ER-3241
ER-3231

SHARP SERVICE MANUAL

CODE: 00ZER3241SM-E

A32 C1

ELECTRONIC CASH REGISTER

MODEL ER-3231 ER-3241

OPTIONS: ER-46SP1* ER-12KT2
ER-34DW3/34DW5/34DW7* ER-22KT2
ER-46PL1 ER-11DK2
ER-12HK2 ER-51DK2
ER-11KT2 ER-33CC/33CC1
PRINTER: M-220F ER-32RS
SRV KEY: LKGIM6959RCZZ (2B5)
* for ER-3241 only

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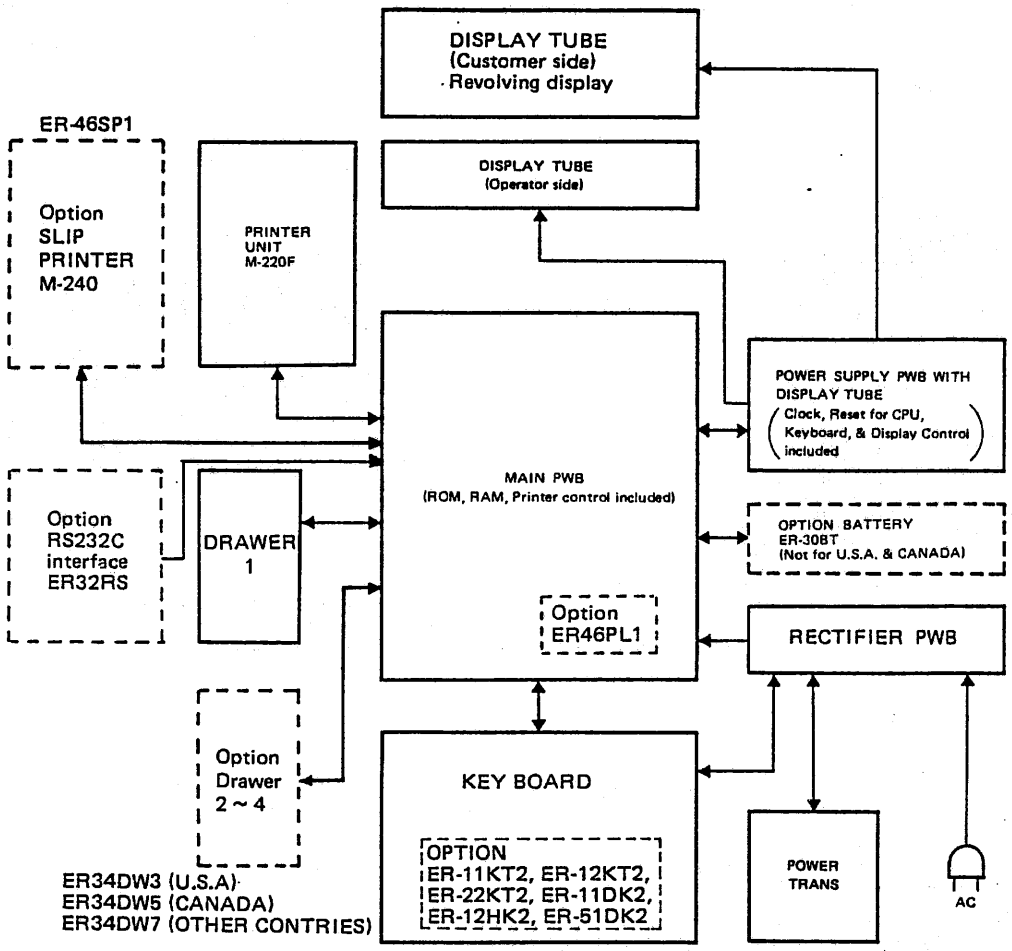
NOTE: MASTER RESET (ALL MEMORIES CLEAR)
THIS FUNCTION HAS BEEN CHANGED TO JOURNAL KEY (↑ JOURNAL),
NOT THE NUMERIC 9 KEY (9)

SHARP CORPORATION

1. INTERNAL BLOCK DIAGRAM



The items indicated within dotted line are optional devices.

2. SPECIAL SERVICE TOOLS

TOOL NAME	PARTS CODE	PRICE RANK
KEY SWITCH removal tool	UKOG-6635RCZZ	AX
KEY TOP and DUMMY KEY, removal tool	UKOG-6636RCZZ	AX

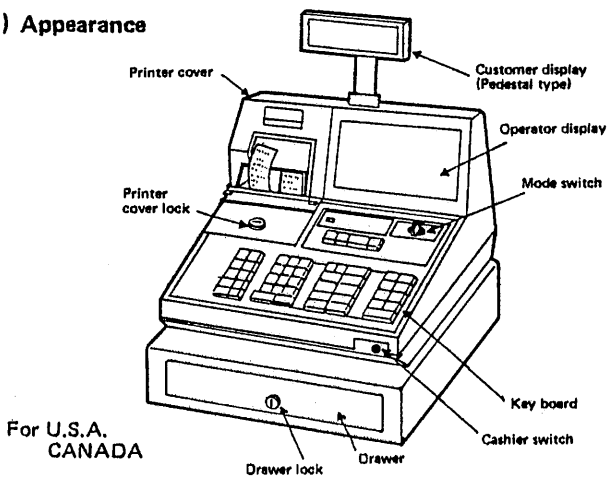
3. REFERENCE DOCUMENTS

1. Cash Register Basic Manual
2. Printer M-220F Service Manual (00ZM220F-SM-E)
3. Options Installation Manual for ER-3241/3231.

4. SPECIFICATIONS

4-1. Appearance/Rating

1) Appearance

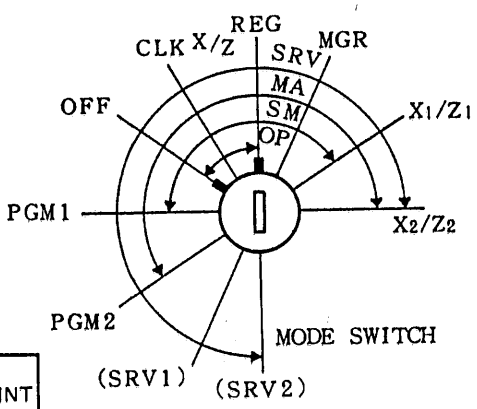


2) Rating

Model name	ER-3241
Power source	AC 115V±10% 50/60 Hz
Power consumption	46W
Operating temperature	0°C to 40°C (32 to 104°F)
Overall dimensions	514 (H) x 440 (W) x 460 (D) mm
	20-15/64 x 17-5/16 x 18-1/8 in (H) (W) (D)
Weight	39.5 lbs (18kg)

4-2. Keyboard

1) Standard Keyboard Layout



RECEIPT
OFF ON

PAPER FEED

↑ RECEIPT	↑ JOURNAL	CLK#	RCPT	PRINT

RA	PO
TAXI SHIFT	TAX2 SHIFT
⊖1	⊖2
%1	%2
RFND	VOID

@/FOR	•	CL		5	10	15	20		CH4	CH5
7	8	9		4	9	14	19		CH2	CH3
4	5	6		3	8	13	18		CH1	#/SBTL
1	2	3		2	7	12	17		CHK	MDSE SBTL
0		00		1	6	11	16		CA/AT/NS	

Cashier switch

2) Key top name (With standard feature)

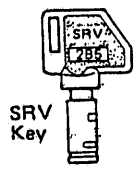
[0] [00] ~ [9] : Numeric entry
[•] : Decimal point
[CL] : Clear
[@/FOR] : Multiplication, split pricing
[↑] : Paper feed (Receipt & Journal)
[#/SBTL] : Non add code print, Time display, sub-total,
[CA/AT/NS] : Cash, Amount tender, No sale
[RA] : Received on account
[PO] : Paid out
[TAX 1 SHIFT] [TAX 2 SHIFT] : Tax shift 1, 2
[⊖1] [⊖2] : Discount
[RFND] : Refund
[VOID] : Void
[1] ~ [20] : Department
[%1] [%2] : Percent 1, 2
[PLU/SUB]* : Price look up, Sub-department
[CH1] ~ [CH5] : Charge sale
[CHK] : Check
[MDSE SBTL] : Merchandise sub-total
[CLK#] : Clerk # entry
[PRINT] : Validation print key
[RCPT] : Receipt

[L1] * : Department level-1 shift key
[L2] * : Department level-2 shift key
[L3] * : Department level-3 shift key
[SLIP] * : Slip print key
[F.S. SHIFT] * : Food stampable state reversal key
[F.S TEND./ST] * : Food stamp tendering and Food stamp subtotal key
[PB] * : Previous balance key
[CB] * : Credit balance key
[TIP] * : Tip amount entry key
[TAX] * : Tax (Manual)
[TRAY TOTAL] : Tray Total
[CASH2] * : Cash 2.

