available for the rear of the machine, to provide for simultaneous two-sided viewing of monetary amounts. (Non-monetary amounts do not appear on the second digital display.)

PRINTER

The printer consists of two parts, the printing unit and the paper feed mechanism. The printing unit has a single printing wheel with thirty characters in the following sequence:

Alpha   A C D E H I M O P Q S T V X Y

Numeric 0 1 2 3 4 5 6 7 8 9 + . - % *
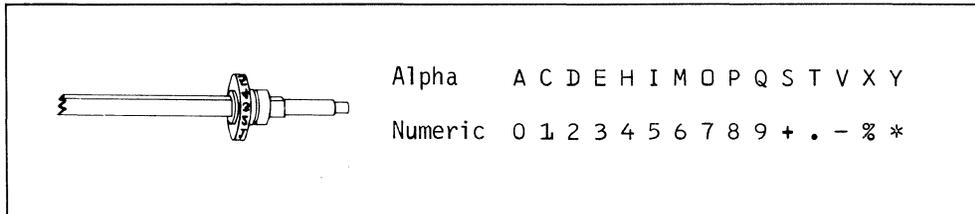
Printing Mechanics

Characters are printed from right to left; there are thirty-one print positions, twelve per inch (approximately 2.1 mm per character). When a character from one half of the print wheel is followed by a character from the other half, an additional half space is used.

DATA TERMINAL COMPONENTS

Printing Positions

Printing positions are numbered from right to left (1 thru 31) as shown in the following layout:

```
        ┌──────────NUMERIC──────────┐    ┌──────NUMERIC──────┐
        3 3 2 2 2 2 2 2 2 2 2 2 1 1 1 1 1 1 1 1 1 1 9 8 7 6 5 4 3 2 1
        1 0 9 8 7 6 5 4 3 2 1 0 9 8 7 6 5 4 3 2 1
                                 │         │               │         │
                                 │         │               │         │
                                 └─ALPHA─┘               └─ALPHA─┘
```
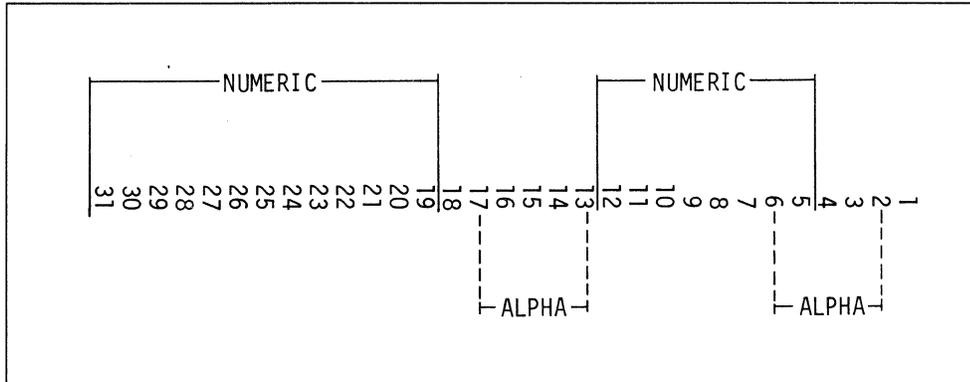
Paper Advance · Automatic and Manual

The paper advance is six lines per inch (4.2 mm per line), which is a standard typewriter spacing. One line advance always follows printing except for TOTAL key and VOID key operations when the paper is advanced twelve lines (two inches / 50.8 mm) following the printing of the date.

The PAPER ADVANCE key in the upper right hand corner of the keyboard will advance the paper at the discretion of the operator.

Printing Time

One line of printing followed by a one line paper advance is completed in one second. Cycling time is not altered by the number of alpha-numeric characters printed.

Printing Paper

A standard two-part pressure-sensitive (carbonless) printing paper* is used to provide an original tear-off** copy and an audit copy of all transactions. The original is fed out of the terminal to be torn off as a customer's receipt. The audit copy is rewound internally.

* The width of the printing paper is 3-7/16 inches (87.3 mm); a new roll is 3-1/2 inches (88.9 mm) in diameter.

** The original tear-off is unprinted when an optional sales form has been inserted in the terminal.

DATA TERMINAL COMPONENTS

OPTIONAL SALES FORM

Optional sales forms can be manually inserted in the Data Terminal. Pressing the DOCUMENT FEED key in the upper right hand area of the keyboard will release the paper feed to allow the insertion of an optional sales form.

The height of an optional sales form should not be less than 7-1/4 inches (184.2 mm) for convenient insertion and removal; width of an optional sales form cannot exceed the following limits:

Max. Width 5-1/2 inches (139.7 mm)
Min. Width 3-1/4 inches (82.5 mm)

Printing Format

The top line of print on a fully inserted optional sales form is 5-1/2 inches from the bottom of the form.

CASH DRAWER

The cash drawer is housed in the base of the Data Terminal. The drawer has a removable till with ten compartments; five for coins, three for bills, one for checks and large denomination bills and one for larger items such as sales checks and invoices. The till can be provided with a locking cover.

TERMINAL LOGIC

The Data Terminal logic and power supply are housed below the cash drawer in the base of the terminal.

Core Memory

A core memory for 512 six-bit characters is provided for storage of the following data:

Alpha description of function keys

Accumulation of totals

Storage of functional key programs

Fixed factor storage

Sequencing segment of the Transaction Number

Storage area for 225 characters of a transaction.

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DATA TERMINAL COMPONENTS

CASH DRAWER LOCK

The cash drawer lock incorporates a three-position switch to provide the following controls:

RELEASE

OPERATE

LOCKED

▶KEY NOT REMOVABLE IN THIS POSITION
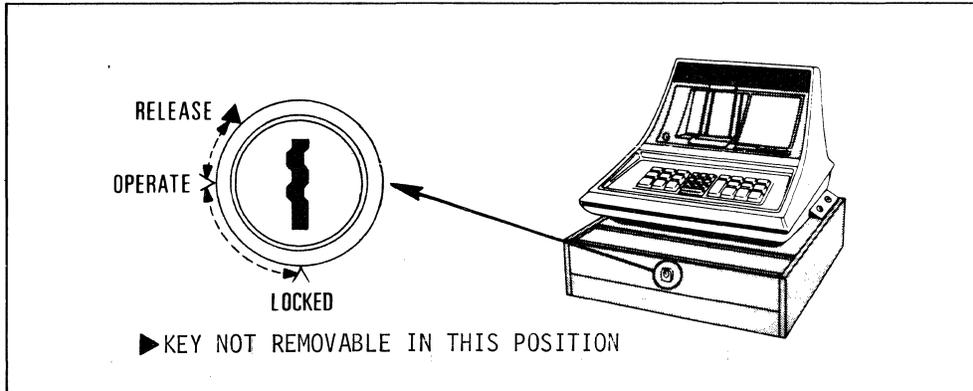
Position 1 · LOCKED

Terminal logic cannot open the cash drawer.

Position 2 · NORMAL OPERATION

TOTAL key and VOID key will open the cash drawer.

Position 3 · EMERGENCY

Cash drawer will open with/without electrical power to the Data Terminal. This position is spring-loaded; when the key is released, the lock returns to Position 2 (NORMAL OPERATION).

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DATA TERMINAL COMPONENTS

PAPER SUPPLY LOCK

The Paper Supply Lock incorporates a spring-loaded push button latch which, when pressed, unlatches and lifts the hinged cover to permit access to the paper roll and the ink cartridge.
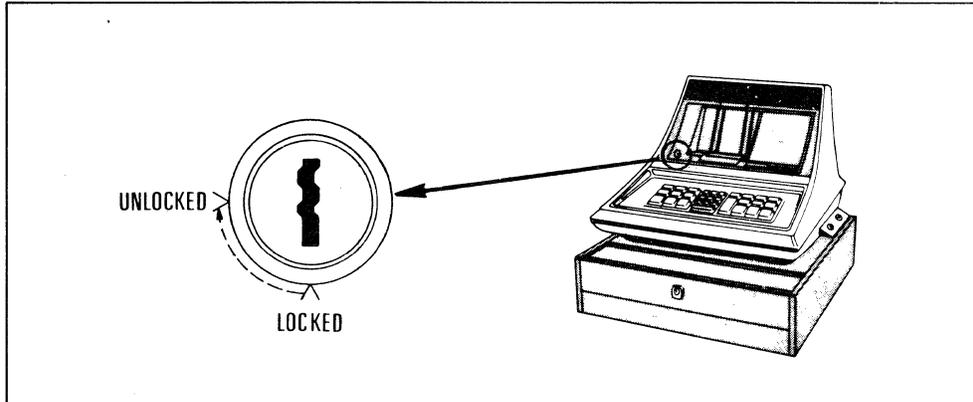
Position 1 - LOCKED

Push button cannot be depressed to release hinged cover.

Position 2 - UNLOCKED

Push button can be depressed, the latch released and the cover lifted.

SEE OPP. PAGE

TERMINAL CASE

AUDIT COPY

CUSTOMER COPY
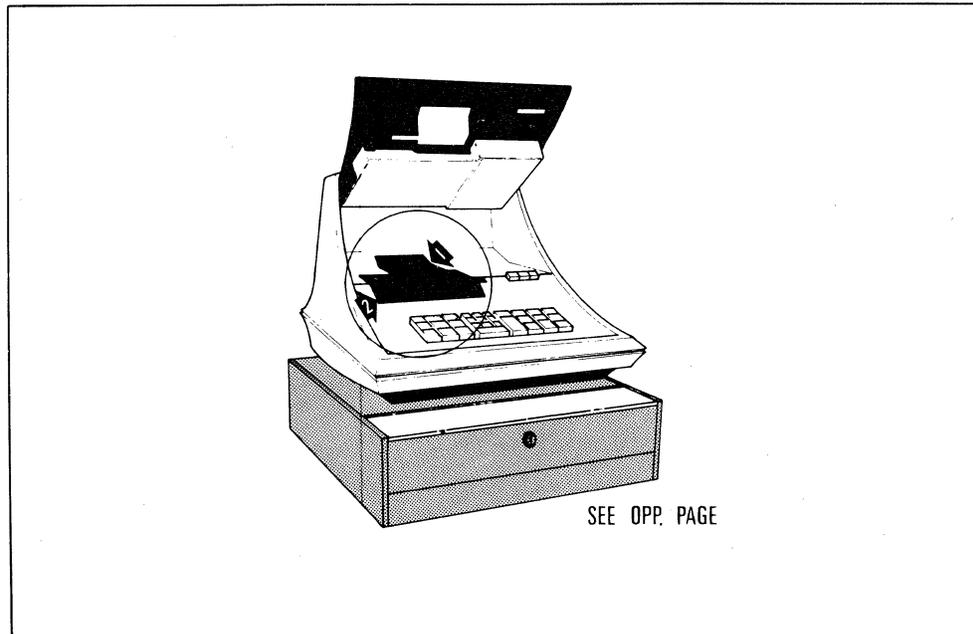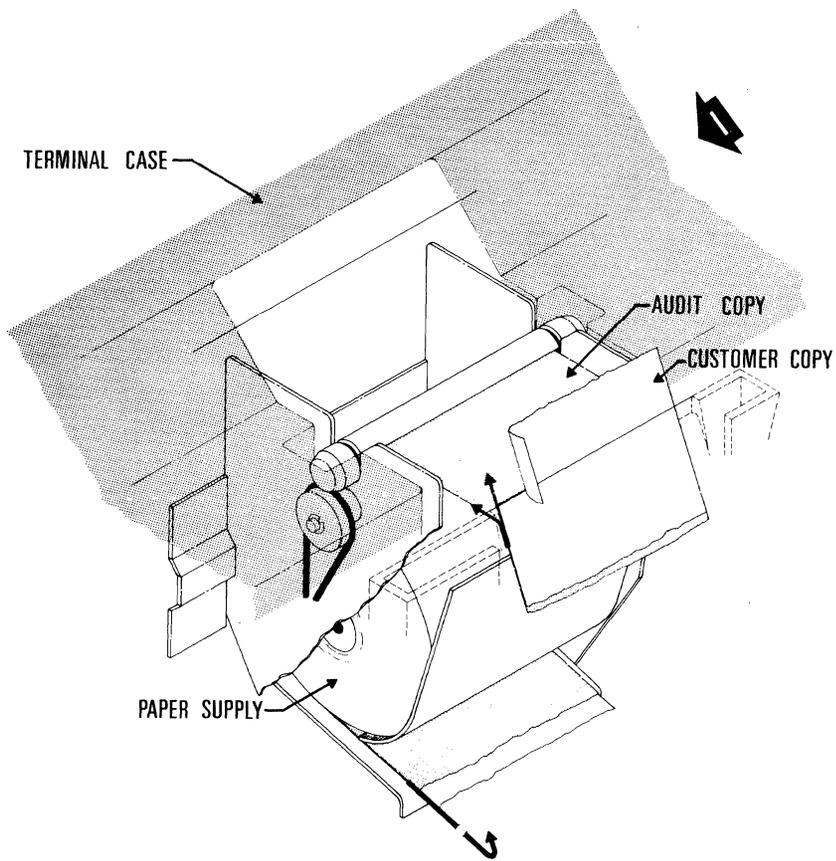
PAPER SUPPLY

PAPER CRADLE

INK CARTRIDGE

TERMINAL CASE

PUSH LOCKING LEVER TO LEFT
TO REMOVE OR INSERT INK CARTRIDGE
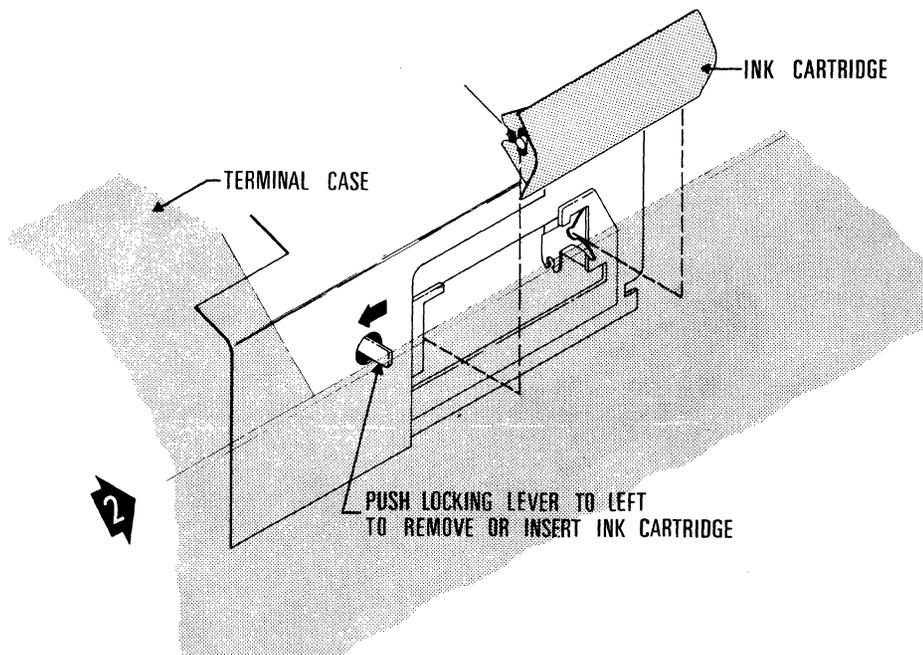
INK CARTRIDGE

DATA TERMINAL COMPONENTS

MODE LOCK

The Mode Lock incorporates a four-position key-operated switch to provide the following operational conditions:

OPERATE

OPEN/X ◄   ► CLOSE

OFF

MODE

►KEY NOT REMOVABLE IN THESE POSITIONS
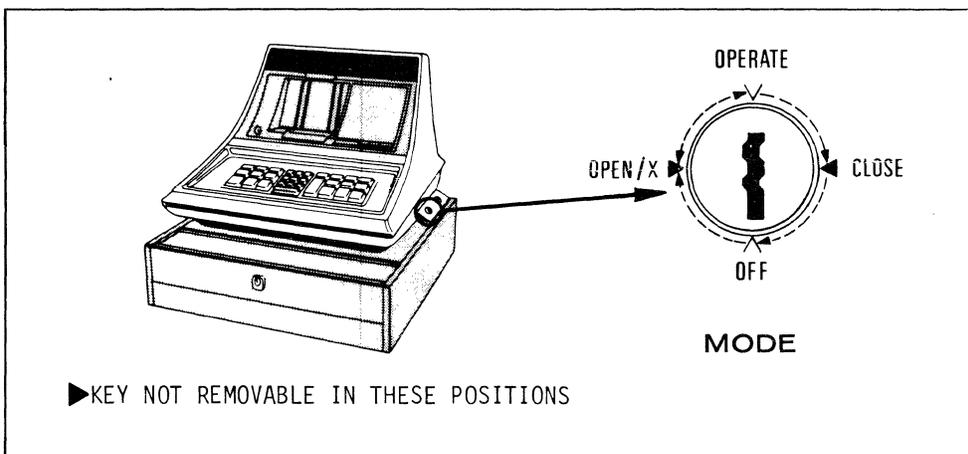
Position 1 - OFF

No power to the terminal power supply.

Position 2 - OPEN/X

Power ON. Variables (such as the date) can be entered and the register totals are printed and transmitted without being cleared from the Data Terminal.