NOTE: Keys marked with asterisk * do not exist on the key board of the STANDARD KEY LAYOUT.

3) Mode Select keys

SRV : Service key (No. 2B5) LKGiM6959RCZZ
MA : Master key (No. 6B5)
SM : Sub-master key (No. 3B2)
OP : Operator key (No. 0B6)



SRV Key

4) Mode Switch Positions

SRV2 mode: ★ This mode can be selected only with the SRV key.
SRV1 mode: ● Machine initialization (partial, full)

- Feature selection
- List of options
- Special data correction
  GT1, GT2, Z counter, etc.

PGM2 mode: ★ This mode can be selected only with the SRV or MA key.
- Programming data of store control level that does not need to be frequently modified.

PGM1 mode: ★ This mode can be selected with any keys other than the OP key.
- Programming of departmental unit price, PLU unit price, %1 ~ %4 rates, etc.

OFF mode: ★ Any key can be inserted or removed from the mode switch when it is in the "OFF mode" position.
- Turning-off power.

CLK X/Z mode:
- Individual reading and resetting for clerks.
- Attendance time will be printed.

REG mode: ★ Any key can be inserted or removed from the mode switch when it is in the "REG mode" position.
- General registrations.

MGR mode: ★ This mode can be selected with any keys other than the OP key.
- All REG-mode operations and transaction void.*
- Overriding of pre-set limitation in the REG mode.

X1/Z1 mode:
- Reading and resetting of daily general reports.
- Generation of various analysis reports.

X2/Z2 mode:
- Reading and resetting of periodically accumulated reports.
- Generation of analysis reports.

***Void mode (Transaction void)**

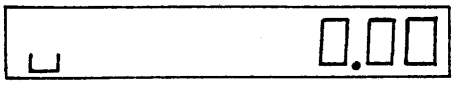
This mode serves to void incorrect registrations when they are noticed after the completion of a transaction or during the stage of tendering. The voiding operations for the latter case are as follows: temporarily finalize the current transaction, press the "VOID" key in the MGR. mode to set the machine to the VOID mode, then enter the whole transaction.

This mode allows even those registrations for which the past or last void is not applicable to be nullified.

The void mode is automatically cancelled whenever a transaction is finalized. Therefore, when clearing two or more transactions, it is necessary to first depress the VOID key before proceeding to the subsequent registration.

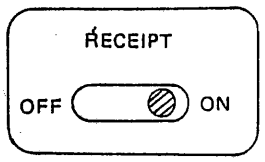
NOTE: The void mode entry is allowed only when the void mode is enabled via the SRV mode programming "JOB #902-C".

Void mode display:



Indication of void mode

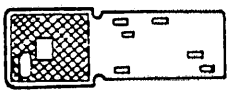
5) Receipt ON-OFF switch



This switch permits or prohibits receipt generation. To permit printing on the journal alone without receipt generation, slide the switch to the OFF position and to permit printing on both the journal and the receipt, slide it to the ON position.

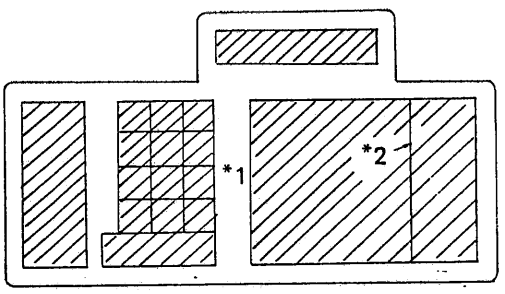
NOTE: The register will generate receipts regardless of the position of this switch except when the mode switch is in the REG position. This means that the receipt roll must be installed even when this switch is kept in the OFF position.

6) Cashier keys (A, B, D and E)



These keys serve to identify cashiers. Insert one of the A, B, D and E keys in the cashier switch.

7) Water-proof Keyboard Cover (GCOVB6822RCZZ)



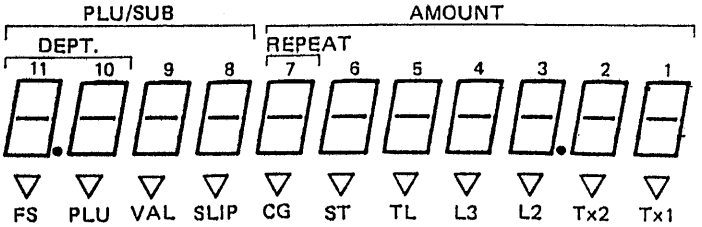
NOTE: The hatched areas protrude.

*1: Because this area does not protrude, this key cover can not be used for the key layout when this area is filled by key tops.

*2: This line does not protrude.

4-3. Display

1) Operator side display (fluorescent display tube): 11-LT-07Z



▽: Machine state indicator lamps.

Contents of display	No. of digits	Column No.	Pattern
Numerals	Numeric input 7 digits	1 to 7	1234567890
	Amount 7 digits	1 to 7	
Symbol	1 digit	4 to 9	(–) Minus sign (floating)
	1 digit	11	(P) PGM mode
	1 digit	11	(E) Error
	1 digit	11	(□) Deficit symbol
	1 digit	10	sentinel indicator
PLU	4 digits	8 to 11	4-digit display (zero-suppressed)
Dept.	2 digits	9 to 10	2-digit display (zero-suppressed)
Repeat	1 digit	7	Endless count, starting from 2
Decimal point	1 digit	2	Decimal point (1 to 3), TAB (2 to 4)
		11	Cash in drawer has exceeded a programmed amount.

The following legends are indicated by a small triangular lamp in the operator display.

TX1: Lights up when the tax shift 1 key is depressed or a taxable 1 item is registered.

TX2: Lights up when the tax shift 2 key is depressed or a taxable 2 item is registered.

L2: Lights up when a second level-Dept. is selected. (option)

L3: Lights up when third level Dept. is selected. (opcion)

TL: Lights up when a registration is finalized by pressing the CA/AT/NS, CA2, CHK, or CH1 thru CH5 without any amount tendered entry.

ST: Lights up alone or together with other lamps when the register has computed subtotals:
This lamp lights up alone when the merchandise sobtotal has been calculated.
The "ST" lamp and the deficit symbol "□" light up together when the tax-included subtotal has been calculated.
The "ST" and "TX1" lamps light up together when the taxable 1 subtotal has been calculated.
The "ST" and "TX2" lamps light up together when the taxable 2 subtotal has been calculated.
The "ST", "TX1" and "TX2" lamps light up together when the taxable 1 and 2 subtotal has been calculated.
The "ST" and "FS" lamps light up when the food stamp eligible subtotal has been calculated.