Position 3 - OPERATE

Normal mode for business operations. Data Terminal is under control of the stored program. Transaction data can be entered at the Data Terminal; completed transactions will be transmitted to the Individual Store & Forward unit or the Line Concentrator.

Position 4 - CLOSE

The register totals are printed, transmitted, and cleared automatically.

NOTE----Since register totals are cleared automatically in the CLOSE position, it is good practice to complete a pre-closing transmission in OPEN/X (Position 2), <u>before</u> advancing the mode lock switch to the CLOSE position.

REFERENCE---Section 4, Mode Lock Function, details the operational conditions.

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PROGRAM LOCK

The Program Lock incorporates a two-position switch to permit programming the lighting sequence and some of the functional characteristics of the function keys.

ON ▶

OFF

PROGRAM

▶KEY NOT REMOVABLE IN THIS POSITION
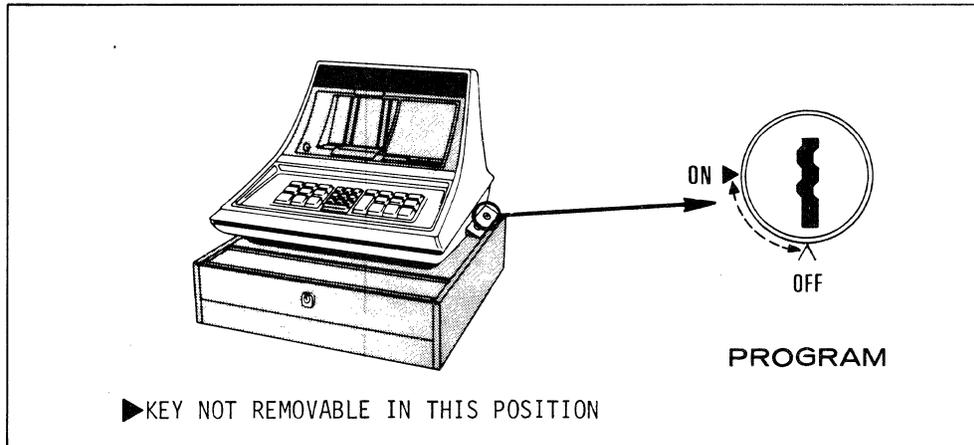
Position 1 - OFF

Position 2 - ON

When the Mode Lock switch is in OPERATE (Position 3), any function key (except the RE-ENTER key) can be programmed for the following conditions:

    The next key/s to be illuminated
    The maximum number of digits that can be entered
    Digit entry requirement and/or digit checking requirement.

REFERENCE---Section 5, Programming Function Keys, details the complete programming operation.

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Section 4

MODE LOCK FUNCTIONS

Mode Lock Location
Operation
Position 1 - OFF
Position 2 - OPEN/X
Position 3 - OPERATE
Position 4 - CLOSE

MODE LOCK FUNCTIONS

MODE LOCK LOCATION

▶ KEY NOT REMOVABLE IN THESE POSITIONS
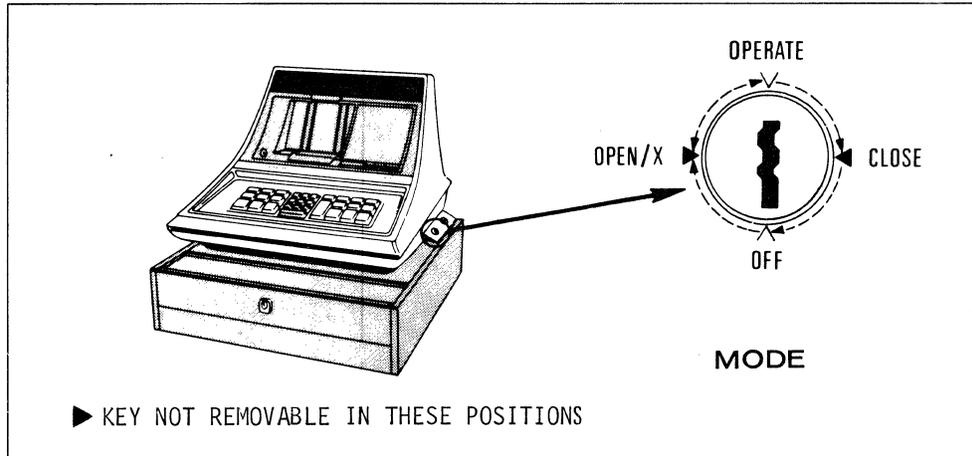
OPERATION

The Mode Lock is a four-position switch, operated by a key. The mode of operation for each position is described below.

POSITION 1 - OFF

No power is supplied to the terminal power supply. The switch can be advanced clockwise to OPEN/X (Position 2) from OFF.

POSITION 2 - OPEN/X

Power is ON. The VOID key is illuminated. The date and other variables listed below can be entered. Register totals are printed and transmitted without being cleared from the Data Terminal.

Key Movement

The switch can be advanced clockwise to OPERATE (Position 3) and returned counter-clockwise to OPEN/X (Position 2), but, the switch cannot be returned counter-clockwise to OFF (Position 1).

Key Non-Removal

The Mode Lock key cannot be removed in OPEN/X (Position 2).

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Storing Variables

Variables can be entered in core memory after touching the VOID key. The VOID key prints the Transaction Number and the words VOID VOID on the same line, the date and the logo on the next two lines; enters the alpha codes ? (question mark) and) (close parenthesis) in the Transaction Transmission Area (TTA) of the Data Terminal's core memory; turns off the VOID key light; and illuminates the SALESPERSON, TAX, DISCOUNT ALLOWANCE, CASH, and TOTAL keys.

Four variables can be stored in accordance with the following procedures:

Terminal ID

Enter no more than nine (9) digits for the identification of the terminal. Read the display and verify the digital entry. Touch the SALESPERSON key (the displayed digital entry is then written into the core memory of the Data Terminal and printed on the form).

Tax Percent

Enter no more than four (4) digits for the tax percent. (The last entered digit is the hundredths of a percent, e.g., 425 4.25% and 1000 10.00%.) Read the display and verify the digital entry. Touch the TAX key (the displayed digital entry is then written into the core memory of the Data Terminal and printed on the form).

Discount Percent

Enter no more than four (4) digits for the discount allowance percent. (The last entered digit is the hundredths of a percent, e.g., 1250 12.50% [12-1/2%].) Read the display and verify the digital entry. Touch the DISCOUNT ALLOWANCE key (the displayed digital entry is then written into the core memory of the Data Terminal and printed on the form).

Date

Enter seven or eight digits; one or two digits for the month, any digit as a spacer, two digits for the day of the month, any digit as a spacer, and two digits for the year. (The spacer digits will appear as spaces in the printout, e.g., 1007070 will be printed as 1 07 70.) Read the display and verify the digital entry. Touch the CASH key (the displayed digital entry is then written into the core memory of the Data Terminal and printed on the form).

MODE LOCK FUNCTIONS

Storing Order

The variables are independent. Any or all can be replaced when the Mode Switch is in the OPEN/X position. Variables can be re-entered in any order.

Storing Content

The factors in core memory at the time of the previous closing of the register will continue to be used until new variables are stored in accordance with the procedure specified above.

Storage Logic

When a variable is stored as outlined above, the data terminal logic performs the following operations:

1---The alpha code of the pressed function key (see table opposite) is stored in the next available location in the Transaction Transmission Area (TTA) of the core memory.

2---The digit/s entered prior to touching the function key are stored in the location immediately AFTER the alpha code in the TTA.

3---The entry is printed.

EXAMPLE - Storing Variables

Mode Lock Position	- - - - - - - - -	OPEN/X (Position 2)	- - - - - -	
Key Touched	- - - - - - - - - - - -	VOID	- - - - - - - - -	
TTA* Contribution	- - - - - - - - - - -	?)	- - - - - - - - -	
Print (on form)		Transaction Number	VOID	VOID
.		1 06 70		
.		LOGO		

Variable Name	Terminal ID	Tax Percent	Discount Percent	Date
New Variable	5241169	4-1/4 %	12-1/2%	Jan. 7, '70
Digit Entry	5241169	425	1250	01007070
Display	5241169	425	1250	.1007070
Key Touched	SALESPERSON	TAX	DISCOUNT ALLOWANCE	CASH
TTA* Contribution	' 5 2 4 1 1 6 9	& 4 2 5	F 1 2 5 0	J 1 0 7 7 0
Print (on form)	5241169 EMP	425 TAX	1250 DISC	.1 07 70 CA

After all four of the variables in the Example above are entered in the order presented, the TTA will contain the following characters:

```
STX  P 1 3 2 9   5 2 4 1 1 6 9 ? )  ' 5 2 4 1 1 6 9 &
```

```
& 4 2 5 F 1 2 5 0 J 1 0 7 7 0
```

PRINTED IDENTITIES		ALPHA CODE STORED IN TTA	FUNCTION KEY TOUCHED
PROGRAMMING SWITCH ON	PROGRAMMING SWITCH OFF		
None	*None*	*None*	RE-ENTER
ID	VOID	) *close paren.*	VOID
+T	+T -T	I *POSITIVE TOTAL* Y *NEGATIVE TOTAL*	TOTAL
EMP	EMP	' *apostrophe*	SALESPERSON
CA	CA	J	CASH
CH	CH	K	CHARGE
X	MEMO	. *period*	OTHER *ON with* CASH & CHARGE
	MEMO	, *comma*	OTHER *ON with* ADD AMOUNT & SUBTRACT AMT
ACCT	ACCT	*space*	ACCOUNT NUMBER
ME	* *digit* * *minus* * *period*	Z *digit/minus/period* *(See Sec. 6-11)*	CREDIT CHECK
DEPT	DEPT	$ *dollar sign*	DEPT/CLASS
QTY	QTY	% *percent sign*	QUANTITY
MDSE	MDSE	" *quotation marks*	MDSE CODE
MISC	MISC	# *number sign*	NON-MDSE CODE
+ *plus sign*	EA *and* +	L	ADD AMOUNT
- *minus sign*	EA *and* -	\ *reverse slant*	SUBTRACT AMT
+S	+S *or* -S	*None*	SUBTOTAL
DISC	DISC	F	DISCOUNT ALLOWANCE
TAX	TAX	& *ampersand*	TAX
P	PYMT	/ *slash*	PAYMENT DEPOSIT
VOID	*None*	*None*	AMOUNT TENDERED

Function Key Alpha Codes
& Printed Identities

MODE LOCK FUNCTIONS

Storage Completion

The final operation in the OPEN/X position is performed by touching the TOTAL key. The terminal then prints the following information:

    Transaction Total (always .00)
    Tax accumulation total
    Discount accumulation total
    Cash In Drawer (CID) total
    Sales total.

At the same time, the transaction data is transmitted and the sequencing segment of the transaction number (See 6-1) is increased by one, but the totals are <u>not</u> cleared from the core storage in the Data Terminal.

USASCII Transmission

The consecutive transmission is in USASCII, and the total transaction appears in the following format:

```
STX  P 1 3 2 9    5 2 4 1 1 6 9 ? )  ' 5 2 4 1 1 6 9 &
```
```
4 2 5 F 1 2 5 0 J 1 0 7 7 0 I TRANSACTION TOTAL
```
```
I TAX TOTAL   Y* DISC TOTAL   I CASH TOTAL   I
```
```
SALES TOTAL   ETB
```

*   Y will precede a negative total;
    I precedes a positive total.

Monitoring Totals

Accumulated totals can be monitored during normal business operations. The Mode Lock key must be inserted and then the switch can be returned counter-clockwise to OPEN/X (Position 2). Only the VOID and TOTAL keys should be touched. The four totals will be printed and the transaction transmission will be in the following format:

```
STX  P  TRANSACTION NUMBER  ?  )  I  TRANSACTION TOTAL
```
```
I  TAX TOTAL   Y* DISC TOTAL   I   CASH TOTAL   I
```
```
SALES TOTAL   ETB
```

*   Y will precede a negative total;
    I precedes a positive total.

The key cannot be removed in the OPEN/X position. To resume normal operations, advance the switch clockwise to OPERATE (Position 3). The key can be removed in the OPERATE position.

MODE LOCK FUNCTIONS

POSITION 3 - OPERATE

Normal mode for routine operation. Data may be entered and arithmetic computations completed for business transactions.

Key Movement

The Mode Lock switch can be returned counter-clockwise to OPEN/X (Position 2) or advanced clockwise to CLOSE (Position 4) from OPERATE (Position 3).

Key Removal

The Mode Lock key can be removed and inserted in OPERATE (Position 3).

POSITION 4 - CLOSE

The register totals are printed and cleared automatically. The totals are transmitted in the following format:

| STX | P | TRANSACTION NUMBER | I | TRANSACTION TOTAL ⟩ |

| ⟨I | TAX TOTAL | Y* | DISC TOTAL | I | CASH TOTAL | I⟩ |

| ⟨SALES TOTAL | ETX |

*   Y will precede a negative total;
I precedes a positive total.
DISC TOTAL will normally be a Y (negative).

Key Movement

The Mode Lock switch can only be advanced clockwise to OFF (Position 1) from CLOSE (Position 4).

CAUTION

Transmission will be lost if Mode Lock switch is advanced to OFF (Position 1) while the Transmit Light is ON.

Key Non-Removal

The Mode Lock key cannot be removed in CLOSE (Position 4).

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Section 5

PROGRAMMING THE FUNCTION KEYS

Programming Next Key Illumination and
    Digit Entry Requirements
Disablement of a Function Key
Example of Function Key Programming

PROGRAMMING THE FUNCTION KEYS

PROGRAMMING KEY ILLUMINATION AND ENTRY REQUIREMENTS

The sequence of illumination and the digit entry requirements for each function key (except RE-ENTER) can be programmed by completing the following steps:

   1---Mode Lock switch must be in OPERATE (Position 3).

   2---Insert Program Lock key and rotate switch clockwise to ON (Position 2). The Data Terminal is now in the Programming Mode: CASH, CHARGE, and OTHER keys are illuminated, and every function key (except RE-ENTER) is ready to be programmed.

   3---Enter the selected nine-digit code for the function key to be programmed.

   4---Read the display and verify the digital entry.

   5---Touch the function key to be programmed. The digital entry followed by the function key identity are printed.

   6---Repeat Steps 3, 4, 5 for every function key that is to be programmed.

   7---Rotate the Program Lock switch counter-clockwise to OFF (Position 1) and remove the key from the Program Lock. (Leave the Mode Lock switch in OPERATE [Position 3].)

   8---Touch the TOTAL key. The Data Terminal is now in the Operate Mode ready to accept business transactions. Only the SALESPERSON key is illuminated (when Data Terminal is programmed as shown in Section 5-4 Example).

Limits to Programming the Function Keys

Normal status of the Data Terminal includes the following programming limits:

RE-ENTER key cannot be re-programmed.

The digit entry must <u>precede</u> touching the function key.

In the following three pairs of function keys, the last programmed key of each pair establishes the program for both keys of the pair:

TOTAL	TAX	ADD AMOUNT
VOID	DISCOUNT ALLOWANCE	SUBTRACT AMOUNT

Function keys can be programmed in any order.

Any number of function keys can be re-programmed without altering the programs of the other keys.

PROGRAMMING THE FUNCTION KEYS

Digit Entry Functions

The nine-digit entry programs the following basic functions:

FIRST DIGIT	KEY/S ILLUMINATED FOR NEXT FUNCTION
1	SALESPERSON
2	CASH CHARGE OTHER
3	ACCOUNT NUMBER
4	DEPT/CLASS
5	MDSE CODE NON-MDSE CODE
6	ADD AMOUNT SUBTRACT AMOUNT OTHER
7	DEPT/CLASS MDSE CODE NON-MDSE CODE
8	VOID
9	ADD AMOUNT SUBTRACT AMOUNT

* 10 in second and third digit positions must be followed by six zeros (000000) in the last six digit positions (see Key Disablement, 5-4)

2ND AND 3RD DIGITS	10* 11 12 13 14 15 16 17 18 19 56 57 58 59
MAX. DIGITS ACCEPTED	0 1 2 3 4 5 6 7 8 9 10 11 12 13
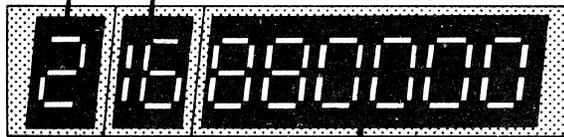
LAST SIX DIGITS	ENTRY AND CHECK REQUIREMENTS
000000	DIGITS NOT REQUIRED
880000	DIGIT ENTRY REQUIRED
888800	DIGITS MUST BE ENTERED AND HAVE A CHECK DIGIT (least significant) TO VERIFY THE NUMBER WITH "DOUBLE-ADD-DOUBLE" WEIGHTING, MODULUS TEN.
888888	DIGITS MUST BE ENTERED AND HAVE A CHECK DIGIT (least significant) TO VERIFY THE NUMBER WITH ARITHMETIC WEIGHTING, MODULUS ELEVEN.

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PROGRAMMING THE FUNCTION KEYS

Illuminating the Function Keys

> The first programming digit entered establishes which function key/s will be illuminated for the next operation of a transaction.
>
> The following seven (7) function keys cannot be programmed to be illuminated:
>
>   RE-ENTER
>   QUANTITY
> * TAX
> * DISCOUNT ALLOWANCE
>   PAYMENT DEPOSIT
>   SUBTOTAL
>   AMOUNT TENDERED
> * TOTAL
>
> * See Sec. 4-2, Storing Variables, for special illumination.