CG: Lights up whenever the change due amount appears in the display or when the total sale amount is negative.

SLIP: Lights up when the machine is set for compulsory validation or slip printing.

VAL: Lights up when the machine is set for compulsory varidation printing.

PLU: Lights up each time a PLU/SUB item is entered.

FS: Light up when an eligible for food stamp is entered.

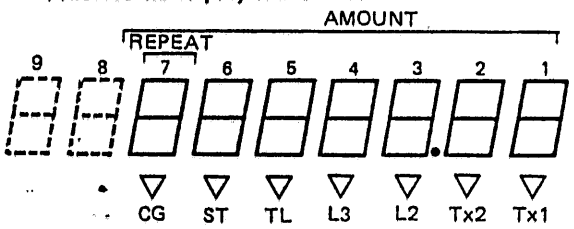
(NOTE)

The number of repeats is displayed from "2" and counted up with each repeat. When ten registrations are done, the display shows "0".

Example: (2 → 3 → 4 ..... 9 → 0 → 1 → 2 .....)

(2) Customer side display (Revolving display)

Fluorescent display tube: 9-LT-03Z



NOTE: The 8th and 9th digits are not used.

4-4. Printer (Model-220F)

1) Overview of the printer

a. Printing system: 2-station print dot matrix printer (M-220F)

b. Printing capacity: 16 digits in all (16 digits for both receipt and journal)

c. Printing speed: about 2.4 lines/sec.

d. Paper feeding speed: about 14.2 lines/sec. (receipt) about 7.1 lines/sec (journal)

e. Functions:
- Stamping
- Receipt ON-OFF and journal select function.
- Individual receipt and journal paper feeding.
- One-line validation printing.
- Validation paper detection (Journal side only)
- Journal paper roll end sensing

f. Paper width: 37.5±0.5mm 1.47" for receipt and journal, max. roll diameter: 80mm (3.14").

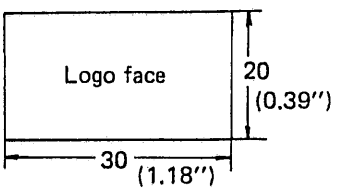
g. Paper quality:
- Receipt and journal paper: bond paper (0.07 to 0.09 mm in thickness 52.3 to 64.0g/m^2 in weight).

h. Reliability: MCBF 2 mill. line. (excluding print head unit) ... Print head unit: 40 mill. characters (life)

i. Color of print: Purple (single color)

j. Paper cutter: Manual cutter.

k. Ribbon cassette: Life: about 6 mill. characters.



2) Logo unit

a. Type: Porous rubber.

b. Color of stamp: Purple (single color)

c. Max. logo dimensions: 30(W) x 10(H) mm 1.18" x 0.39"

3) Validation printing

1. Number of validation printing lines: 1 line.
2. Number of validation columns: 35 digits
3. Recommended validation card
   (1) Type of paper: ordinary paper
   (2) Minimum paper width: 130mm(5.12 inches)
   (3) Paper thickness
   - ordinary paper 0.07~0.15mm

4-5. Drawer/Lock

1) Drawer

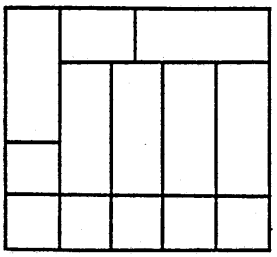
- Metallic drawer
- Open/close operation with the micro switch

Part/Rotate \ Country	U.S.A., PANAMA	CANADA	SOUTH AFRICA
Compartment	6B/6C	6B/5C	4B/8C
Rotation	180°	180°	90°
Micro switch	O	O	O

O: Installed as a standard feature.

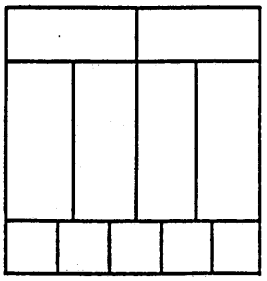
(COMPARTMENT LAYOUTS)

1-1) 6B/6C



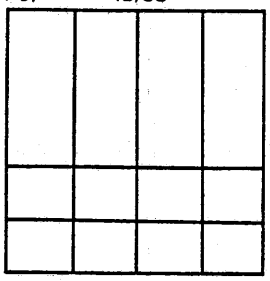
U.S.A.

1-2) 6B/5C



CANADA

1-3) 4B/8C



SOUTH AFRICA

2) Locks

2-1) DRAWER LOCK Key No. B01

(For USA and Canada)

LOCK: 180° counter clockwise

UNLOCK: 180° clockwise

(For South Africa)

OPEN: 90° clockwise

2-2) PRINTER COVER LOCK Key No. 224

LOCK: 90° clockwise

UNLOCK: 90° counter clockwise

4-6. Totalizer and Counter

Item	Totalizer	Counter	Preset	Note
GT	12Dg x 3 S			
Z counter		4Dg x 1 (2)		
DEPARTMENT	8Dg x 30 S (90)	6Dg x 30 S (90)	6Dg x 30 (90)* 1Dg x 30 (90)* 1 x 30 (90) 1 x 30 (90) 1 x 30 (90) 1 x 30 (90) 1 x 30 (90) 6 ch x 30 (90) 1 x 30 (90) 1 x 30 (90) 1Dg x 30 (90)	*UNIT PRICE *HALO +/– TAX SORT 1/2 SIS or SIF Inhibit or provide OPEN and/or PRESET Alpha N. descriptor VALIDATION enforce HASH Flag for report
DEPT. TTL	8Dg x 4 S			
PLU	8Dg x (350) S	6Dg x (350) S	6Dg x (350)* 1 x (350) 1 x (350) 1 x (350) 2Dg x (350) 2Dg x (350) 6 ch x (350)	*UNIT PRICE (or HALO amount) +/– TAX SORT 1/2 Inhibit or provide Split pricing denominator Dept. number Alpha N. descriptor

Item	Totalizer	Counter	Preset	Note
NET	8Dg x 3 S			
VOID	8Dg x 4	4Dg x 4	6 chara x 1	VOID in REG. mode, two kind of VOID TTL in VOID mode and HASH VOID.
REFUND	8Dg x 2 S	4Dg x 2 S	6 chara x 1*	Normal & hash RFND *Alpha numeric
P/O	8Dg x 1 S	4Dg x 1 S	6 chara x 1*	*Alpha numeric
R/A	8Dg x 1 S	4Dg x 1 S	1 x 1 6 chara x 1	*Tend./Direct Alpha numeric
TX'BL SALES	8Dg x 2 S			
TAX TTL	8Dg x 9 S		72 steps* 4Dg x 2	*for 2 Tables for % TAX
MEDIA TTL	8Dg x 8 S	4Dg x 8	6 chara x 8* 8Dg x 1* 1Dg x 8	*Alpha numeric *Sentinel Flag for report
(–)	8Dg x 2 S	4Dg x 2 S	6 chara x 2*	*Alpha numeric
%	8Dg x 4 S	4Dg x 4 S	4Dg x 4* 1 x 4 6 chara x 4	% rate +/– Alpha numeric
CASH CHECK	8Dg x 1	4Dg x 1	8Dg x 1*	*HALO
CASH SALE	8Dg x 2 S	4Dg x 2 S	6 chara x 2*	*Alpha numeric
CHK CHANGE	8Dg x 1		8Dg x 1*	*HALO
TIP (TOTAL)	8Dg x 2	4Dg x 2	1Dg x 1* 6chara x 2	*HALO
PLU TTL	8Dg x 1 S	4Dg x 1 S		
FS SALE	8Dg x 1	4Dg x 1		
FS CHANGE	8Dg x 1			
0 P-bal		4Dg x 1		
no sale		4Dg x 1		
validation		4Dg x 1		
slip count		4Dg x 1		
customer		4Dg x 1		
PERIODIC TTL	8Dg x ( )	4Dg x ( )		
consecutive		4Dg x 1		
machine No.			3Dg x 1	
HOURLY TTL	8Dg x 24	4Dg x 24		
CASHIER			6 chara x 4	Cashier's name
SALES	8Dg x 1 x4	4Dg x 1 x 4	*	*Same descriptor with the general report.
PO	8 x 1 x 4	4 x 1 x 4	*	
RA	8 x 1 x 4	4 x 1 x 4	*	
REFUND	8 x 1 x 4	4 x 1 x 4	*	
VOID	8 x 1 x 4	4 x 1 x 4	*	
(–)	8 x 2 x 4	4 x 2 x 4	*	
MEDIA	8 x 6 x 4	4 x 4 x 4	*	
CLERK	8Dg x 3 x 15 8 x 2 x (99)	4Dg x 3 x 15 (99) 4 x 2 x (99)	6 chara x 15 (99)	Clerk's name TIP
SLIP BUFFER	16Dg x (43)			
BALANCE FILE	8Dg x (1344) 2Dg x (1344)			amount print position