Limiting the Length of the Digital Entry

> The second and third digits entered determine the maximum number of transaction digits that will be accepted with that function key. This will not preclude entering fewer transaction digits.
>
> NOTE----The entry of 10 in the second and third digit positions prevents the entry of any transaction digits and must therefore be followed by six zeros in the last six positions (See Disablement Of A Function Key below).

Digital Entry & Checking Requirements

> The last six digits entered establish whether or not any transaction digits will be required, and if digits are required whether the modulus ten, modulus eleven, or no checking method will be used.

DISABLEMENT OF A FUNCTION KEY

> Program code X10880000 will disable a function key ("X" may be any first programming digit). The second and third digits (10) permit the entry of no transaction digits while at the same time the last six digits (880000) require the entry of one or more transaction digits. Therefore, with the Mode Lock in OPERATE (Position 3), touching a function key whose program is X10880000 will always turn ON the RE-ENTER light.

PROGRAMMING THE FUNCTION KEYS

EXAMPLE OF FUNCTION KEY PROGRAMMING

Programming Example

An example of programming the function keys for illumination and operational sequence is shown on the page opposite.

Printout of Programming Example

The printout of the programming example on the opposite page is shown below:

	FUNCTION KEYS
110000000 +T	TOTAL
216880000 EMP	SALESPERSON
712000000 CA	CASH
312880000 CH	CHARGE
712880000 X	OTHER
756888800 ACCT	ACCOUNT NUMBER
710000000 ME	CREDIT CHECK
514880000 DEPT	DEPT/CLASS
714880000 QTY	QUANTITY
918880000 MDSE	MDSE CODE
618880000 MISC	NON-MDSE CODE
716000000 +	ADD AMOUNT
710000000 +S	SUBTOTAL
914000000 TAX	TAX
916000000 P	PAYMENT DEPOSIT
115880000 VOID	AMOUNT TENDERED

1858   12345008   .00+T

3 18 70

FRIDEN

DIGIT ENTRY	KEY PROGRAMMED	KEYS TO BE ILLUMINATED	MAX. NUMBER OF DIGITS TO BE ACCEPTED
1 10 000000	VOID TOTAL*	SALESPERSON	*No digits*
2 16 880000	SALESPERSON	CASH CHARGE OTHER	6 digits
7 12 000000	CASH	DEPT/CLASS MDSE CODE NON-MDSE CODE	2 digits
3 12 880000	CHARGE	ACCOUNT NUMBER	2 digits
7 12 880000	OTHER	DEPT/CLASS MDSE CODE NON-MDSE CODE	2 digits
7 56 888800	ACCOUNT NUMBER	DEPT/CLASS MDSE CODE NON-MDSE CODE	10 digits
7 10 000000	CREDIT CHECK	DEPT/CLASS MDSE CODE NON-MDSE CODE	*No digits*
5 14 880000	DEPT/CLASS	MDSE CODE NON-MDSE CODE	4 digits
7 14 880000	QUANTITY	DEPT/CLASS MDSE CODE NON-MDSE CODE	4 digits
9 18 880000	MDSE CODE	ADD AMOUNT SUBTRACT AMT	8 digits
6 18 880000	NON-MDSE CODE	ADD AMOUNT SUBTRACT AMT OTHER	8 digits
7 16 000000	ADD AMOUNT * SUBTRACT AMT	DEPT/CLASS MDSE CODE NON-MDSE CODE	6 digits
7 10 000000	SUBTOTAL	DEPT/CLASS MDSE CODE NON-MDSE CODE	*No digits*
9 14 000000	DISCOUNT ALLOW. TAX*	ADD AMOUNT SUBTRACT AMT	4 digits
9 16 000000	PAYMENT DEPOSIT	ADD AMOUNT SUBTRACT AMT	6 digits
1 15 880000	AMOUNT TENDERED	SALESPERSON	5 digits

*Programming the * key programs the other key of that pair.
(See Section 5-1, Limits to Programming the Function Keys)

Function Key Programming Example

Section 6

DATA TERMINAL OPERATION

DATA TERMINAL OPERATION

NORMAL OPERATING MODE OF THE DATA TERMINAL

OPERATE (Position 3) of the Mode Lock Switch places the Data Terminal under control of the programmed function keys and therefore in the normal mode for business transactions.

Illumination of the Function Keys

VOID and TOTAL key programming establishes which key/s will be illuminated at the "start of the business day" and at the end of each transaction. (Ref: Sec 5.)

Digit Entries for Transactions

Digit entries can be made at any time <u>except</u> when the RE-ENTER key is illuminated or the TRANSMIT light is on.

In most cases, a digit entry must <u>precede</u> the use of a function key.

Display of Digit Entries

When a digit key is touched, any numbers in the display move to the left one position and the number of the digit key touched appears in the rightmost (first) position of the display. (Ref: Sec. 3-2, Digital Display.)

Validity Check of Digital Entries

When a function key is programmed for digit checking, the digital entry proceding the use of that function key will be checked in accordance with its programmed requirements when that function key is touched. (Ref: Sec. 5-2, Digit Checking.)

When the digital entry does not meet the programmed requirements, the RE-ENTER key is illuminated and existing keyboard lights are turned off.

Touching the RE-ENTER key turns off its light and cancels all operations made since the last function key was touched and the operator can now re-make the digital entry.

Function Key Operations

When any function key is touched (except the RE-ENTER key) the following operations are performed:

    1---Digital entry is checked if programmed to be checked.

    2---Arithmetic is performed if required.

PRINTED IDENTITIES		ALPHA CODE STORED IN TTA	FUNCTION KEY TOUCHED
PROGRAMMING SWITCH ON	PROGRAMMING SWITCH OFF		
None	*None*	*None*	RE-ENTER
ID	.VOID	) *close paren.*	VOID
+T	+T -T	I *POSITIVE TOTAL* Y *NEGATIVE TOTAL*	TOTAL
EMP	EMP	' *apostrophe*	SALESPERSON
CA	CA	J	CASH
CH	CH	K	CHARGE
X	MEMO	. *period*	OTHER *ON with* CASH & CHARGE
	MEMO	, *comma*	OTHER *ON with* ADD AMOUNT & SUBTRACT AMT
ACCT	ACCT	*space*	ACCOUNT NUMBER
ME	* *digit* * *minus* * *period*	Z *digit/minus/period* *(See Sec. 6-11)*	CREDIT CHECK
DEPT	DEPT	$ *dollar sign*	DEPT/CLASS
QTY	QTY	% *percent sign*	QUANTITY
MDSE	MDSE	" *quotation marks*	MDSE CODE
MISC	MISC	# *number sign*	NON-MDSE CODE
+ *plus sign*	EA *and* +	L	ADD AMOUNT
- *minus sign*	EA *and* -	\ *reverse slant*	SUBTRACT AMT
+S	+S *or* -S	*None*	SUBTOTAL
DISC	DISC	F	DISCOUNT ALLOWANCE
TAX	TAX	& *ampersand*	TAX
P	PYMT	/ *slash*	PAYMENT DEPOSIT
VOID	*None*	*None*	AMOUNT TENDERED

Function Key Alpha Codes

& Printed Identities

3---The alpha code for that key (see opposite) is stored in the Transaction Transmission Area (TTA) of the magnetic core memory followed by the associated digital entry (except, not after use of the RE-ENTER, SUBTOTAL, and AMOUNT TENDERED keys).

4---If the function key was illuminated, its light is turned off.

5---The stored and/or entered data are printed, except for the following four DELAYED PRINT function keys:

    SALESPERSON
    PAYMENT DEPOSIT
    DISCOUNT ALLOWANCE
    TAX

REFERENCE: Section 8, Printing Conventions

6---The next-use function keys programmed to be illuminated will be turned ON.

TRANSACTION NUMBER

The Transaction Number is composed of a four-digit sequencing segment followed by a nine- (or less) digit Terminal Identification. All blanks to the left of the Terminal ID (within the nine position segment) are printed as spaces.

Four (4) digit sequencing segment of the Transaction Number

Nine (9) digit Terminal ID

2973   56789 VOID   VOID
      3 18 70

FRIDEN
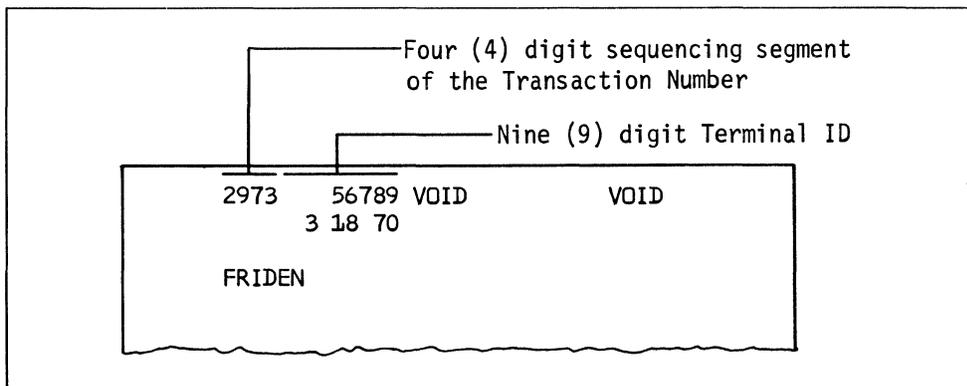
When either the VOID key or the TOTAL key is touched, both segments of the Transaction Number are printed and then the four-digit sequencing segment is advanced one unit. After the sequencing number prints 9999 it is advanced one unit and will next print 0000.

The sequencing segment of the Transaction Number cannot be altered or programmed.

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DATA TERMINAL OPERATION

Terminal Identification Number

> The Terminal ID is a nine- (or less) digit number that is printed in the nine position segment of the Transaction Number. All blanks to the left of the Terminal ID will be printed as spaces.
>
> Alteration of the Terminal ID number can be made by the procedure outlined in Section 4-2, Storing Variables.

TRANSMIT LIGHT 'ON'

Keyboard Use

> The keyboard should not be used while the TRANSMIT LIGHT is ON. During the time the light is on, the terminal is transmitting transaction data or a credit inquiry.

Non-Use Time

> Transmission period is usually less than two (2) seconds, although heavy activity may extend the time to 15 seconds.

DATA TERMINAL OPERATION
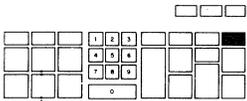
RE-ENTER KEY

Functional Conditions

RE-ENTER key is functional when digits are displayed, and/or when RE-ENTER key is illuminated.

Light is turned ON in the RE-ENTER key whenever a 14th digit is entered, OR by a programmed function key after one of the following errors have occurred:

    ----No digits entered when digit entry is required
    ----Digits entered when no digits can be accepted
    ----Number of digits entered exceeds number to be accepted
    ----Digital entry does not meet digit checking requirement
    ----Disabled function key was touched (See Sec. 5-3, DISABLEMENT OF A FUNCTION KEY)
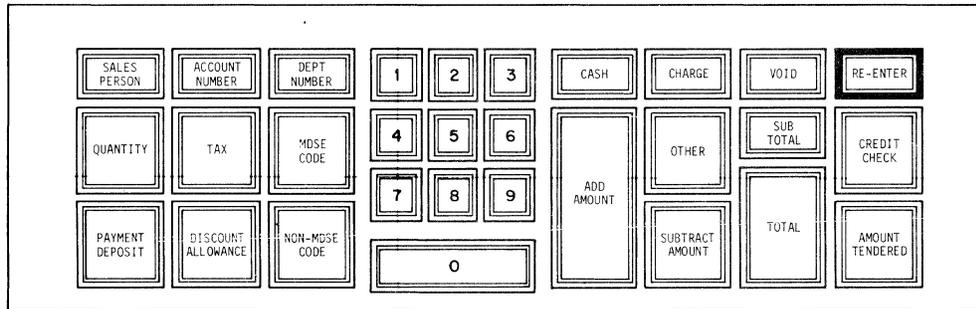
TTA Contribution

None

Totals Accumulation

None

Special Notations

The keyboard is locked mechanically while the RE-ENTER key is illuminated, except, AMOUNT TENDERED and CREDIT CHECK keys are mechanically free, but functionally inoperative.

Touching the unilluminated RE-ENTER key cancels any current digital entry, erases the digital display, and re-starts the current function.

Touching the illuminated RE-ENTER key turns OFF the RE-ENTER light, cancels any digital entry, erases the digital display, re-illuminates the currently available function keys, and re-starts the current function.

DATA TERMINAL OPERATION

VOID KEY

Functional Conditions

VOID key is not illuminated*. To be functional, one of the following sets of keys must be illuminated*:

* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the VOID key causes alpha code) (close parenthesis) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by the Communication Code ETB. The transaction is transmitted.

EXAMPLE

Digit Entry	None
Key Touched	VOID
TTA Contribution	) ETB
Print (on form)	Transaction No. VOID
.	Date
.	LOGO

Totals Accumulation

None

Special Notations

When the VOID key is touched, the following functions are performed:

1---Content of TTA is transmitted to the storage unit.
2---Cash Drawer is opened.
3---Sequencing segment of the transaction number is increased by one unit.
4---SALESPERSON key is illuminated when Data Terminal is programmed as shown in Section 5-4 Example.

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DATA TERMINAL OPERATION

SALESPERSON KEY

Functional Conditions

SALESPERSON key must be illuminated to be functional. Light in the key is turned ON by the VOID* key or the TOTAL* key.
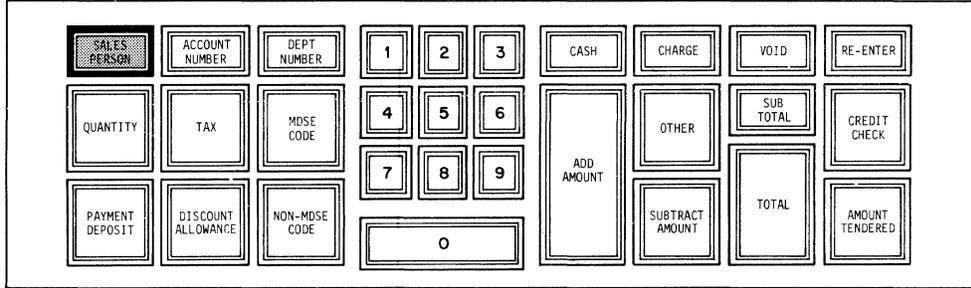
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the SALESPERSON key causes alpha code ' (apostrophe) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by any digit/s (employee number) entered prior to touching the SALESPERSON key.

EXAMPLE

```
Digit Entry         16654
Key Touched         SALESPERSON
TTA Contribution    ' 1 6 6 5 4
Print (on form)     Delayed Print
  .                 (16654 EMP will be printed
  .                            after touching the
  .                            next function key)
```

Totals Accumulation

None

Special Notations

This is a DELAYED PRINT key.

The next function key touched should **not** be one of the following:

VOID	SUBTRACT AMOUNT	TAX
ACCOUNT NUMBER	SUBTOTAL	PAYMENT DEPOSIT
ADD AMOUNT	DISCOUNT ALLOWANCE	TOTAL

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DATA TERMINAL OPERATION
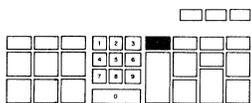
CASH KEY

Functional Conditions

CASH key must be illuminated to be functional. Light in the key is turned ON by the SALESPERSON* key.
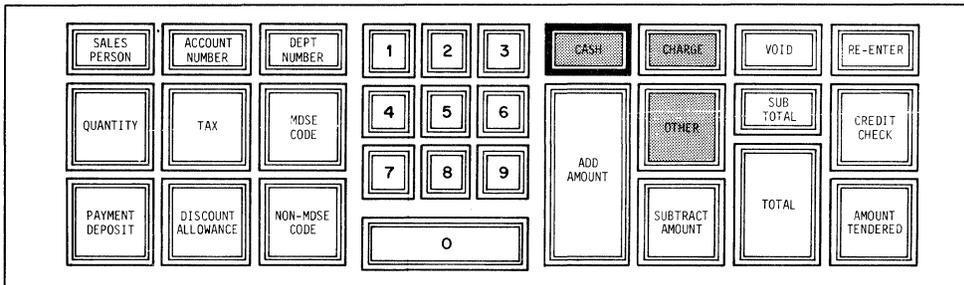
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the CASH key causes alpha code J to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by any digit/s entered prior to touching the CASH key.

EXAMPLE

Digit Entry	None
Key Touched	CASH
TTA Contribution	J
Print (on form)	16654 EMP CA
.	(16654 EMP was entered but was
.	not printed by
.	touching the SALESPERSON key)

Totals Accumulation

None. See Special Notations below.

Special Notations

Sets up condition to cause amounts entered in subsequent functions to be accumulated in Temporary Cash Total; except, amounts entered after touching the PAYMENT DEPOSIT key will not be accumulated in the Temporary Cash Total.

DATA TERMINAL OPERATION
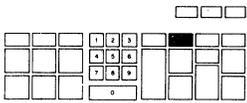
CHARGE KEY

Functional Conditions

CHARGE key must be illuminated to be functional. Light in the key is turned ON by the SALESPERSON* key.

SALES PERSON	ACCOUNT NUMBER	DEPT NUMBER	1	2	3	CASH	CHARGE	VOID	RE-ENTER
QUANTITY	TAX	MDSE CODE	4	5	6		OTHER	SUB TOTAL	CREDIT CHECK
			7	8	9	ADD AMOUNT		TOTAL	
PAYMENT DEPOSIT	DISCOUNT ALLOWANCE	NON-MDSE CODE	0				SUBTRACT AMOUNT		AMOUNT TENDERED
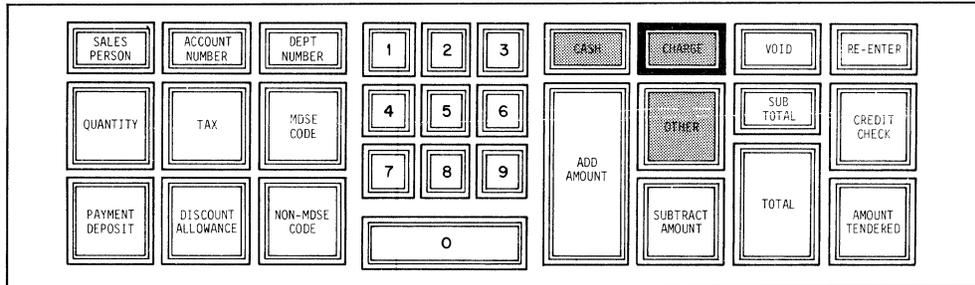
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the CHARGE key causes alpha code K to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by any digit/s entered prior to touching the CHARGE key.

EXAMPLE

```
Digit Entry        3  (code number for type of
.                      charge)
Key Touched        CHARGE
TTA Contribution   K 3
Print (on form)    16654 EMP      3 CH
.                 (16654 EMP was entered but was
.                            not printed by
.                            touching the SALESPERSON key)
```

Totals Accumulation

None. See Special Notations Below.

Special Notations

Sets up condition to prevent amounts entered in subsequent functions from being accumulated in Temporary Cash Total, except for the entry made after touching the PAYMENT DEPOSIT key.

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DATA TERMINAL OPERATION
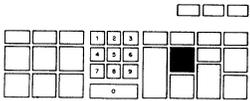
OTHER KEY - Illuminated With CASH And CHARGE Keys

Functional Conditions

OTHER key must be illuminated to be functional. Light is
turned ON by the SALESPERSON* key. (See also Section 6-10,
OTHER KEY - Illuminated With ADD and SUBTRACT Keys.)
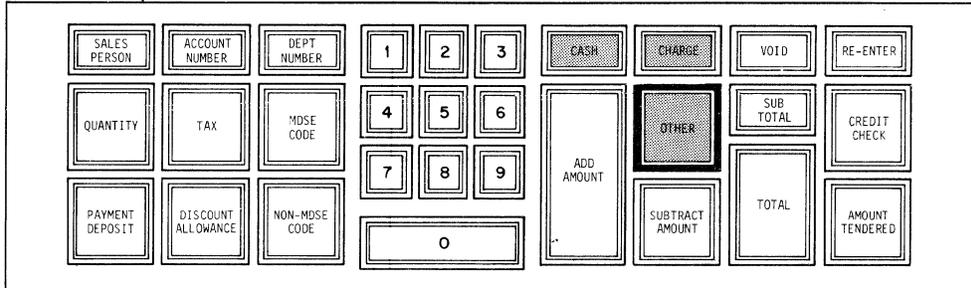
SALES PERSON	ACCOUNT NUMBER	DEPT NUMBER	1	2	3	CASH	CHARGE	VOID	RE-ENTER
QUANTITY	TAX	MDSE CODE	4	5	6		OTHER	SUB TOTAL	CREDIT CHECK
			7	8	9	ADD AMOUNT		TOTAL	
PAYMENT DEPOSIT	DISCOUNT ALLOWANCE	NON-MDSE CODE		0			SUBTRACT AMOUNT		AMOUNT TENDERED

* When Data Terminal is programmed as shown in Section 5-4
  Example.

TTA Contribution

Touching the OTHER key after it has been turned ON by the
SALESPERSON key causes alpha code . (period) to be stored
in the next available location in the TTA (Transaction
Transmission Area) of the core memory, followed by any
digit/s entered prior to touching the OTHER key.

EXAMPLE

```
Digit Entry          27    (a transaction code,
.                              not cash/charge)
Key Touched          OTHER
TTA Contribution     2 7
Print  (on form)     16654 EMP         27 MEMO
.                    (16654 EMP was entered but was
.                                    not printed by
.                                    touching the SALESPERSON key)
```

Totals Accumulation

None. See Special Notations below.

Special Notations

Sets up condition to prevent amounts entered in subsequent
functions from being accumulated in Temporary Cash Total,
except for the entry made after touching the PAYMENT
DEPOSIT key.

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DATA TERMINAL OPERATION
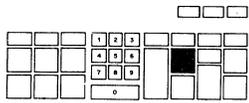
OTHER KEY - Illuminated With ADD and SUBTRACT Keys

Functional Conditions

OTHER key must be illuminated to be functional. Light is turned ON by the NON-MDSE CODE* key. (See also Section 6-9, OTHER KEY - Illuminated With CASH and CHARGE Keys.)
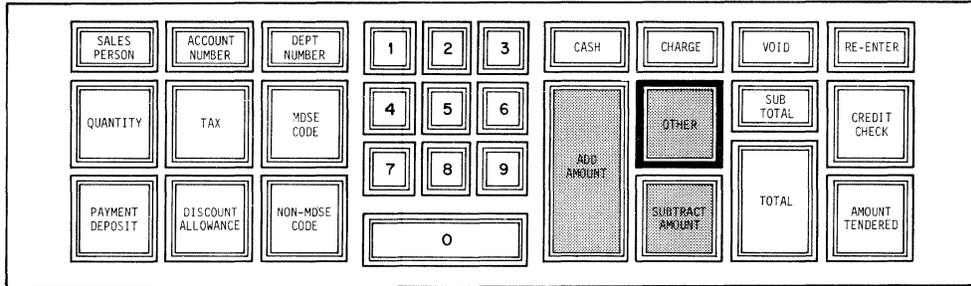
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the OTHER key after it has been turned ON by the NON-MDSE CODE key causes alpha code , (comma) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by any digit/s entered prior to touching the OTHER key.

EXAMPLE

Digit Entry	15 (a non-mdse code)
Key Touched	OTHER
TTA Contribution	1 5
Print (on form)	15 MEMO

Totals Accumulation

None

Special Notations

None

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DATA TERMINAL OPERATION
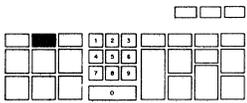
ACCOUNT NUMBER KEY

Functional Conditions

ACCOUNT NUMBER key must be illuminated to be functional. Light in the key is turned ON by the CHARGE* key.
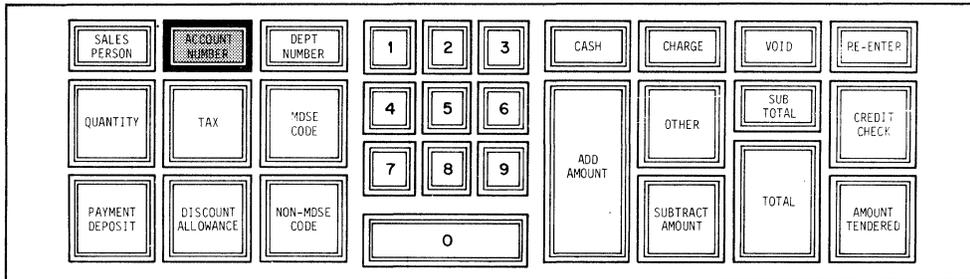
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the ACCOUNT NUMBER key causes alpha code SP (space) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by any valid combination of digits entered prior to touching the ACCOUNT NUMBER key.

EXAMPLE

Digit Entry	73329534
Key Touched	ACCOUNT NUMBER
TTA Contribution	SP 7 3 3 2 9 5 3 4
Data Terminal	
. Transmission	STX SP 7 3 3 2 9 5 3 4 ETB
Line Concentrator	
. Reply	ACK ?
Print* (on form)	73329534 ACCT

* Prints immediately only when there is no credit check
. or when credit is unmodified.

Totals Accumulation

None

Special Notations

RE-ENTER key will be illuminated, after the ACCOUNT NUMBER key is touched, when an invalid account number has been entered (See Section 5-4 Programming Function Keys).

CREDIT CHECK key will be illuminated, after ACCOUNT NUMBER
key is touched, when any of the following conditions occur:

    1---Data Terminal cannot contact Line Concentrator (-
       displayed)
    2---Line Concentrator cannot contact Disc (. displayed)
    3---Account number is found on Disc (a digit, 0 - 9
       displayed).

Data Terminal will be inoperative until Line Concentrator
responds or CREDIT CHECK light is turned ON.

DATA TERMINAL OPERATION
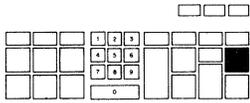
CREDIT CHECK KEY

Functional Conditions

CREDIT CHECK key must be illuminated to be functional. After using the ACCOUNT NUMBER key, the light in the CREDIT CHECK key is turned ON when one of the following system conditions occur:

    1---Data Terminal cannot contact Line Concentrator (- displayed)

    2---Line Concentrator cannot contact Disc (. displayed)

    3---Account number is found on Disc (a digit, 0 - 9 displayed).
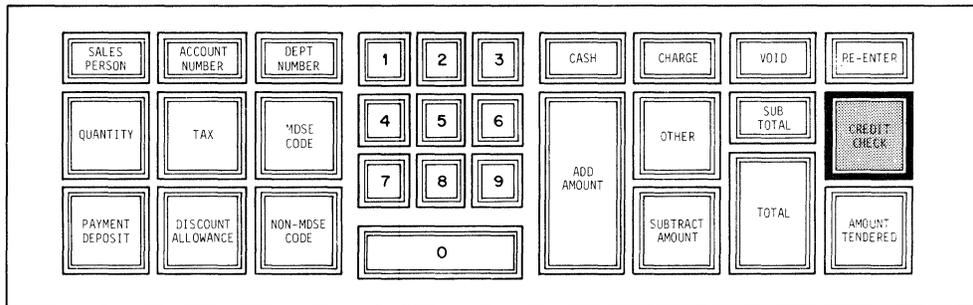
TTA Contribution

Touching the CREDIT CHECK key causes alpha code Z to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by a - (minus) from the Data Terminal, or a . (period) or a digit from the Line Concentrator.

EXAMPLE

ACCOUNT NUMBER Key Transmission	STX SP 7 3 3 2 9 5 3 4 ETB		
System Condition	1	2	3
Line Concen. Reply	None	ACK .	ACK 7
Data Terminal Display	- (minus)	. (period)	7 (digit 0 9)
Digit Entry	None	None	None
Key Touched	CREDIT CHECK	CREDIT CHECK	CREDIT CHECK
TTA Contribution	Z -	Z .	Z 7
Print (on form)	73329534 ACCT *-	73329534 ACCT *.	73329534 ACCT *7

Totals Accumulation

None

Special Notations

None

DATA TERMINAL OPERATION
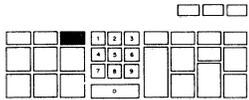
DEPT/CLASS KEY

Functional Conditions

DEPT/CLASS key must be illuminated to be functional. Light in the key is turned ON by any of the following* keys:
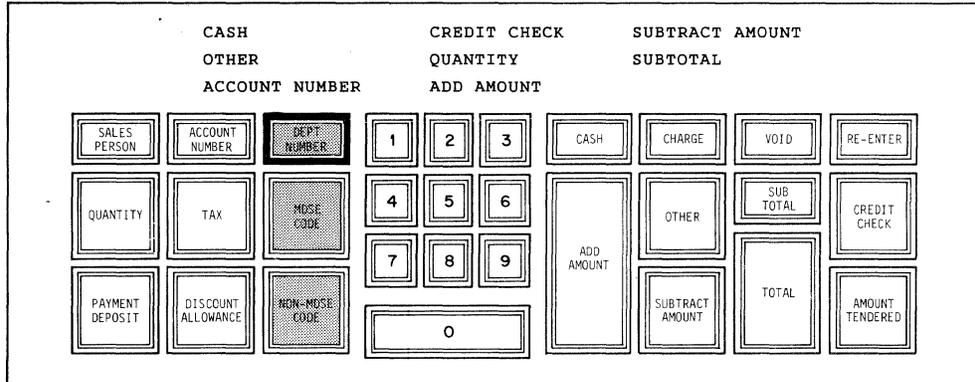
CASH   CREDIT CHECK   SUBTRACT AMOUNT
OTHER   QUANTITY   SUBTOTAL
ACCOUNT NUMBER ADD AMOUNT

* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the DEPT/CLASS key causes alpha code $ (dollar sign) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory followed by any digit/s entered prior to touching the DEPT/CLASS key.

EXAMPLE

Digit Entry	542
Key Touched	DEPT/CLASS
TTA Contribution	$ 5 4 2
Print (on form)	542 DEPT

Totals Accumulation

None

Special Notations

When DEPT/CLASS key is programmed with a first digit* 6 or 9, the following dollar entries will be added to the Temporary Sales Total after touching the ADD AMOUNT key (dollar entries will be subtracted from the Temporary Sales Total after touching the SUBTRACT AMOUNT key).

* See Section 5-2, Digit Entry Functions.

DATA TERMINAL OPERATION
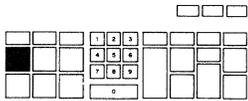
QUANTITY KEY

Functional Conditions

QUANTITY key is never illuminated. To be functional one of the following* sets of keys must be illuminated:
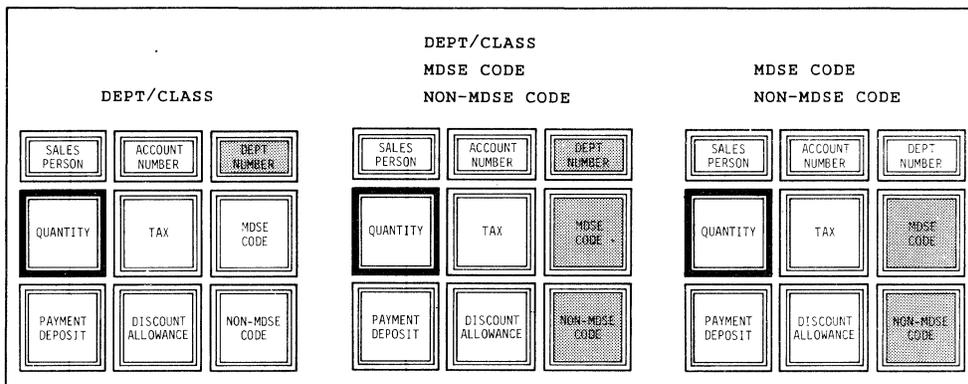
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the QUANTITY key causes alpha code % (percent sign) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by any digit/s entered prior to touching the QUANTITY key.

EXAMPLE

Digit Entry	4
Key Touched	QUANTITY
TTA Contribution	% 4
Print (on form)	4 QTY

Totals Accumulation

None

Special Notations

A maximum of four (4) digits can be entered.

The digits entered with the QUANTITY key are stored in the Multiplier Area of core memory.

DATA TERMINAL OPERATION
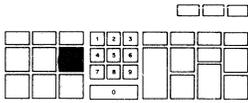
MDSE CODE KEY

Functional Conditions

MDSE CODE key must be illuminated to be functional. Light in the key is turned ON by one of the following* keys:

```
CASH              QUANTITY
OTHER             ADD AMOUNT
ACCOUNT NUMBER    SUBTRACT AMOUNT
CREDIT CHECK      SUBTOTAL                              DEPT/CLASS
```
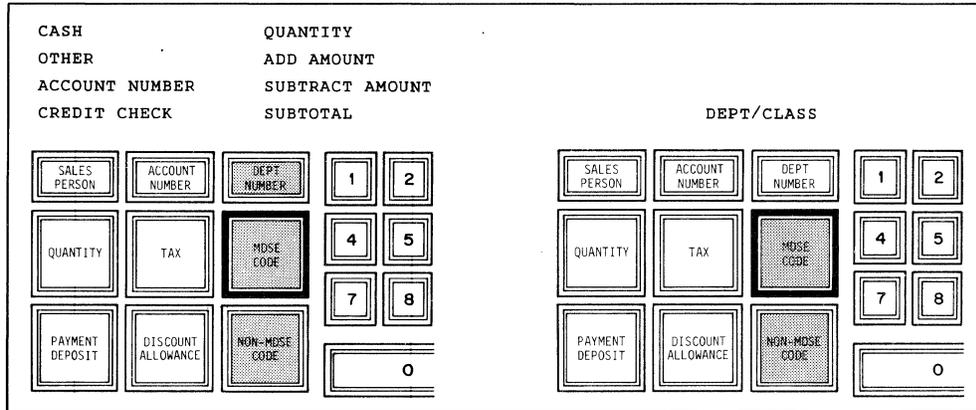

* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the MDSE CODE key causes alpha code " (quotation mark) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by any digit/s entered prior to touching the MDSE CODE key.

EXAMPLE

```
Digit Entry        726354
Key Touched        MDSE CODE
TTA Contribution   " 7 2 6 3 5 4
Print (on form)    726354  MDSE
```

Totals Accumulation

None

Special Notations

When MDSE CODE key is programmed with a first digit* 6 or 9, the following dollar entries will be added to the Temporary Sales Total after touching the ADD AMOUNT key (dollar entries will be subtracted from the Temporary Sales Total after touching the SUBTRACT AMOUNT Key.