(NOTE)

The number in ( ) is the maximum number with all options.

The number out of ( ) indicates standard amount with no option installed.

"S" means "with +/– sign".

"Dg" = Digits, "chara" = Characters

4-7. Overflow Indication

If any amount totalizer except GTs which is printed on X or Z reports has overflowed, two exclamation marks are printed for each totalizer on the report.

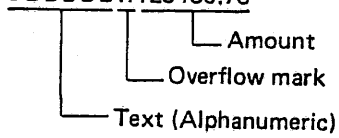
There is a possibility that the marks may be printed amounts less than the totalizer's capacity. (i.e. in case a negative registration after having overflowed causes the new amount to be within the totalizer's capacity, the marking is printed.)

A "!!" mark is printed in the 7th column from the most left column on the amount total line to show the overflow.

EXAMPLES:

1) AAAAAA!!$12345.67

2) BBBBBB!!123456.78



4-8. In Case of Power Failure

When power is lost, the machine retains its memory contents and all information on sales registrations.

(1) When a power failure is detected in either the register idling state or during registration, the machine returns to the normal state of operation after power recovery.

(2) When power-failure is detected during a print cycle, the register prints "----------" and then carries out the correct printing procedure.

4-9. Motor Seizure Detecting Function

When motor seizure is sensed due to a paper jam inside the machine or ink ribbon jam, power to the motor is shut off to prevent the motor from overheating.

(1) Motor seizure sensing method

After the motor starts to run, the CPU monitors printer timing pulses continuously.

When a timing pulse is delayed beyond the predetermined cycle, the CPU interprets it as a motor seizure and therefore turns the motor power-on signal PA7 to low level to stop the motor.

(2) Motor seizure alarm

The CPU issues intermittent buzzer-on signal PC4 after stopping the motor to alert the condition.

(3) Release of the motor seized condition.

a) Power off.

b) Remove the cause of motor seizure, such as a paper jam or ink ribbon jam.

c) Power on.

d) Depress the [CL] key.

NOTE: Even in the motor lock condition, paper feed keys (Receipt/Journal) are acceptable.

5. OPTIONS

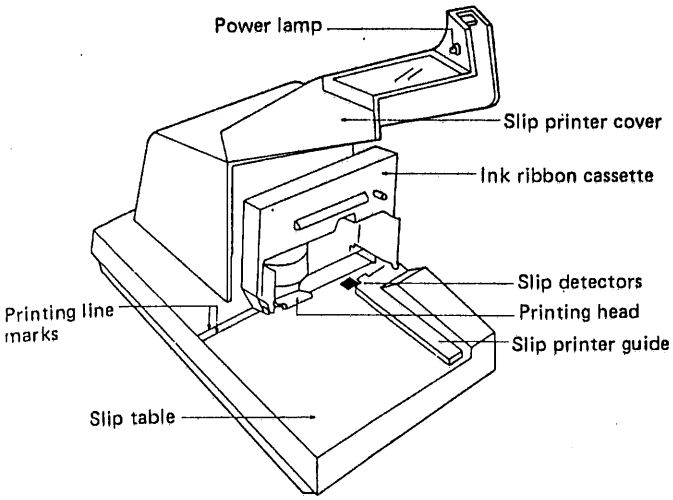
No.	Description	Model name, Parts code	RAM	Key	SRV1 setting (JOB CODE)	Note
1	Restaurant RAM	ER-46PL1	8K (HM6264)	O		8KB RAM 1 chip
2	PLU/SUB-Department	ER-46PL1	8K (HM6264)	–		8KB RAM 1 chip
3	Key kit (1 x 1 size) x 30 pcs.	ER-11KT2	–	O	#901-C, D #950	• Department expandable up to 50 depts. • Flexible key layout
4	Key kit (1 x 2 size) x 30 pcs.	ER-12KT2	–	O		
5	Key kit (2 x 2 size) x 10 pcs.	ER-22KT2	–	O		
6	Key Kit (1.5 x 2 size) x 10 pcs.	ER-12HK2	–	O		
7	Dummy key (1 x 1 size) x 30 pcs.	ER-11DK2	–	O		
8	RS232C interface	ER-32RS	–	–	#906-C	
9	Slip printer	ER-46SP1	–	–	#907A,B,C,D	
10	Remote drawer	ER-34DW3/DW5/DW7	–	–	#902-A	
11	Water proof key cover	GCOVB6822RCZZ	–	–	–	• Service parts only
12	External option battery	ER-30BT	–	–	–	Not for USA, CANADA
13	Coin case 6B/6C	ER-33CC	–	–	–	For U.S.A. and PANAMA
14	Coin case 6B/5C	ER-33CC1	–	–	–	For CANADA
15	Key kit	ER51 DK2	–	–	–	

NOTE: For installation of options, refer to the ER-3241/3231 OPTIONS INSTALLATION MANUAL.

[1] ER-46SP1 (Slip Printer)

The ER-46SP1 is a full slip printer (remote type) which can be connected to the ER-3241.

1. Appearance



2. SRV/PGM programming for slip printer

Mode	Job #	Programming Item
SRV1	907-A 907-B	• Printing method • Slip printer Yes/No
	907-C & D	• Slip selective print Slip print shifting
PGM2	255	Limit of times of slip print
	260	Slip print compulsory/Non comp.

3. Component parts

- Printer unit (slip printer M-240 FORM STOPPER MECHANISM)
- Ink ribbon (color: purple)
- Slip printer interface PWB unit
- Slip paper (standard)
- Cable (1.5 meter)
- etc.
- Slip head stopper

(NOTE)

- In case the slip is hard to insert, turn mode switch to "PGM1 or PGM2" position, depress the [SLIP] key, then try to insert the slip again. – (slip release operation).

4. Slip

Slips used for the slip printer must conform to the following standard. The use of slips that do not meet the standard causes problems, such as improper seating and blurry printing.

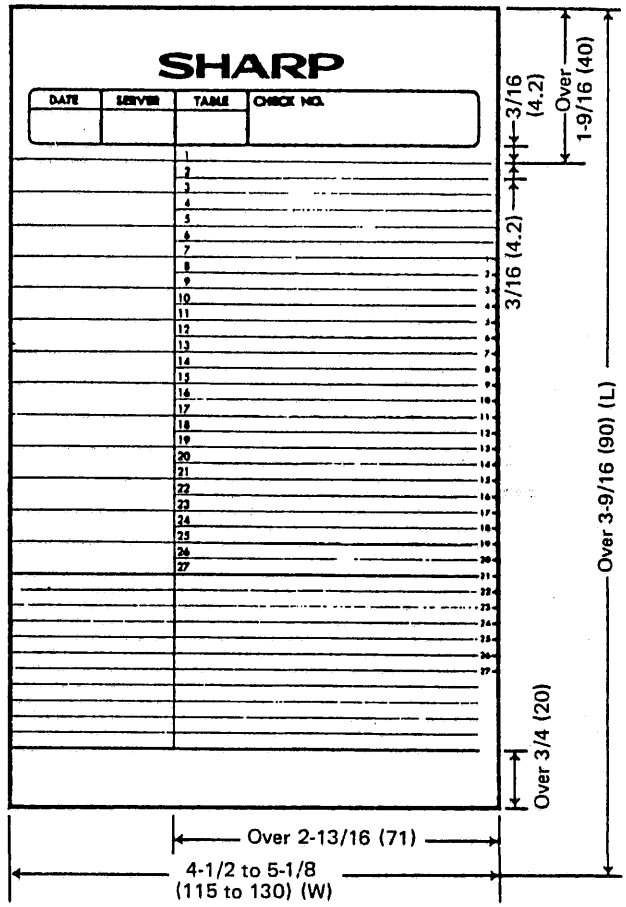
(1) Paper specifications
- Ordinary paper
- Thickness: 0.09 to 0.45 mm

(2) Form
Ordinary paper + carbon paper, or printing paper

(3) Dimensions
Width: 71 to 210 mm
Length: 90 to 297 mm
Observe the dimensions shown in illustration at right.

(4) Numbering
Print numbers as shown in illustration at right. The numbers printed in the center indicate serial numbers of printing lines, and the numbers at the right side are used to line up the slip in order to print on the proper lines. The number 1 is printed on the 7th line from above as shown in illustration at right, and the subsequent numbers are printed on the following underlines in sequence.

Format of recommended slip Unit: in. (mm)



(5) Printing position alignment of slips
Every printing occurs between two red line marks Ⓐ and Ⓑ on the slip table.
At the use of recommended slips
Place the slip along the slip printer guide. Feed it deep into the slip printer (in the direction of arrow ①) until it touches the stopper in the table.
Printing starts on the line just above the printing line No. 1 (within the frame of table/check No.) Make sure this line is between marks Ⓐ and Ⓑ.
If you want print on a line halfway on the slip, the slip can be inserted in the direction of arrow ② too.

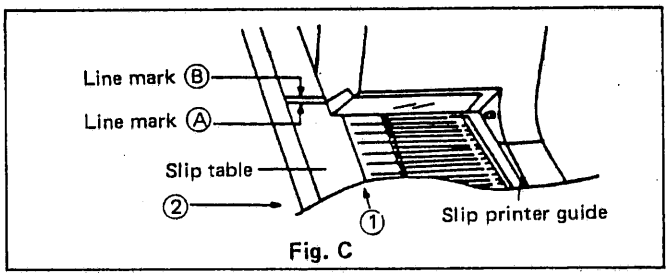
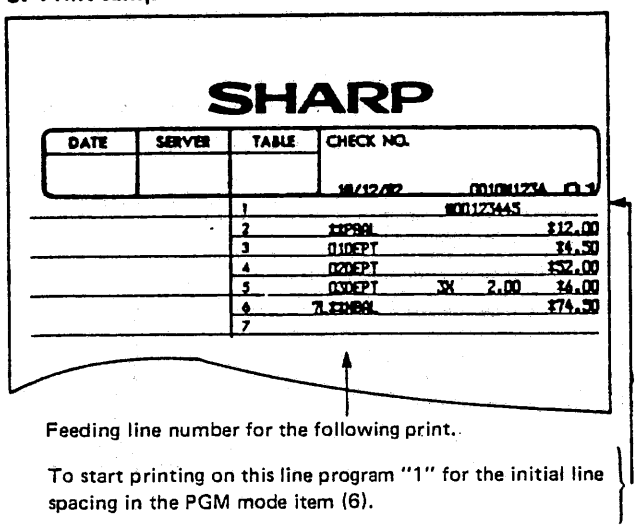


Fig. C

5. Print sample



The 2nd column may be shifted towards the right by a maximum of 16 digits. Refer to SRV mode programming #907-C & D on page 15.

5. Storage Capacity

The register is designed to store entered information first and then print it when the [SLIP] key is pressed after the finalization of a transaction (or pressing the [CA/AT/NS], [CHK], or [CH1] thru [CH5] key). Therefore, if it stores 44 lines of information, its storage capacity is fully used and it is required to print the stored information on a slip (the "SLIP" lamp lights up). If you make further entries under such a situation, an error occurs. If you encounter such an error, follow the procedure below.

(1) Clear the error with the [CL] key.
(2) Press the [SLIP] key to achieve slip printing.
(3) When the "SLIP" lamp goes off, enter the remainder of information.

If you do not need any slip printing, follow the procedure below.

(1) Clear the error with the [CL] key.
(2) Press the [@/FOR] key.

This key operation causes the register to print "SLIP BUF DELETE" on the journal and clears the slip buffer memory — which is intended to temporarily store all entered information to be printed on a slip. That enables the entry of the remainding information.

6. Compulsory Slip Printing

If a transaction is finalized using the transaction finalize key and programmed for compulsory slip printing, the "SLIP" lamp lights up in the display. In this case perform slip printing by the programmed number of times. If this printing is not done, the register does not accept further entries.

7. Slip Detectors

Two slip detectors (TOF, BOF) are provided at area shown in Fig. A. If the slip is not inserted in this area, the detector senses no slip, and does not print.

If the SLIP key is depressed without slip insertion correctly, or slip ends during slip printing, the ER-3241 will enter the error state (with continuous buzzer sound and display "E"). Meanwhile, the slip printer prints ＊CONTINUE＊ on the slip and releases its paper holder.

If such a situation is encountered, insert the slip correctly and depress the [SLIP] key. This will cause the ER-46SP1 to print a consecutive number and ＊CONTINUE＊ on the slip and only the information which has not printed yet.

TOF: Top of form
BOF: Bottom of form

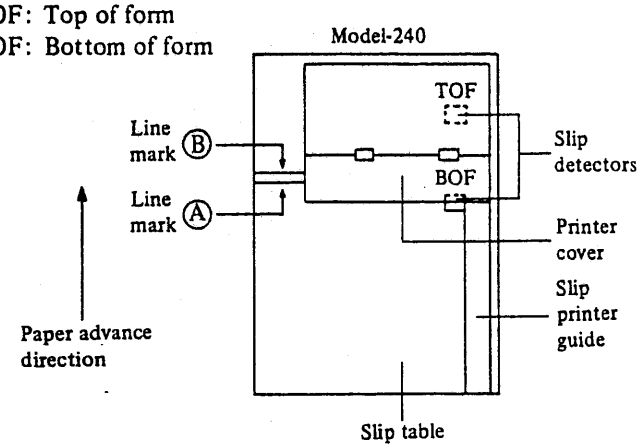


Fig. A

FOR A DESCRIPTION OF THE ER-46SP1 INTERFACE CIRCUIT, REFER TO THE ER-3241 PRINTER M-220F CIRCUIT DESCRIPTIONS ON THIS MANUAL SINCE THE CIRCUIT IS ALMOST THE SAME AS THAT OF THE M-220F.

8. Validation Print

Connecting the slip printer to the cash register prevents its built-in printer from performing validation printing, Carry out validation printing by use of the slip printer.

After pressing the [CA/AT/NS], [CH1], [CH2], [PO] or [RA] key, (dept. key or PLU/SUB key), hold a simple receipt to the slip guide and advance the receipt deep into the printer until it touches the holder.

Depress the VP key permits the validation printing.