DATA TERMINAL OPERATION
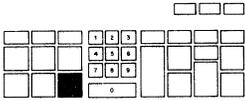
NON-MDSE CODE KEY

Functional Conditions

NON-MDSE CODE key must be illuminated to be functional. Light in the key is turned ON by one of the following* keys:

CASH	QUANTITY
OTHER	ADD AMOUNT
ACCOUNT NUMBER	SUBTRACT AMOUNT
CREDIT CHECK	SUBTOTAL

DEPT/CLASS
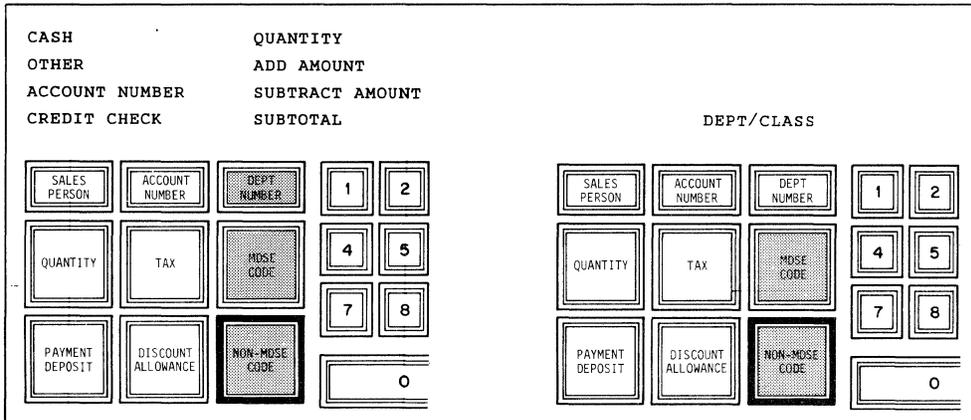
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the NON-MDSE CODE key causes alpha code (number symbol) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory, followed by any digit/s entered prior to touching the NON-MDSE CODE key.

EXAMPLE

Digit Entry	1341516
Key Touched	NON-MDSE CODE
TTA Contribution	1 3 4 1 5 1 6
Print (on form)	1341516 MISC

Totals Accumulation

None

Special Notations

When NON-MDSE CODE key is programmed with a first digit* 6 or 9, the following dollar entries will be added to the Temporary Sales Total after touching the ADD AMOUNT key (dollar entries will be subtracted from the Temporary Sales Total after touching the SUBTRACT AMOUNT key).

* See Section 5-2, Digit Entry Functions.

DATA TERMINAL OPERATION
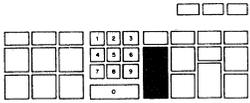
ADD AMOUNT KEY

Functional Conditions

ADD AMOUNT key must be illuminated to be functional. Light in the key is turned ON by one of the following* keys:

MDSE CODE   DISCOUNT ALLOWANCE

NON-MDSE CODE   PAYMENT DEPOSIT   TAX
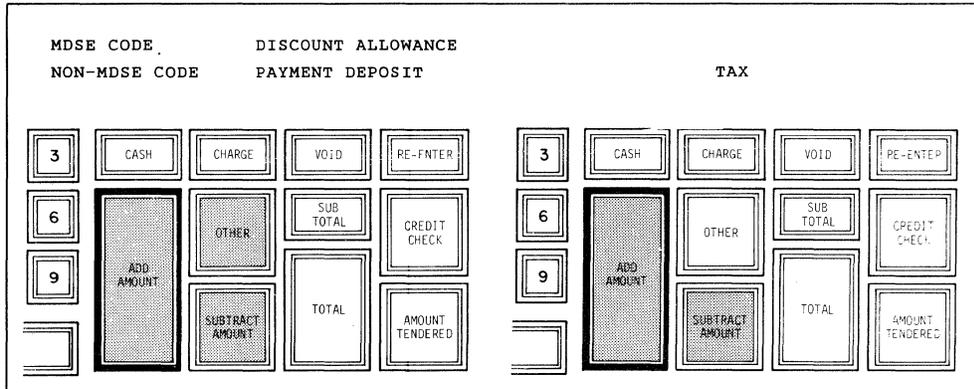
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

Touching the ADD AMOUNT key causes alpha code L to be stored in the next available location in the TTA (Transaction Transmission Area) of core memory, followed by the digits entered prior to touching the ADD AMOUNT key followed by another alpha code L and the amount printed in the right-hand column (on form).

EXAMPLE

Digit Entry	None	3 (quantity)	None (stored 5%)
Key Touched	MDSE CODE or	MDSE CODE or	TAX
	NON-MDSE CODE	NON-MDSE CODE	
Digit Entry	295 (price)	295 (price each)	None (stored 5%)
Key Touched	ADD AMOUNT	ADD AMOUNT	ADD AMOUNT
TTA Contribution	L 2 9 5 L 2 9 5	L 2 9 5 L 8 8 5	& L L 4 4
Print (on form)	2.95 EA 2.95+	2.95 EA 8.85+	5.00% TAX .44+

	Non-Prog. Tax %	Fixed $ Tax
Digit Entry	400 (4% tax)	None
Key Touched	TAX	TAX
TTA Contribution	& 4 0 0	&

	Non-Prog. Tax %	Fixed $ Tax
Digit Entry	None	572 (Fixed $ tax)
Key Touched	ADD AMOUNT	ADD AMOUNT
TOTAL TTA Contrib.	& 4 0 0 L L 4 4 6	& L 5 7 2 L 5 7 2
Print (on form)	4.00% TAX 4.46+	TAX 5.72+

*   Example is based on the purchase of four tires $27.88 each
     sent to a state with a 4% tax; Federal tax is $1.43 per tire.

DATA TERMINAL OPERATION

Totals Accumulation

The unit price entered prior to touching the ADD AMOUNT key, or the extension*, is accumulated in the Transaction Total, the Temporary Sales Total, and in the Temporary Cash Total (CASH sales only).

The tax amount printed after touching the ADD AMOUNT key is accumulated in the Transaction Total, Temporary Tax Total, and in the Temporary Cash Total (CASH sales only).

Discount amount printed after touching the ADD AMOUNT key is accumulated in the Transaction Total, Temporary Discount Total, and in the Temporary Cash Total (CASH sales only).

The Payment Deposit Amount printed after touching the ADD AMOUNT key is accumulated in the Transaction Total, and in the Temporary Cash Total (CHARGE sales only).

See opposite page for a tabular Flowchart of Totals Accumulations.

*   Extension   Quantity times price.

Special Notations

A maximum of seven (7) digits can be entered.

A maximum of seven (7) digits can be <u>accumulated</u> in any of the totals.

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Totals Accumulation after touching the ADD AMOUNT key or the SUBTRACT AMOUNT key is controlled by the key used immediately preceding as is shown in the following tabulation:

DEPT/CLASS C MDSE CODE K NON-MDSE CODE R	TAX J	DISC ALLOW Q	PAY'T DEP. P	ANY OTHER KEY (except C K R J O P)
Touch ADD AMOUNT or SUBTRACT AMOUNT	Touch ADD AMOUNT or SUBTRACT AMOUNT	Touch ADD AMOUNT or SUBTRACT AMOUNT	Touch ADD AMOUNT or SUBTRACT AMOUNT	Touch ADD AMOUNT or SUBTRACT AMOUNT
Accumulate Printed Amt in Transaction Total	Accumulate Printed Amt in Transaction Total	Accumulate Printed Amt in Transaction Total	Accumulate Printed Amt in Transaction Total	Accumulate Printed Amt in Transaction Total
Accumulate Printed Amt in Temp. CKR Total				
	Accumulate Printed Amt in Temp. J Total			
		Accumulate Printed Amt in Temp. Q Total		
Write Printed Amt in Last Amt Printed Buffer	Write Printed Amt in Last Amt Printed Buffer	Write Printed Amt in Last Amt Printed Buffer	Write Printed Amt in Last Amt Printed Buffer	Write Printed Amt in Last Amt Printed Buffer
CHARGE & OTHER Sales End Here	CHARGE & OTHER Sales End Here	CHARGE & OTHER Sales End Here	CASH Sales End Here	CHARGE & OTHER Sales End Here
CASH Sales Include:	CASH Sales Include:	CASH Sales Include:	CHARGE & OTHER Sales Include: Change Sign +/-	CASH Sales Include:
Accumulate Printed Amt in Temp. P Total	Accumulate Printed Amt in Temp. P Total	Accumulate Printed Amt in Temp. P Total	Accumulate Printed Amt in Temp. P Total	Accumulate Printed Amt in Temp. P Total

DATA TERMINAL KEYBOARD

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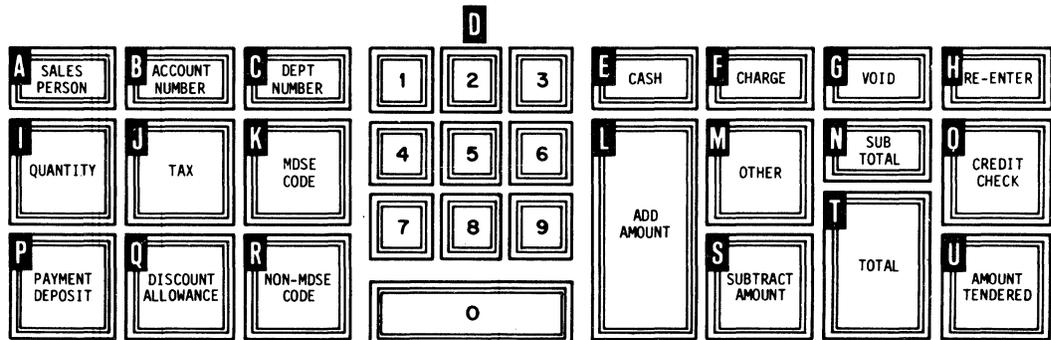
DATA TERMINAL OPERATION
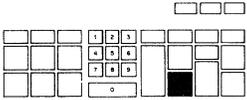
SUBTRACT AMOUNT KEY

Functional Conditions

SUBTRACT AMOUNT key must be illuminated to be functional.
Light in the key is turned ON by one of the following*
keys:

| MDSE CODE | DISCOUNT ALLOWANCE | TAX |
| NON-MDSE CODE | PAYMENT DEPOSIT | |
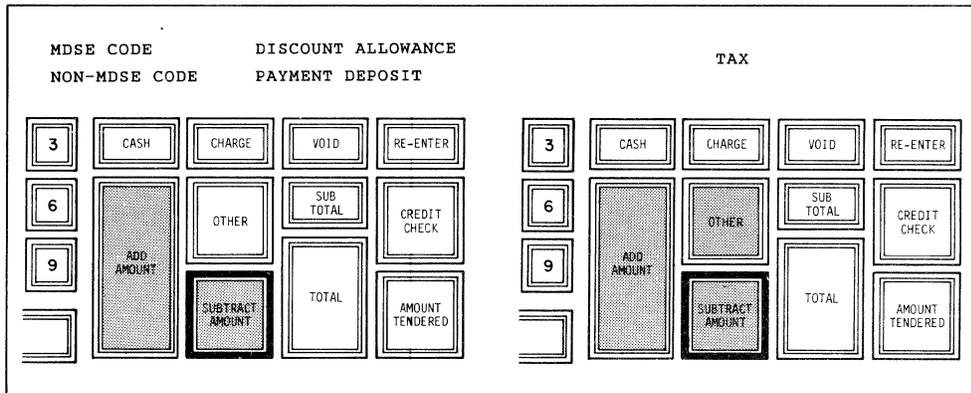
* When Data Terminal is programmed as shown in Section 5-4
  Example.

TTA Contribution

Touching the SUBTRACT AMOUNT key causes alpha code X
(reverse slant) to be stored in the next available location
in the TTA (Transaction Transmission Area) of core memory,
followed by the digits entered prior to touching the
SUBTRACT AMOUNT key followed by another alpha code x
(reverse slant) and the amount printed in the right-hand
column (on form).

EXAMPLE

Digit Entry	52 (Pay't Deposit Code)	None (stored 10%)
Key Touched	PAYMENT DEPOSIT	DISCOUNT ALLOWANCE
TTA Contribution	/ 5 2	F

Digit Entry	500 ($5.00 deposit)	None (stored 10%)
Key Touched	SUBTRACT AMOUNT	SUBTRACT AMOUNT
TOTAL TTA Contrib.	/ 5 2 5 0 0 5 0 0	F 1 2 0*
Print (on form)	52 PYMT 5.00-	10.00% DISC 1.20-

* 1.20 is 10% of a $12.00 purchase.

Examples of SUBTRACT AMOUNT key use with unprogrammed discount allowance
percent and fixed dollar discount allowance are shown on the opposite page.

	Non-Stored Disc. Allow. %	Fixed $ Amount
Digit Entry	1500	23 (Disc. Allow. Code)
Key Touched	DISCOUNT ALLOWANCE	DISCOUNT ALLOWANCE
TTA Contribution	F 1 5 0 0	F 2 3

Digit Entry	None	250 ($2.50)
Key Touched	SUBTRACT AMOUNT	SUBTRACT AMOUNT
TOTAL TTA Contrib.	F 1 5 0 0 1 8 0*	F 2 5 0 2 5 0
Print (on form)	15.00% DISC 1.80−	DISC 2.50−

* 1.80 is 15% of a $12.00 purchase.

Totals Accumulation

Payment accumulations are <u>not</u> functional with CASH transactions.

With CHARGE or OTHER transactions, amounts entered after touching the PAYMENT DEPOSIT key will be <u>added</u> to the Temporary Cash Total when the SUBTRACT AMOUNT key is touched (or will be <u>subtracted</u> from the Temporary Cash Total if the ADD AMOUNT key is touched next).

Every printed DISCOUNT ALLOWANCE amount is accumulated in the Transaction Total, Temporary Discount Allowance Total, and in the Temporary Cash Total (CASH sales only).

The tax amount printed after touching the SUBTRACT AMOUNT key is accumulated in the Transaction Total, Temporary Tax Total, and in the Temporary Cash Total (CASH sales only).

Discount amount printed after touching the SUBTRACT AMOUNT key is accumulated in the Transaction Total, Temporary Discount Total, and in the Temporary Cash Total (CASH sales only).

The Payment Deposit Amount printed after touching the SUBTRACT AMOUNT key is accumulated in the Transaction Total, and in the Temporary Cash Total (CHARGE sales only).

See opposite page for a tabular Flowchart of Totals Accumulations.

Special Notations

A maximum of seven (7) digits can be entered.

A maximum of seven (7) digits can be <u>accumulated</u> in any of the totals.

DATA TERMINAL OPERATION

SUBTOTAL KEY

Functional Conditions

SUBTOTAL key is never illuminated. To be functional one of
the following sets of keys must be illuminated:
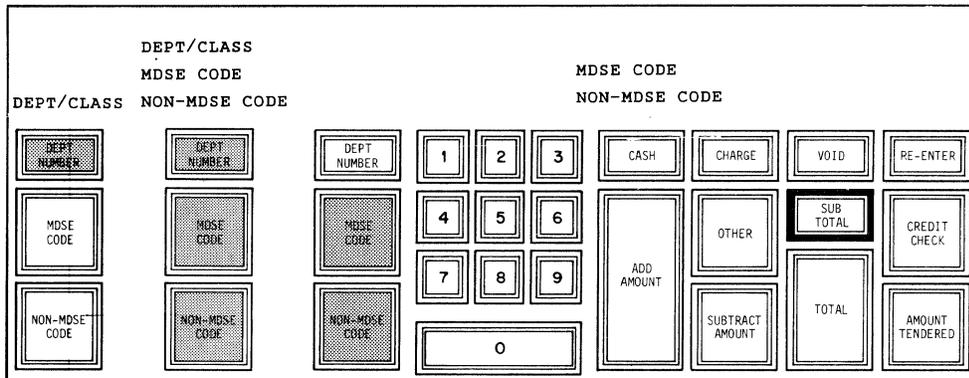
TTA Contribution

None

EXAMPLE

Digit Entry	None
Key Touched	SUBTOTAL
TTA Contribution	None
Print (on form)	Transaction Amount ±s

Totals Accumulation

None

Special Notations

Touching the SUBTOTAL key causes the transaction amount to
be displayed; transaction amount and transaction number are
printed.

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DATA TERMINAL OPERATION
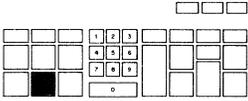
DISCOUNT ALLOWANCE KEY

Functional Conditions

DISCOUNT ALLOWANCE key is never illuminated. To be functional one of the following sets of keys must be illuminated:
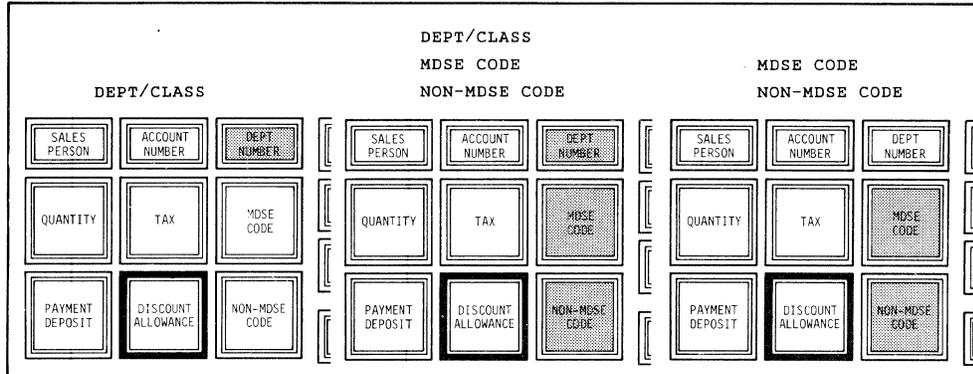
TTA Contribution

Touching the DISCOUNT ALLOWANCE key causes alpha code F to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory followed by any digits entered prior to touching the DISCOUNT ALLOWANCE key (See Special Notations below).