NOTE: When the machine has been programmed "COMPULSORY" for total validation print, if a slip paper is being inserted in the slip printer, the total validation print is automatically performed once on the slip after transaction finalizing key depression ([CA/AT/NS], [CH1], [CH2], keys).

9. Error

If the slip advances inward and is out of contact with the detectors or the slip is drawn out in the course of printing, the detectors are off.

In this case the ER-3241 behaves as follows:

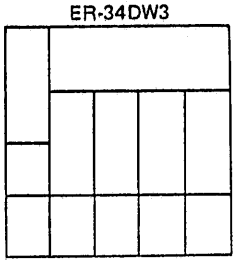
1. The status lamp "SLIP" lights up.
2. The alarm produces an error warning sound (long note).

The slip printer prints "→→→→ " on slip.

The slip printer release its paper holder. If such situation is encountered, stop the sound by indexing the [CL] key, insert the slip properly, and index the [SLIP] key.

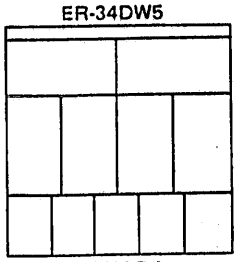
This causes the slip printer to print a consecutive number, "→→→→" and information which is not printed yet, and the build-in printer to print "★★★SLIP PRINT" on journal.

[2] ER-34DW3/34DW5/34DW7 (Remote Drawer)



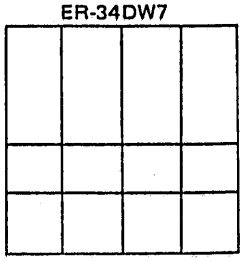
U.S.A
PANAMA

6 bill/6 coin



CANADA
BARBADOS

6 bill/5 coin



SOUTH AFRICA

4 bill/8 coin

Cable length: 1.5 m **Fig. B**

- PROGRAMMING IN THE SRV-1 MODE
  JOB #902-A: Number of drawers

6. QUICK REFRENECE TO PROGRAM JOB NUMBERS AFFECTING KEYS, FUNCTIONS AND REPORTS

	SUBJECT	SRV JOB #	PGM2 JOB #	PGM1 JOB #
A	AMOUNT SYMBOL	905		
	AMOUNT TENDER		260	
C	CASHIR	902, 915		145
	CLERK	902, 906, 917		140, 144
	CONSECUTIVE #	905	253	
	CB	905, 907	231, 234, 260	
	CA2		260, 262, 263, 264	
	CHK	905	230, 260, 261, 262, 263, 264, 274	
	CH1–CH5		260, 262, 263 264, 213	
	CLK X/Z		256	
	CUPON		235	
D	DEPARTMENT	901	210, 212, 214 256	110
	DATE	905	250	
	DRAWER	902, 903	260	
F	FOOD STAMP	906	211, 221, 231	
	FRACTION TREATMENT	903		
	FREE KEY LAYOUT	950		
G	GT (GT1 – GT3)	904, 920, 921, 922, 923		
H	HASH	901	210	
	HALO		212, 232, 261, 262	
J	JOURNAL SELECT		256	
L	LOGO	906	254	
M	MDSE	905		
	⊖1 – ⊖2		231, 232, 234, 236	
	MACHINE NUMBER		252	
N	NON ADD CODE	906	230	

	SUBJECT	SRV JOB #	PGM2 JOB #	PGM1 JOB #
P	PLU/SUB	902, 904, 907	221, 224	120, 121
	PB	905, 908	231, 234, 260	
	% (%1 – %4)	903	231, 234, 235	130
	PO		230, 232, 234	
	PGM1		280	
	PERIODIC REPORT	902		
R	RS232C	906		
	RA	903	230, 232, 234	
	RFND		234, 256	
S	SBTL	904, 905	213, 260, 263	
	SLIP	907	255, 260	
	SECRET CODE	930	280, 281, 282	
	SPLIT PRICING		234	
	SENTINEL		257	
	STACK REPORT		286	
T	TAX	903, 904, 905	211, 221, 231, 232, 234, 240, 241, 260, 284	
	TIP	907	232, 234	
	TRAY		234	
	TIME		251	
V	VOID MODE	902		
	VOID		234, 256	
	VALIDATION		260, 274	
Z	Z COUNTER	910 – 917		
	Z1		281	
	Z2		282	

7. SRV (SERVICE) MODE

Service (SRV) Key is Required for use in service mode 1 or 2.

7-1. Program Reset

In the event the unit becomes "LOCKED" in a program loop, the programming may be restarted without altering memory in the following manner:

1) Method A

1. Remove the power cord from the AC outlet.
2. Turn the mode switch from the service 2 position to the service 1 position (SRV1).
3. Re-insert the AC plug into the outlet.

2) Method B

1. Turn the mode switch from the service 2 position to the service 1 position. (SRV2 to SRV1)

7-2. Master Reset (All Memories Clear)

To clear all memories and place the program in a key halt (wait) condition, do the following:

(1) Turn the mode switch to the service 2 mode position.
(2) Depress and hold **journal paper feed key.**
(3) While holding the key depressed, turn the mode switch from the service 2 mode position to the service 1 mode position. (SRV2 to SRV1)

Note 1: After performing this procedure the unit must be completely reprogrammed in both the service (SRV) mode and program (PGM) mode.

Note 2: After turning the mode switch to the service 2 mode position, the memory is cleared of the date and time. Therefore the unit must be set in the PGM2 mode.

If the MASTER RESET operation is performed, the following readouts should be seen for service 1 (SRV-1) mode program and PGM mode program. ..... See Sample Print-1 and 2.

7-3. Reading of SRV1 Mode Programming

[JOB CODE #900]

All SRV programming reports including the key layout report are printed in the SRV1 mode by JOB code #900.

Key operation:

900 → [#/SBTL] → [CA/AT/NS]

[JOB DOE #950]

The key layout report is printed in the SRV1 mode by JOB code #950.

Key operation:

950 → [#/SBTL] → [CA/AT/NS]

SRV1 mode (JOB #900)

900 → [#/SBTL] → [CA/AT/NS]

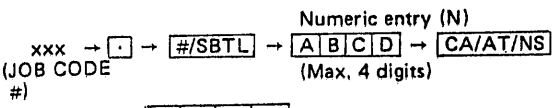
```
00/00/00 12:00AM
000A#0000    ****
     /

#0900

  901# 1020
  902# 1020
  903# 5002
  904# 0200
  905# 3000
  906# 0000
  907# 0000
  910#    Z1 0000
  911#    Z2 0000
  912#    Z2 0000
  913#    Z1 0000
  914#    Z1 0000
  915#    Z1 0000
  916#    Z1 0000
  917#    Z1 0000
  920#
  921#
GT1
  $0000000000.00
  922#
  923#
GT2
  $0000000000.00
GT3
  $0000000000.00

  930# 0000
```

```
#0950

  1 DPT.01 KEY16
  2 DPT.02 KEY17
  3 DPT.03 KEY18
  4 DPT.04 KEY19
  5 DPT.05 KEY20
  6 DPT.06 KEY21
  7 DPT.07 KEY22
  8 DPT.08 KEY23
  9 DPT.09 KEY24
 10 DPT.10 KEY25
 11 DPT.11 KEY26
 12 DPT.12 KEY27
 13 DPT.13 KEY28
 14 DPT.14 KEY29
 15 DPT.15 KEY30
 16 DPT.16 KEY31
 17 DPT.17 KEY32
 18 DPT.18 KEY33
 19 DPT.19 KEY34
 20 DPT.20 KEY35
 21 DPT.21  --
 22 DPT.22  --
 23 DPT.23  --
 24 DPT.24  --
 25 DPT.25  --
 26 DPT.26  --
 27 DPT.27  --
 28 DPT.28  --
 29 DPT.29  --
 30 DPT.30  --
 31 DPT.31  --
 32 DPT.32  --
 33 DPT.33  --
 34 DPT.34  --
 35 DPT.35  --
 36 DPT.36  --
 37 DPT.37  --
 38 DPT.38  --
 39 DPT.39  --
 40 DPT.40  --
 41 DPT.41  --
 42 DPT.42  --
 43 DPT.43  --
 44 DPT.44  --
 45 DPT.45  --
 46 DPT.46  --
 47 DPT.47  --
 48 DPT.48  --
 49 DPT.49  --
 50 DPT.50  --
```

```
 51 PLU      --
 52 CASH2    --
 53 CH1      KEY43
 54 CH2      KEY44
 55 CH3      KEY47
 56 CH4      KEY45
 57 CH5      KEY48
 58 CHECK    KEY42
 59 ST       KEY46
 60 TTL      --
 61 VOID     KEY06
 62 RFND     KEY01
 63 %1       KEY02
 64 %2       KEY07
 65 %3       --
 66 %4       --
 67 (-)1     KEY03
 68 (-)2     KEY08
 69 TX S1    KEY04
 70 TX S2    KEY09
 71 MTAX     --
 72 ***R/A   KEY05
 73 ***P/O   KEY10
 74 FS SFT   --
 75 FS TND   --
 76 PRINT    KEY51
 77 RCPT     KEY50
 78 SLIP     --
 79 L 1      --
 80 L 2      --
 81 L 3      --
 82 **PBAL   --
 83 **CBAL   --
 84 CLK#     KEY49
 85 TIP IN   --
```