EXAMPLE

	Stored %	Non-Stored %	Fixed $ Disc.
Discount Requirement	10% of $12.00	15% of $12.00	$2.50
Digit Entry	None	1500	23 (Disc. Code)
Key Touched	DISCOUNT ALLOWANCE	DISCOUNT ALOOWANCE	DISCOUNT ALLOWANCE
TTA Contribution	F	F 1 5 0 0	F 2 3
Print (on form)	Delayed Print	Delayed Print	Delayed Print

Totals Accumulation

None

Special Notations

This is a DELAYED PRINT key (see Example opposite Section 6-20, SUBTRACT AMOUNT Key). Printing will follow the use of the ADD AMOUNT or SUBTRACT AMOUNT key. The amount printed after touching the ADD AMOUNT key will be added to the Temporary Discount Allowance Total; the amount printed after touching the SUBTRACT AMOUNT key will be subtracted from the Temporary Discount Allowance Total.

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The Discount Allowance percentage used can be a factor stored in core memory (see Section 4-2, Storing Variables) or a digit entry (a two-place decimal of the percent required, e.g. 1500 is entered for 15%).

For a fixed dollar discount, a discount code is entered before touching the DISCOUNT ALLOWANCE key. The fixed dollar discount amount is entered after touching the DISCOUNT ALLOWANCE key. The stored Discount Allowance percentage is _not_ applied after the entry of the discount allowance amount.

DATA TERMINAL OPERATION
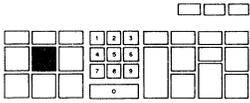
TAX KEY

Functional Conditions

TAX key is never illuminated. To be functional, one of the following sets of keys must be illuminated:
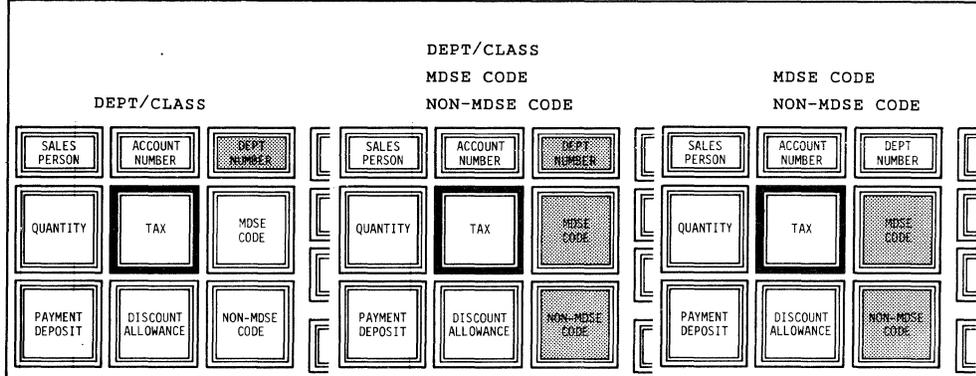
TTA Contribution

Touching the TAX key causes alpha code & (ampersand) to be stored   in   the   next   available   location   in   the   TTA (Transaction Transmission Area) of the core memory followed by the digits entered prior to touching the TAX key (see Special Notations below).

EXAMPLE

	Stored Tax %	Non-Stored Tax %	Fixed $ Tax
Tax Requirement*	5% of 111.52	4% of 111.52	$5.72
Digit Entry	None	400	17 (Tax Code)
Key Touched	TAX	TAX	TAX
TTA Contribution	&	& 4 0 0	& 1 7
Print (on form)	Delayed Print	Delayed Print	Delayed Print

* This example is based on the purchase of four tires $27.88 each.
    Non-stored 4% tax is for out-of-state delivery.
    Fixed Dollar tax is Federal Excise Tax of $1.43 per tire.

Totals Accumulation

None

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Special Notations

This is a DELAYED PRINT key (see Example opposite Section 6-18, ADD AMOUNT key).

Printing will follow the use of the ADD AMOUNT key (or the SUBTRACT AMOUNT key). The amount printed after touching the ADD AMOUNT key will be added to the Temporary Tax Total; the amount printed after touching the SUBTRACT AMOUNT key will be subtracted from the Temporary Tax Total.

The Tax Percentage used can be a factor stored in core memory (see Section 4-2, Storing Variables) or a digit entry (a two-place decimal of the percent required, e.g. 400 is entered for 4%).

For a fixed dollar tax, a tax code is entered before touching the TAX key. The fixed dollar tax amount is entered before touching the ADD AMOUNT (or SUBTRACT AMOUNT) key. The stored Tax Percentage is not applied after the entry of the tax amount.

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DATA TERMINAL OPERATION

PAYMENT DEPOSIT KEY

Functional Conditions

PAYMENT DEPOSIT key is never illuminated. To be functional, one of the following sets of keys must be illuminated:
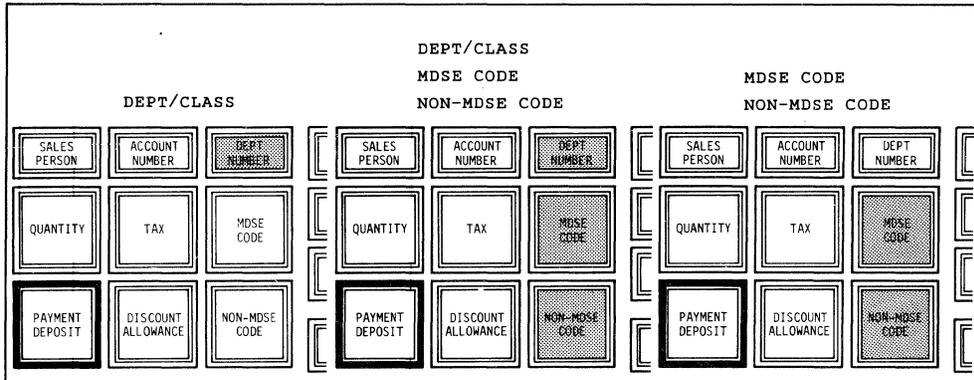
TTA Contribution

Touching the PAYMENT DEPOSIT key causes alpha code / (slash) to be stored in the next available location in the TTA (Transaction Transmission Area) of the core memory followed by the digits entered as the Payment Deposit code.

EXAMPLE

Digit Entry	52
Key Touched	PAYMENT DEPOSIT
TTA Contribution	/ 5 2
Print (on form)	Delayed Print

Digit Entry	500
Key Touched	SUBTRACT AMOUNT
TOTAL TTA Contrib.	/ 5 2 5 0 0 5 0 0
Print (on form)	52 PYMT 5.00-

Totals Accumulations

Payment accumulations are not functional with CASH transactions.

With CHARGE or OTHER transactions, touching the PAYMENT DEPOSIT key sets up condition to cause amounts entered in subsequent operations to be subtracted from the Temporary Cash Total when ADD amount key is used next (or, to be added to the Temporary Cash Total if the SUBTRACT AMOUNT key is used next).

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Special Notations

This is a DELAYED PRINT key. Printing will follow the use
of the ADD AMOUNT key (or the SUBTRACT AMOUNT key).

DATA TERMINAL OPERATION
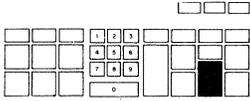
TOTAL KEY

Functional Conditions

TOTAL key is never illuminated. To be functional, one of
the following sets of keys must be illuminated:

DEPT/CLASS
MDSE CODE   MDSE CODE
DEPT/CLASS NON-MDSE CODE   NON-MDSE CODE

| DEPT NUMBER | DEPT NUMBER | DEPT NUMBER | 1 | 2 | 3 | CASH | CHARGE | VOID | RE-ENTER |
MDSE CODE	MDSE CODE	MDSE CODE	4	5	6		OTHER	SUB TOTAL	CREDIT CHECK
NON-MDSE CODE	NON-MDSE CODE	NON-MDSE CODE	7	8	9	ADD AMOUNT		TOTAL	AMOUNT TENDERED
			0				SUBTRACT AMOUNT		
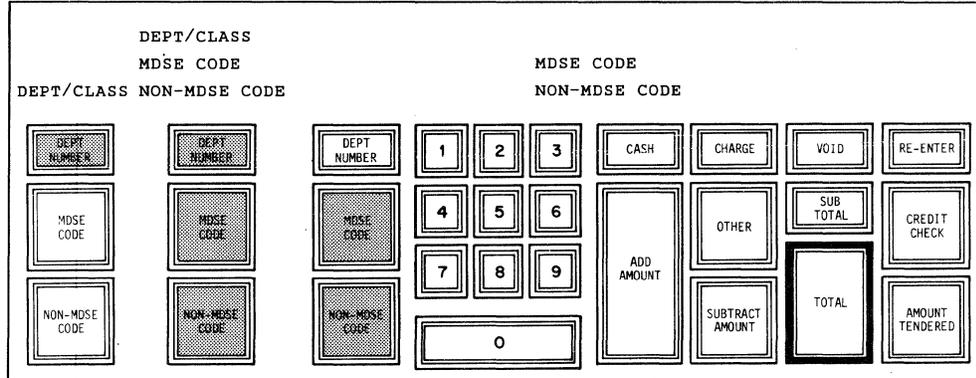
TTA Contribution

Touching the TOTAL key causes alpha code I (or Y if total
is negative) to be stored in the next available location in
the TTA (Transaction Transmission Area) of the core memory,
followed by the Transaction Total and the communication
code ETB.

EXAMPLE

Digit Entry	None
Key Touched	TOTAL
.	I Transaction Total ETB + Positive Total
TTA Contribution	
.	Y Transaction Total ETB − Negative Total
Print (on form)	Transaction Number Transaction Total ±T
.	Date
.	LOGO

Totals Accumulation

The   amounts   in   the four temporary totals (Tax, Discount,
Cash, and Sales) are added to their respective totals in
the core memory and the temporary totals are cleared to be
ready for the next transaction.

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Special Notations

The total should not exceed seven (7) digits.

When the TOTAL key is touched the following activities occur:

 ----Cash Drawer is opened
 ----Transaction Total is displayed
 ----The transaction is transmitted
 ----The sequencing segment of the Transaction Number is
   incremented by one (see Section 6-2, Transaction
   Number).

DATA TERMINAL OPERATION
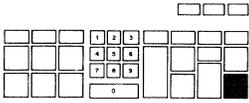
AMOUNT TENDERED KEY

Functional Conditions

AMOUNT TENDERED key is never illuminated. To be functional the following conditions must be met:

1. Data Terminal cannot contact Line Concentrator: (-) minus is displayed
2. Line Concentrator cannot contact Disc Drive: (.) period is displayed
3. Account number is found on Disc: (0-9) digit is displayed .
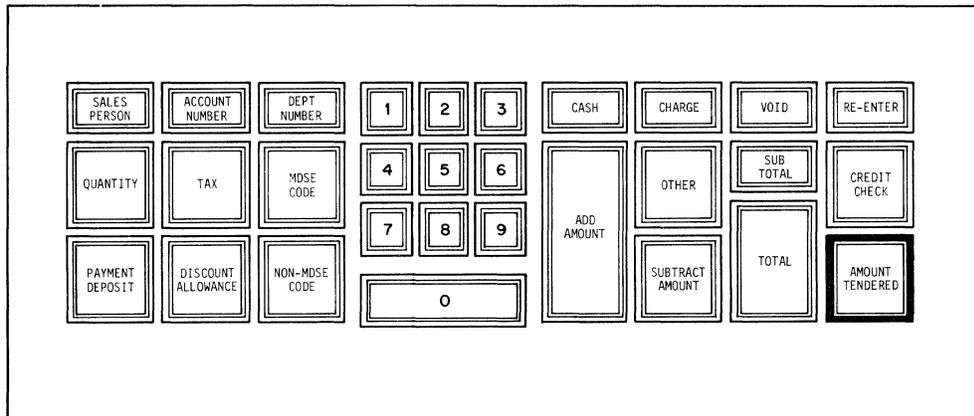
* When Data Terminal is programmed as shown in Section 5-4 Example.

TTA Contribution

None

Totals Accumulation

None.

Special Notations

RE-ENTER key will be illuminated when amount tendered is less than the transaction total.

The change due the customer is displayed when the AMOUNT TENDERED key is touched. The display shows the difference between the amount tendered and the transaction total.

There is no printout.

Section 7

PHYSICAL CHARACTERISTICS AND SUPPLIES

PHYSICAL CHARACTERISTICS AND SUPPLIES

MDTS DATA TERMINAL

A	CASH DRAWER LOCK	
B	PAPER SUPPLY LOCK	
C	MODE LOCK	
D	PROGRAM LOCK	
1	19.5" (49.53 cm)	
2	20" (50.8 cm)	
3	19" (48.26 cm)	
4	5.5" (13.98 cm)	
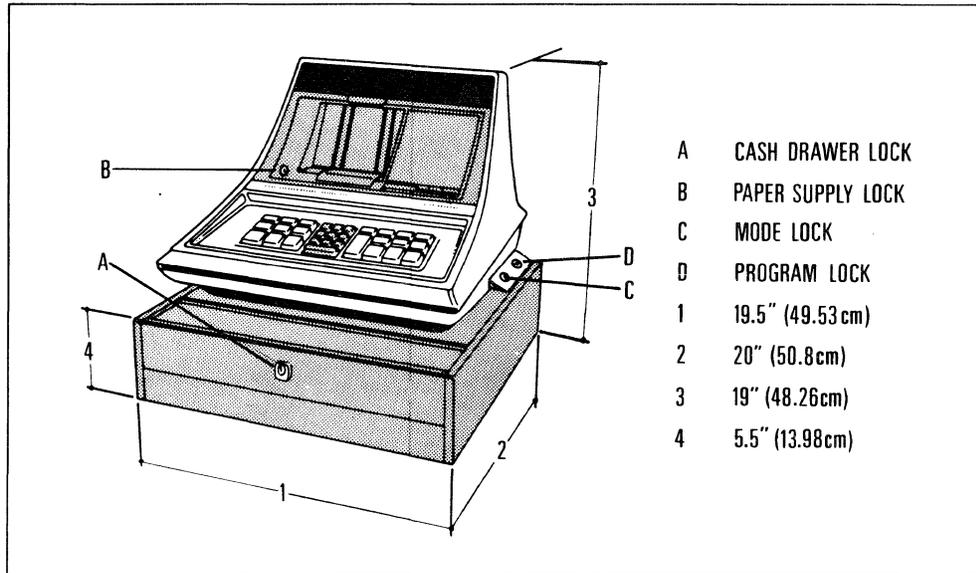
Dimensions

See sketch for principal overall dimensions. Base of terminal should be 30" - 32" above the floor for maximum convenience of the "90 percentile woman".

Clearance

Four inches clear space is required at the rear for ventilation.

Power

115 (±10%) Volts single phase 60 Hz; 300 watts.

Connections

1 standard wall plug with ground. (7 foot cord provided.)
1 two wire connector to go to Individual Store & Forward (ISF) Module or Line Concentrator (LC).

Locks

A is Cash Drawer Lock   See Section 3-5.
B is Paper Supply Lock   See Section 3-6.
C is Mode Lock   See Section 3-7.
D is Program Lock   See Section 3-8.

Operational Environment

36 F. to 105 F. (2.2 C. to 41 C.)
Humidity: 20% to 95%.

Section 8

PRINTING CONVENTIONS

Mechanical Operation
Printing Position Assignments

PRINTING CONVENTIONS

MECHANICAL OPERATION

The printer has thirty-one print positions, numbered from right to left. The printing wheel moves from right to left, is inked by an ink cartridge, and prints when the hammer strikes the paper against the print wheel.

PRINTING POSITION ASSIGNMENTS

Print positions are assigned specific usage. The following chart identifies the print position assignments:

EIGHT (8) POSITIONS

AMOUNTS PRINTED WITH ADD AMOUNT, SUBTRACT AMOUNT, TOTAL OR SUB-TOTAL KEYS AS DECIMAL NUMBERS; ALSO FOR NUMERIC-CODES PRINTED WITH CASH AND CHARGE KEYS

TWO (2) POSITIONS

CA FOR CASH
CH FOR CHARGE
+ FOR ADD AMOUNT
- FOR SUBTRACT AMT.
+S,-S FOR SUBTOTAL
+T,-T FOR TOTAL

SIX (6) POSITIONS

DIGIT ENTRIES FOR FUNCTION KEYS PRESSED FOLLOWING USE OF A DELAYED PRINT KEY. DIGITS ARE PRINTED AS WHOLE NUMBERS.

NUMERIC

NUMERIC

ALPHA

ALPHA

DECIMAL POINT FOR A TAX OR DISCOUNT PERCENTAGE, OR A UNIT PRICE.

DECIMAL POINT FOR DOLLAR AMOUNTS.

PERCENT SIGN (%) WHEN MULTIPLYING TAX FACTOR OR DISCOUNT ALLOWANCE FACTOR.

FOUR (4) POSITIONS

IDENTITY OF FUNCTION KEY TOUCHED AFTER USE OF A DELAYED PRINT KEY.

Section 9

TRANSACTION EXAMPLES

Cash Sale - Single Item
Charge Sale
Cash Sale - Quantity of Single Item and
   Additional Item

TRANSACTION EXAMPLES

CASH SALE - SINGLE ITEM

CASH CUSTOMER PURCHASES A SHIRT; DIVISION 45, CLASS 21, SKU #26513501, AT $6.95 FROM SALESPERSON #12344. LOCAL SALES TAX APPLICABLE. CUSTOMER PAYS WITH $10.00.

STEP	FUNCTION KEYS ILLUMINATED	KEYBOARD ENTRY	DISPLAY AFTER KEYBOARD ENTRY	FUNCTION KEY PRESSED	DISPLAY FOLLOWING FUNCTION	PRINTED ON FORMS (TTA Contribution)
1		Salesperson number	12344	SALESPERSON		Nothing (12344)
2		None		CASH		12344 EMP CA (J)
3		Division, Class	4521	DEPT NUMBER		4521 DEPT. ($4521)
4		SKU Number	26513501	MDSE CODE		26513501 MDSE (26513501)
5		Unit Price	695	ADD AMOUNT	6.95	6.95 EACH 6.95+ (L695L695)
6		None	6.95	TAX		Nothing (&)
7		None		ADD AMOUNT	.35	5.00% TAX .35+ (LL35)
8		None	.35	TOTAL	7.30	1294 123009 7.30+ T 5 02 69 Friden (1730 ETB)
9		Amount Tendered	1000	AMOUNT TENDERED	2.70	Nothing

```
                        12344    EMP                    CA
                         4521    DEPT
                     26513501    MDSE
                         6.95    EA            6.95+
                         5.00%   TAX            .35+
          1294          123009                 7.30+   T
                        5 02 69

FRIDEN
```

```
STX  P 1 2 9 4 @ @ @ 1 2 3 0 0 9 ' 1 2 3 4 4
```

```
J $ 4 5 2 1 " 2 6 5 1 3 5 0 1 L 6 9 5 L 6 9 5
```

```
& L L 3 5 I 7 3 0 ETB
```

CASH SALE - SINGLE ITEM - Sales Slip

Printout and Transaction Transmission

TRANSACTION EXAMPLES

CHARGE SALE

REVOLVING CHARGE CUSTOMER #1234451917 PURCHASES A DRESS; DIVISION 75, CLASS 16, SKU #40506071, AT $15.88 FROM SALES-PERSON #60203, LOCAL SALES TAX APPLICABLE.

STEP	FUNCTION KEYS ILLUMINATED	KEYBOARD ENTRY	DISPLAY AFTER KEYBOARD ENTRY	FUNCTION KEY PRESSED	DISPLAY FOLLOWING FUNCTION	PRINTED ON FORMS / TTA Contribution
1	INSERT SALES CHECK IN PRINTER					
2		Salesperson number	60203 / 60203	SALESPERSON		Nothing / 60203
3		Type of Charge	3 / 3	CHARGE		60203 EMP 3 CH / K3
4		Customer's Account Number	1234551917 / 1234551917	ACCOUNT NUMBER		1234551917 ACCT / SP1234551917 *
5		Division-Class	7516 / 7516	DEPT NUMBER		7516 DEPT / S7516
6		SKU Number	40506071 / 40506071	MDSE CODE		40506071 MDSE / 40506071
7		Unit Price	1588 / 1588	ADD AMOUNT	15.88 / 15.88	15.88 EACH 15.88+ / L1588 L1588
8			15.88 / 15.88	TAX		Nothing / &
9		None		ADD AMOUNT	.79 / .79	5.00% TAX .79+ / LL79
10		None	.79 / .79	TOTAL	16.67 / 16.67	1320 123009 16.67+ T / 5 02 69 / FRIDEN / I1667ETB
11		REMOVE SALES CHECK				

* WHEN A CREDIT CHECKING DEVICE IS CONNECTED TO THE MDTS TERMINAL, THE ACCOUNT NUMBER IS TRANSMITTED IN THE FOLLOWING FORMAT:

```
STX SP 1234551917 ETB
```

IF THE NUMBER IS FOUND ON THE NEGATIVE CREDIT FILE, A CODE (0-9) WILL BE DISPLAYED AND THE CREDIT CHECK LIGHT WILL BE ON. DEPRESSION OF THE CREDIT CHECK KEY WILL THEN PRINT THE ACCOUNT NUMBER AND THE CODE (0-9) WITH AN ASTERISK (*). THE SALE MAY THEN BE VOIDED OR COMPLETED

```
                    DESCRIPTION                           AMOUNT

                                60203    EMP         3 CH
                           1234551917    ACCT
                                 7516    DEPT
                             40506071    MDSE
                                15.88    EACH      15.88+
                                5.00%    TAX          .79+
                        1320    123009             16.67+  T
                                5 02 69
                        FRIDEN
```

| STX | P 1 3 2 0 @ @ @ 1 2 3 0 0 9 ' 6 0 2 0 3 K 3 | SP |

| 1 2 3 4 5 5 1 9 1 7 $ 7 5 1 6 " 4 0 5 0 6 0 7 1 |

| L 1 5 8 8 L 1 5 8 8 & L L 7 9 I 1 6 6 7 | ETB |

CHARGE SALE · Charge Form Printout
and Transaction Transmission

TRANSACTION EXAMPLES

CASH SALE - QUANTITY OF SINGLE ITEM AND ADDITIONAL ITEM

CASH CUSTOMER PURCHASES TWO SHIRTS; DIVISION 45, CLASS 21, SKU #26513501, AT $6.95 EACH, AND TIE: SKU #53300 AT $2.50 EACH FROM SALESPERSON #32104. LOCAL SALES TAX APPLICABLE. CUSTOMER PAYS EXACT AMOUNT OF SALE.

STEP	FUNCTION KEYS ILLUMINATED	KEYBOARD ENTRY	DISPLAY AFTER KEYBOARD ENTRY	FUNCTION KEY PRESSED	DISPLAY FOLLOWING FUNCTION	PRINTED ON FORMS (TTA Contribution)
1		Salesperson number	32104 / 32104	SALESPERSON		Nothing / '32104
2		None		CASH		32104 EMP CA / J
3		Division-Class	4521 / 4521	DEPT NUMBER		4521 DEPT / $4521
4		Quantity	2 / 2	QUANTITY		2 QTY / %2
5		SKU Number	26513501 / 26513501	MDSE CODE		26513501 MDSE / "26513501
6		Unit Price	695 / 695	ADD AMOUNT	1390 / 13.90	6.95 EACH 13.90+ / L695L1390
7		SKU Number	53300 / 53300	MDSE CODE		53300 MDSE / "53300
8		Unit Price	250 / 250	ADD AMOUNT	250 / 2.50	2.50 EACH 2.50+ / L250L250
9		None	250 / 2.50	SUBTOTAL	1640 / 16.40	1296 123009 16.40+ S
10		None	1640 / 16.40	TAX		Nothing / &
11		None		ADD AMOUNT	82 / .82	5.00% TAX .82+ / LL82
12		None	82 / .82	TOTAL	1722 / 17.22	1296 123009 17.22+ T / 5 02 69 / FRIDEN / I1722ETB

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```
              32104    EMP
               4521    DEPT
                  2    QTY
           26513501    MDSE
               6.95    EA           13.90+
              53300    MDSE
               2.50    EA            2.50+
    1296      123009                16.40+  S
               5.00%   TAX            .82+
    1296      123009                17.22+  T
              5 02 69