7-4. Service Mode Programming (SRV1 mode)

All programming procedures have the following key entry sequence:



The part of A B C D is described in each detail item section.
As long as the decimal point key is not depressed, the programming in the machine will not change.

LIST OF SRV MODE PROGRAMMING

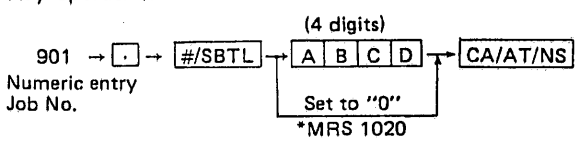
(JOB #)

901 Dept. programming
902 Optional features
903 Optional features
904 Print skipping
905 Printing MISC
Validation/date print format/check digit/
Amount leading symbol/key entry during RCPT issuing
906 Tax payment with FS/tip print/slip printer
907 Slip printing method
910 Z counter setting for Z1 report
911 Z counter setting for Z2 report
912 Z counter setting for TAX report
913 Z counter setting for Hourly report
914 Z counter setting for PLU report
915 Z counter setting for Cashier report
916 Z counter setting for Balance file report
917 Z counter setting for clerk report
920 GT1 upper 6 digits setting
921 GT1 lower 6 digits setting
922 GT2 upper 6 digits setting
923 GT2 upper 6 digits setting
930 Secret code for PGM2 mode
950 KEY LAYOUT assignment

The following explains the detail of the programming.

[JOB CODE #901]

Key operation:



* MRS means Master Reset which is the default preset after a SRV mode initialization.

#901-A Number of department levels

Level-1	Level-2	Level-3	KEY ENTRY
Yes	No	No	1
Yes	Yes	No	2
Yes	Yes	Yes	3

* Refer to section 7-4. on page 18.

NOTE: Level shift auto-return/manual return may be selected in the PGM2 mode (JOB #256).
Level-1: Dept. 1 ~ (X)
Level-2: Dept. 31 ~ (30 + X)
Level-3: Dept. 61 ~ (60 + X)
X = 1 – 30: defined by SRV Program #901.

#901-B 1. Level shift (1, 31, 61...)/Level by level (1, 2, 3, 4...) for department print sequence in the general report.
The selection is not effective when the A is "1" (i.e. always zero for the case).
2. Hash Dept. programming allowed in PGM2/Not.
3. Zero skip on department report./Not.

(1) Level shift (1, 31, 61 ...) Level by level (1, 2, 3, 4 ...) general report	(2) Hash Dept Programming in PGM2	(3) Zero skip on Dept report	KEY ENTRY
1, 2, 3, 4 ...	Not allowed	Skip	0
		No Skip	1
	Allowed	Skip	2
		No Skip	3
1, 31, 61 ...	Not allowed	Skip	4
		No Skip	5
	Allowed	Skip	6
		No Skip	7

* Reports issued in the X1/Z1 and X2/Z2 modes.

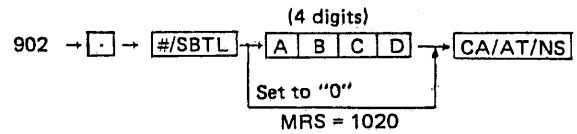
#901-C, D: Number of departments

NUMBER OF DEPARTMENTS	KEY ENTRY
1	01
2	02
3	03
4	04
5	05
6	06
7	07
8	08
∫	∫
48	48
49	49
50	50

1. The number can be selected only in 1 – 30 if the A is not "1".
2. The number of departments can be expanded to 24 by the key option (ER11KT2, ER12KT2, ER22KT2, ER12HK2, ER11DK2). For the key top layout of the department expansion, refer to JOB #950.

[JOB CODE #902]

Key operation:



#902-A

Number of drawers.
The cashier A, B, D and E are assigned to a drawer by a fixed relation which is decided automatically by the number of drawers used for an ECR.

Number of drawer	(Cashier) drawer #	KEY ENTRY
0	No drawer	0
1	(A, B, D, E)1	1
2	(A, B)1, (D, E)2	2
3	(A)1, (B)2, (D,E)3	3
4	(A)1, (B)2, (D)3, (E)4	4

Drawer #1 = Standard fixed drawer
Drawer #2–4 = Optional remote drawers
(ER-34DW3, ER-34DW5, ER34DW7)

#902-B

1. Cashier media totals exists/Does not exist on cashier reports.
2. Clerk # appear/Hidden

	Display	Print
Appear	1234	1234
Hidden	———	* * * *

(Clerk #: 1234) Clerk # may be preset in either PGM1 or PGM2 mode (JOB #140).

3. Clerk # entry compulsory/Non compulsory in the REG and CLK X/Z modes.

(1) Cashier * media totals	(2) Clerk #	(3) Clerk # entry	KEY ENTRY
Not exist (SALE, CID print only)	Hidden	Non comp.	0
		Compulsory	1
	Appear	Non comp.	2
		Compulsory	3
Exist	Hidden	Non comp.	4
		Compulsory	5
	Appear	Non comp.	6
		Compulsory	7

#902-C

1. Clerk sales total to include tax or not include tax.
2. One hole cashier switch/4 PUSH down clerk switch
3. Enable or inhibit of void mode in the MGR mode.

(1) Clerk sales total includes tax or not	(2) One hole cashier switch/4 push down switch (Select always "2" for ER324)	(3) void mode	KEY ENTRY
Not include	4 push clerk switch	Enable	0
		Inhibit	1
	One hole clerk switch	Enable	2
		Inhibit	3
Includes	4 push clerk switch	Enable	4
		Inhibit	5
	One hole clerk switch	Enable	6
		Inhibit	7

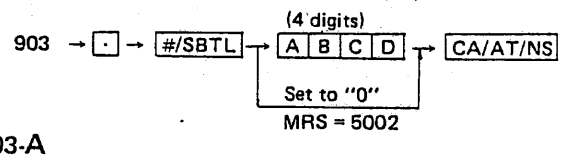
#902-D

1. Enable or disable periodic (Monthly total) report in the X2/Z2 mode.
2. Enable of disable PLU/Sub department function.
3. Zero skip on PLU report in the X1/Z1 mode.