FRIDEN
```

| STX | P 1 2 9 6 @ @ @ 1 2 3 0 0 9 ' 3 2 1 0 4 J $ 4 5 2 1 |

| % 2 " 2 6 5 1 3 5 0 1 L 6 9 5 L 1 3 9 0 " 5 3 3 0 0 L |

| 2 5 0 L 2 5 0 & L L 8 2 I 1 7 2 2 ETB |

CASH SALE - QUANTITY OF A SINGLE ITEM
AND AN ADDITIONAL ITEM

Sales Slip Printout and Transaction Transmission

Section 10

DATA TRANSMISSION GUIDE

Single Terminal ISF
Multi-Terminal ISF (Cascading)
Multi-Terminal Collective Store & Forward
Multi-Terminal On-Line Linkage
Transmission Procedure

DATA TRANSMISSION GUIDE

SINGLE TERMINAL ISF

Transmission of Transaction Data to the remote computer from one Individual Store & Forward (ISF) module requires the following equipment at the ISF:

    202E type Data Set or equivalent modem to

        Xmt   1200 BAUD/BPS (120 characters/second)

        Rec   5 BAUD/BPS Reverse Channel

Linked through a Voice Grade telephone line to the following equipment at the Computer:

    202C type Data Set or equivalent modem to

        Xmt/Rec   1200 BAUD/BPS (120 cps)

        Xmt   5 BAUD/BPS Reverse Channel.

ASTA - Asynchronous to Synchronous Transmission Adapter Model No. 9002185.

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MULTI-TERMINAL ISF (CASCADING)

Individual Store & Forward (ISF) modules can be connected in series with a single 202E type Data Set (modem) when each ISF is modified for cascading coupling.

As each ISF completes the transmission of its stored transactions it "opens" the circuit to the next ISF in the cascaded series.

MULTI-TERMINAL COLLECTIVE STORE & FORWARD

Two or more MDTS Point of Sale Terminals are connected with a Line Concentrator (LC) where transaction data is collected for later transmission to a foreign computer and where credit checking may be performed at the Line Concentrator.

The message transfer is half-duplex, but the communications facility is a full duplex, multi-point leased line (schedule 3004 type C2 conditioning). The line control procedures conform to the USASCII standard.

The equipment includes:

Line Concentrator (LC) for each 180 (or less) terminals.

Synchronous Communications Adapter (SCA).

Magnetic Tape or Disc Drive.

201B type Data Set or equivalent type modem to

Xmt/Rec   2400 BAUD/BPS (300 cps).
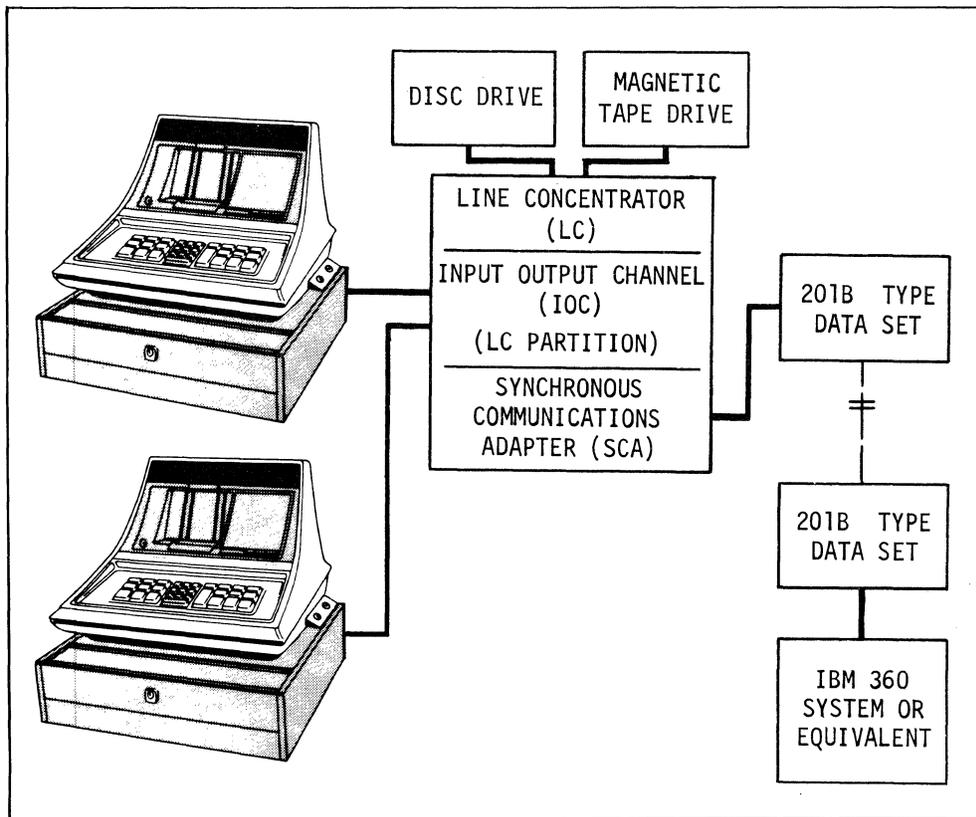
DATA TRANSMISSION GUIDE

MULTI-TERMINAL ON-LINE LINKAGE

Two or more MDTS Point of Sale Terminals are connected with a Line Concentrator (LC) for On-Line Real Time communication with a foreign computer for immediate transaction data forwarding and central credit verification.

The message transfer is half-duplex, but the communications facility is a full duplex, point-to-point leased line (Schedule 3004 type C2 conditioning). The line control procedures conform to the USASCII standard.

The equipment includes:

Line Concentrator (LC) for each 180 (or less) terminals.

On Line Communications Adapter (OLCA).

201B type Data Set or equivalent type modem to

Xmt/Rec 2400 BAUD/BPS (300 cps).

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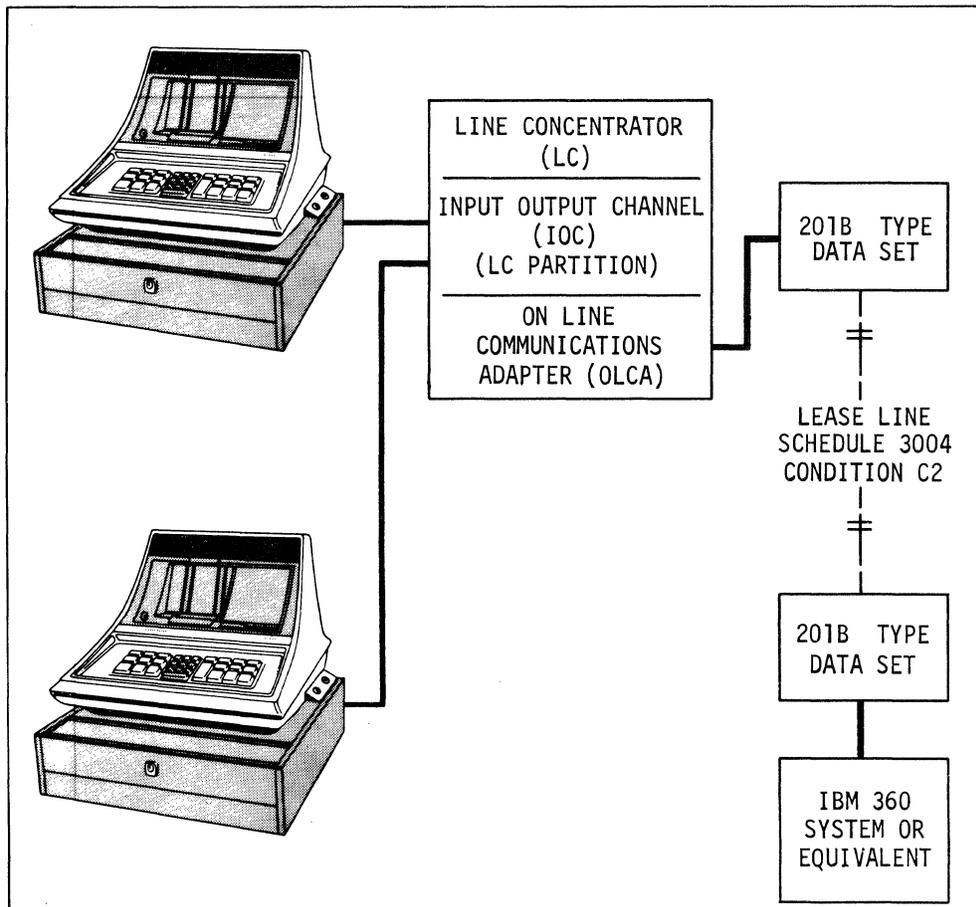
DATA TRANSMISSION GUIDE

TRANSMISSION PROCEDURE

The common elements of the transmission procedures are outlined below:

Terminal to LC

Each of 10 or less Point-of-Sale Terminals can be linked by a twisted pair to one Input-Output Channel (IOC)* of the Line Concentrator (LC).

* Each IOC is associated with an LC Partition.

The IOC polls/scans the linked terminals every 833 microseconds until one terminal is ready to transmit a transaction or a credit inquiry.

Message transfer is 10 bit serial at 1200 BAUD/BPS (120 cps) from terminal to IOC (1 start, 7 data bits, even parity, 1 stop - USASCII). Reverse channel message transfer is 120 BAUD/BPS (12 cps) from IOC to terminal, except LC uses 5 BAUD/BPS reverse channel to signal terminal to re-transmit when LC senses an error.

LC systems communicate synchronously in a full duplex non-simultaneous mode.

OFF-LINE Link to Computer

Transmission of stored transactions-to-date occur when the computer sends ENQ to an ISF Module.

End of text is ETX.

Individual transactions terminate with ETB.

When ISF cannot transmit transactions EOT (end of transmission) is sent to the computer.

Message transfer is bit serial at 1200 BAUD/BPS from ISF to computer and 5 BAUD/BPS reverse channel from computer to ISF.

ISF Module systems communicate asynchronously in a half duplex mode.

LC Link to Computer

"Immediate" transmission of credit checking inquiries and individual transactions are performed with the Line Concentrator (LC) and an On-Line Communications Adapter (OLCA) in the ON-LINE condition with the computer.

DATA TRANSMISSION GUIDE

ON-LINE Link (Credit Inquiry)

Credit checking replies take priority over Transaction transmissions.

Transmitting a Credit Check inquiry or a Transaction includes the following steps:

LC Transmits*

ENQ	Ready to make Credit Check inquiry or Ready to transmit a Transaction

Computer transmits*

ACK	Ready to receive data
ENQ	Not ready to receive but have previous Credit Check reply ready to transmit
WABT	Wait; on-line, but not ready to receive
NAK	Error detected in message
No reply	Off-line
Invalid reply	Off-line

LC receives ACK O and transmits*

STX SP ACCOUNT NO. ETX	For Credit Check

See Section 9, Transaction Examples

LC receives ENQ and transmits*

ACK O	Ready to receive previous Credit Check reply

Computer receives ACK O and transmits*

STX REPLY ETX

All transmissions are terminated with EOT.

* *Transmissions of credit inquiries and responses start with:*

SOH Terminal ID Acct. No. ETX.

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Message transfer is bit serial at 2400 BAUD/BPS (300 cps) from Line Concentrator (LC) to and from Computer and a Computer to LC supervisory channel at 5 BAUD/BPS.

Linkage is full duplex, non-switched, binary synchronous.

All transmissions conform to the USASCII requirements as specified in the Proposed USA Standard Data Communication Control Procedures dated 1968 September 18.

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Section 11

GLOSSARY

Credit Check
Delayed Print
Digit Entry
LC-Line Concentrator
LC Partition
Logo
Matrix
Mod 10 or 11 (Modulus 10 or 11)
Negative Credit Check
NKC - Next Keyboard Condition
OLCA - On-Line Communications Adapter
Storage
Time-Out
Transaction Number
TTA - Transaction Transmission Area
USASCII - USA Standard Code for Information Interchange
Example of Mod 10
Example of Mod 11

GLOSSARY

C

Credit Check

The MDTS credit check reports an account number's modification of credit as it has been stored in a Disc Drive. See Section 2-3, Credit Checking Routine.

D

Delayed Print

A Delayed Print function key has been designed to withhold printing its data until a next available function key has been used. The Data Terminal has the following DELAYED PRINT function keys: (See Sec. 6.)

SALESPERSON   TAX

DISCOUNT ALLOWANCE   PAYMENT DEPOSIT

Digit Entry

Digit Entries are numerical data entered at the Data Terminal by touching digit keys. As each digit is entered at the keyboard it appears in the first position at the right end of the display, and all displayed numbers move one position to the left to make room for each new digit entry. Touching the RE-ENTRY key "erases" the current display of the digit entries, see Sec. 5.1.

L

Line Concentrator (LC)

A Line Concentrator is a SINGER SYSTEM TEN Processor 20 used as a collective device to concentrate the transaction data from 180 (or less) Data Terminals and store it in magnetic tape or disc files. The LC will forward the transaction data when put on-line to the computer.

When coupled to a disc file to provide credit checking, the Line Concentrator holds the inquiring data terminal mechanically locked up until the credit check is completed, see Sec. 2-2 thru Sec. 2-4.

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GLOSSARY

LC Partition

> A Line Concentrator Partition is the modular segment that links 10 (or less) Data Terminals with the LC. A single LC may have 18 (or less) partitions, hence a possible 180 Data Terminals. However, no more than 140 Data Terminals should be linked when the LC is "on-line" to the computer due to the inherent time requirements for computer service, see Sec. 2-3:

Logo

> (Logogram) is a letter, symbol, or sign used to represent a business, see Sec. 3-3.

M

Matrix - Seven Bar

> The display matrix is a pattern of seven straight lines of light which are selectively turned ON to display a parallelogram style number, see Sec. 3-2, Digital Display.

Modified-Credit Check

> A modified-credit check is limited to reporting an account number's modified credit as it has been stored in an accessible file (e.g. the on-site Disc Drive); credit for a valid account number is unlimited unless reported to be modified. See Section 2-3, Credit Checking Routine.

Modulus or 'Mod' (10 or 11)

> The number by which the result of a calculation is divided to arrive at a remainder. For example: 222: 11 20 with a remainder of 2. 11 is the "modulus", or divisor, see Sec. 5-4. See examples, Sec. 11-5 and 11-6.

N

Next Keyboard Condition

> (NKC) is the status of the Data Terminal keyboard after a function key is touched, i.e., what specific function keys can be used. The common usage keys of the NKC are illuminated, see Sec. 5, Programming The Function Keys.
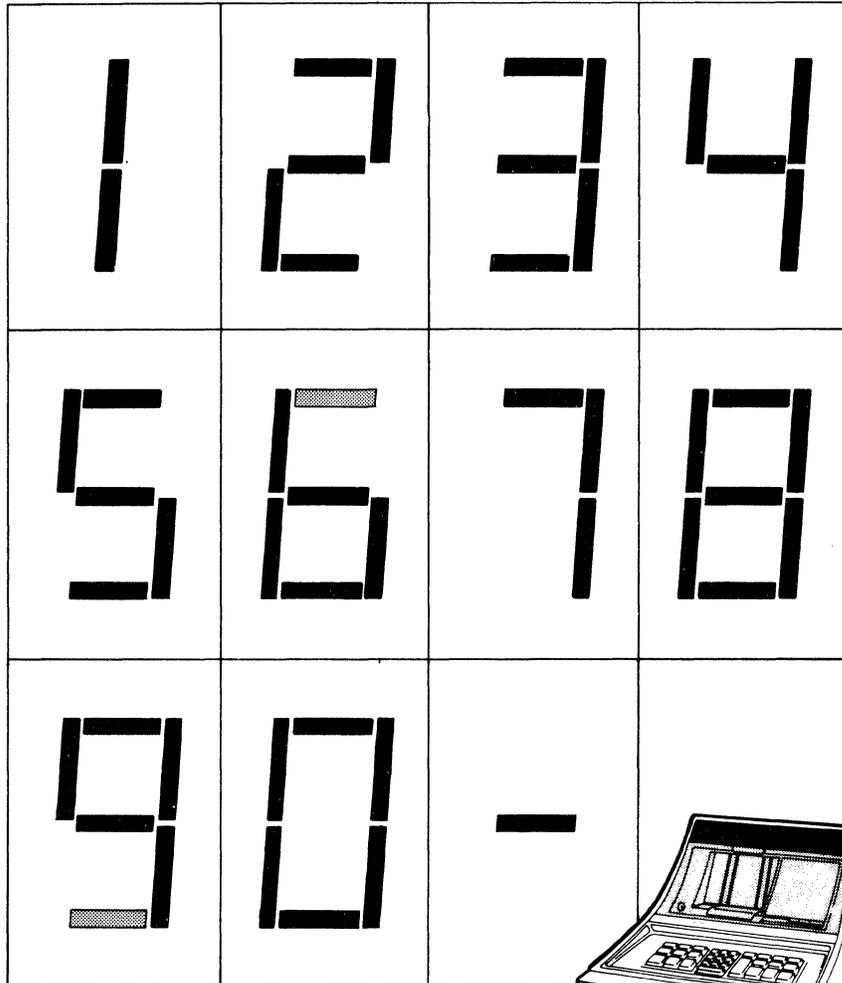
THESE BARS OPTIONAL
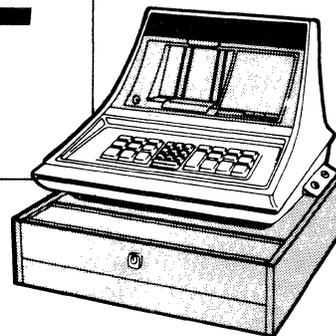
Seven Bar Matrix

GLOSSARY

O

OLCA

On Line Communications Adapter. The Line Concentrator may be fitted with the special OLCA to provide real-time credit checking at the computer, see Sec. 2-4.

S

Storage

Alpha/numeric/symbolic characters placed in a specific area of core memory, see Sec. 3-4, Core Memory Storage.

T

Time-Out

A feature causing the keyboard to be released if more than 15 seconds elapse between the sending of characters to the Line Concentrator (3 seconds with Individual Store & Forward).

Transaction Number

A four-digit sequencing segment followed by a nine or less digit Terminal Identification make   up   the   complete Transaction Number, see Sec. 6-2, Transaction Number.

Transaction Transmission Area (TTA)

That portion of the memory in which the data from a transaction are gathered for transmission.   When a transmission occurs, the TTA is cleared except for the following information which is transmitted with each transmission, but never cleared.

S T X	P	Transaction Number

See Sec. 4-2, Storing Variables.

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U

USASCII

A contraction for "United States of America Standard Code for Information Interchange." This standard defines the graphics and codes for a character set to be used for information interchange between equipments of different manufacturers. Commonly referred to as ASCII.

MDTS
INTERNAL CODE

b_4	b_3	b_2	b_1	COLUMN ROW	0	1	2	3	4	5	6	7
0	0	0	0	0	NUL	DLE	SP	0	@	P	`	p
0	0	0	1	1	SOH	DC1	!	1	A	Q	a	q
0	0	1	0	2	STX	DC2	"	2	B	R	b	r
0	0	1	1	3	ETX	DC3	#	3	C	S	c	s
0	1	0	0	4	EOT	DC4	$	4	D	T	d	t
0	1	0	1	5	ENQ	NAK	%	5	E	U	e	u
0	1	1	0	6	ACK	SYN	&	6	F	V	f	v
0	1	1	1	7	BEL	ETB	'	7	G	W	g	w
1	0	0	0	8	BS	CAN	(	8	H	X	h	x
1	0	0	1	9	HT	EM	)	9	I	Y	i	y
1	0	1	0	10	LF	SUB	*	:	J	Z	j	z
1	0	1	1	11	VT	ESC	+	;	K	[	k	{
1	1	0	0	12	FF	FS	,	<	L	\	l	¦
1	1	0	1	13	CR	GS	−	=	M	]	m	}
1	1	1	0	14	SO	RS	.	>	N	^	n	~
1	1	1	1	15	SI	US	/	?	O	___	o	DEL

USASCII SUBSET

OMITTED FROM USASCII SUBSET

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GLOSSARY

EXAMPLE - MOD 10

Double Add Double

```
Take a basic account number                5   2   0   6   3

Multiply the units position and
     every alternate position by two        2       2       2

                    Products               10       0       6

Bring down those digits not
     multiplied by two                          2       6

Cross-add the digits and these
     non-multiplied digits              1+0+2+0+6+6        15*

Subtract this total from the next                          20
     highest number ending in zero                        -15

               CHECK DIGIT                                  5

Self-Checking Account Number               5   2   0   6   3   5

*   If this total ends in zero then the check digit
    calculation is finished and the check digit is zero
    (0).
```

Digit Verification

```
Self-Checking Account Number               5   2   0   6   3   5

Multiply the units position by 1,
     tens position by 2, other
     positions alternately                  2   1   2   1   2   1

               Products                    10   2   0   6   6   5

Cross-add the numbers              1+0+2+0+6+6+5 ≤ 20
```

This sum divisible by 10 with no remainder satisfies Mod 10
digit check requirements.

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GLOSSARY

EXAMPLE · MOD 11

Arithmetic Weights

Take a basic account number	5	2	0	6	3

Multiply each digit by the proper
weight (i.e., starting with the
units position the multiplier
is 2, the tens position is 3 and
so on)

	6	5	4	3	2
Products	30	10	0	18	6

Add these products   30+10+0+18+6 ≃ 64

Divide this sum by eleven   64 ÷ 11 ≃ 5 and a 9
remainder*

Subtract this remainder from eleven
$$11$$
$$-\ 9$$

CHECK DIGIT   2

Self-Checking Account Number	5	2	0	6	3	2

* When the sum of the products is evenly divisible by
eleven (zero remainder, the check digit is zero.
However, when this sum is not evenly divisible by
eleven, subtract the remainder from eleven. This
difference is the check digit. When this difference is
ten (a double digit), the basic account number cannot
be used. This occurs approximately every eleven
numbers resulting in the loss of about 9.1% of the
basic account numbers.

Digit Verification

Self-Checking Account Number	5	2	0	6	3	2

Multiply each digit from units
position with 1,2,3,4,5,6,

	6	5	4	3	2	1
Products	30	10	0	18	6	2

Add these products   30+10+0+18+6+2 ≃ 66

Divide this sum by eleven   66 ÷ 11 ≃ 6

This sum divisible by 11 with no remainder satisfies Mod 11
digit check requirements.

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Section 12

APPENDIX

APPENDIX

LINKAGE REQUIREMENTS - MULTI-TERMINAL ISF W/CASCADING

```
                    ┌─────────────────────┐
                    │    MDTS TERMINAL     │
                    │         ┌────┐       │
                    │         │ FU │       │
                    └─────────┴────┴───────┘
                              │                  TRANSM. RATE
     CABLE LENGTH UP TO A     │                  1200 FORWARD BAUD
     MAXIMUM OF 8 WIRE MILES  │                  120 REVERSE
                              │
                    ┌─────────┴────┐
                    │       │ IOC  │         │
                    │  LINE CONCENTRATOR     │
                    │       ┌──────┐         │
                    │       │ OLCA │         │
                    └───────┴──────┴─────────┘
                              │         └ ─ ─ ─ ─ ─ ┐
     CABLE LENGTH 10' STD.    │          2400 BAUD  │
     >10' CONSULT TEL. COMP.  │                     │
                              │                     │
                    ┌─────────┴────┐                │
                    │   201 B TYPE │                │
                    │   DATA SET   │                │
                    │   OR EQUIV.  │                │
                    └──────────────┘                │
                                                    │
     2400 BAUD                                      │  4800 BAUD
     FULL DUPLEX                                    │  LESS THAN 30'
                                                    │
                    ┌──────────────┐                │
                    │   201 B TYPE │                │
                    │   DATA SET   │                │
                    │   OR EQUIV.  │                │
                    └──────────────┘                │
                              │         ┌ ─ ─ ─ ─ ─ ┘
     10' STD.                 │          2400 BAUD
     50' MAX.                 │
                    ┌─────────┴────┐
                    │   IBM 2701   │
                    │ COMM. TERMINAL│
                    └──────────────┘
                              │
                    ┌─────────┴────┐
                    │    IBM 360   │
                    │   COMPUTER   │
                    └──────────────┘

          ┌──────────────────────────────────────┐
          │ FU    FORWARDING UNIT                 │
          │ IOC   INPUT/OUTPUT CHANNEL            │
          │ OLCA  ONLINE COMMUNICATIONS ADAPTER   │
          └──────────────────────────────────────┘
```

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APPENDIX

LINKAGE REQUIREMENTS - MULTI-TERMINAL COLLECTIVE

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APPENDIX

LINKAGE REQUIREMENTS - MULTI-TERMINAL ON-LINE SYSTEM

```
                        ┌─────────────────────┐
                        │    MDTS TERMINAL     │
                        │         ┌────┐       │
                        │         │ FU │       │
                        └─────────┴────┴───────┘
        CABLE LENGTH UP TO A    │  TRANSM. RATE
        MAXIMUM OF 8 WIRE MILES │  1200 FORWARD BAUD
                                │  120 REVERSE

                        ┌─────────┬────┬───────┐
                        │         │IOC │       │
                        │   LINE CONCENTRATOR   │
CABLE LENGTH            ├───────────────────────┤
MAX. 50'                │      DISC CONTR       │
1.375 MHz               ├───────────────────────┤        CABLE LENGTH
          ┌──────┐      │    MAG. TAPE CONTR    │        MAX. 12'
          │ DISC │      ├───────────────────────┤        120 KHz
          │ DRIVE│      │         SCA           │
          └──────┘      └───────────────────────┘        ┌──────┐
        CABLE LENGTH                                      │  ○○  │
        10'                                               │  ○   │
        >10' CONSULT         ┌───────────┐                └──────┘
        TEL. COMP.           │ 201B TYPE │                 TAPE
                             │ DATA SET  │                 DRIVE
                             │ OR EQUIV. │
                             └───────────┘
        2400 BAUD              ↑    ↓
        FULL DUPLEX            │    │
                             ┌───────────┐
                             │ 201B TYPE │
                             │ DATA SET  │
                             │ OR EQUIV. │
                             └───────────┘
        CABLE LENGTH 10'   │  2400 BAUD
        50' MAXIMUM        │

                             ┌───────────┐
                             │ IBM 2701  │
                             │ COMM. TERMINAL
                             └───────────┘

                        ┌─────────────────────┐
                        │   IBM 360 COMPUTER   │
                        └─────────────────────┘
```

FU	FORWARDING UNIT
IOC	INPUT OUTPUT CHANNEL
SCA	SYNCHRONOUS COMMUNICATIONS ADAPTER

Section 13

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MDTS