(1) Periodic report (X2/Z2)	(2) PLU/ Sub dept.	(3) Zero skip on PLU report	KEY ENTRY
Inhibit	Inhibit	Skip	0
		Not skip	1
	Enable	Skip	2
		Not skip	3
Enable	Inhibit	Skip	4
		Not skip	5
	Enable	Skip	6
		Not skip	7

[JOB CODE #903]

Key operation:



#903-A

Fraction treatment for multiplication and % calculation.

Fraction treatment	KEY ENTRY
Round down	0
Round off	5
Round up	9

EXAMPLE

Example of regist. / Result	*0.03@ 30% = *0.00 (9)	*0.03@ 10% = *0.00 (3)
Round down (0)	*0.00	*0.00
Round off (5)	*0.01	*0.00
Round up (9)	*0.01	*0.01

◯ : rounded digit

#903-B

1. The key operation is possible or impossible when the drawer is open.
2. Selection of either Singapore tax or normal tax.

(1) Operation with drawer open	(2) Singapore tax* normal tax	KEY ENTRY
Disable	Normal tax	0
	Singapore tax	1
Enable	Normal tax	2
	Singapore tax	3
Disable	Normal tax	4
	Singapore tax	5
Enable	Normal tax	6
	Singapore tax	7

#903-C

1. Enable or disable tax delete function.
2. Error action for incorrect operation.
   LOCK ERROR: Long error released by [CL] key. (2 seconds)
   ONE SHOT ERROR: Short error
3. Enable or inhibit key catch sound.

(1) Tax delete*	(2) Error action	(3) Key catch sound	KEY ENTRY
Disable	All lock	Enable	0
		Inhibit	1
	Lock & One shot	Enable	2
		Inhibit	3
Enable	All lock	Enable	4
		Inhibit	5
	Lock & One shot	Enable	6
		Inhibit	7

#903-D

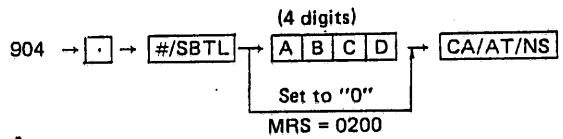
1. Received on account (RA) with tendering or Direct Received on account.
2. Enable or inhibit No sale after non add code (#) print.
3. Enable or inhibit No sale function.

#903-D

(1) RA with tender or direct RA	(2) No sale after non add code print	(3) No sale	KEY ENTRY
With tender	Enable	Enable	0
		Inhibit	1
	Inhibit	Enable	2
		Inhibit	3
Direct	Enable	Enable	4
		Inhibit	5
	Inhibit	Enable	6
		Inhibit	7

[JOB CODE #904]

Key operation:



#904-A

1. GT1 (Grand total 1) is printed on Z report or skipped.
   GT1 = Grand total of plus registrations.
2. GT2 (Grand total 2) is printed on Z report or skipped.
   GT2 = Grand total of minus registration.
3. GT3 (Grand total 3) is printed on Z report or skipped.
   GT3 = Net grand total (GT1 – GT2)

(1) GT1	(2) GT2	(3) GT3	KEY ENTRY
Print	Print	Print	0
		Skip	1
	Skip	Print	2
		Skip	3
Skip	Print	Print	4
		Skip	5
	Skip	Print	6
		Skip	7

#904-B

1. GT3 is printed on X reports./Skipped.
2. Coupon PLU is printed on X, Z reports./ Skipped.
3. Net sales SBTL is printed on X, Z report./Skipped.

(1) X report GT3 Print	(2) X/Z report coupon PLU Print	(3) X/Z report Nets ST Print	KEY ENTRY
Skip	Print	Print	0
		Skip	1
	Skip	Print	2
		Skip	3
Print	Print	Print	4
		Skip	5
	Skip	Print	6
		Skip	7

#904-C

1. Taxable 1 subtotal is printed on X, Z reports or skipped.
2. Gross Tax 1 and refund Tax 1 total are printed on X, Z report or skipped.
3. Net Tax 1 total isprinted on X, Z reports or skipped.

#904-C

(1) Taxable 1 subtotal	(2) Gross Tax 1 & Refund Tax 1 total	(3) Net Tax 1 total	KEY ENTRY
Print	Print	Print	0
		Skip	1
	Skip	Print	2
		Skip	3
Skip	Print	Print	4
		Skip	5
	Skip	Print	6
		Skip	7

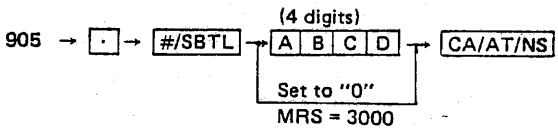
#904-D

1. Taxable 2 subtotal is printed on X, Z reports or skipped.
2. Gross Tax 2 and refund Tax 2 total are printed on X, Z reports or skipped.
3. Net Tax 2 total is printed on X, Z reports or skipped.

(1) Taxable 2 subtotal	(2) Gross Tax 2 & Refund Tax 2 total	(3) Net Tax 2 total	KEY ENTRY
Print	Print	Print	0
		Skip	1
	Skip	Print	2
		Skip	3
Skip	Print	Print	4
		Skip	5
	Skip	Print	6
		Skip	7

[JOB CODE #905]

Key operation:



#905-A

1. Total tax amount are printed on X, Z reports or skipped.
2. Gross manual tax and refund manual tax are printed on X, Z reports or skipped.
3. Net manual tax total is printed on X, Z reports or skipped.

(1) X/Z report TOTAL TAX Print	(2) X/Z report Gross manual Tax & Refund manual Tax	(3) X/Z report Net manual Tax	KEY ENTRY
Print	Print	Print	0
		Skip	1
	Skip	Print	2
		Skip	3
Skip	Print	Print	4
		Skip	5
	Skip	Print	6
		Skip	7

#905-B

1. Regular header format./With the consecutive number in larger in size.
2. Regular header format./Two line header (special format 2: i.e. No cashier/clerk name print)
3. Check change total is printed on X, Z reports or skipped.

(1) Special format 1	(2) Special format 2	(3) Check change total	KEY ENTRY
Regular header	Regular header	Print	0
		Skip	1
	2 line header	Print	2
		Skip	3
Consecutive number	Regular header	Print	4
		Skip	5
	2 line header	Print	6
		Skip	7

#905-C

1. Key entries during receipt issuing action (from depression of a transaction finalizing key CA/AT/NS , CH1~CH5 or CHK", PO or RA key to the finalizing of receipt issuing) are valid/invalid.
2. Validation print format: Date/Time or Machine No./Consecutive No.
3. Merchandise subtotal is printed or skipped.

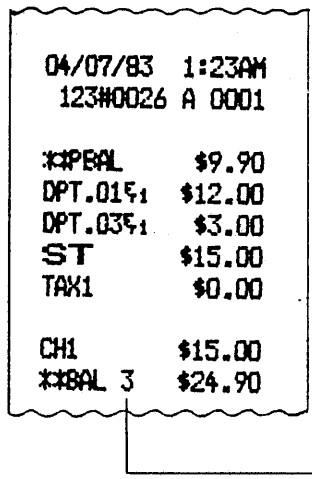
(1) Key entry during receipt issuing	(2) Validation print format	(3) Merchandise subtotal	KEY ENTRY
Valid	Date/Time	Skip*	0
		Print	1
	M-No./C-No.	Skip*	2
		Print	3
Invalid	Date/Time	Skip*	4
		Print	5
	M-No./C-No.	Skip*	6
		Print	7

- Date/Time: 00/00/00 12:00AM CASH $1.23
  (00/00/00 = Date)
- Machine No. / Consecutive No.: 000#0013 A CASH $1.23

*SKIP: Merchandise subtotal amount is displayed by depressing [MDSE SBTL] key but not printed.

#905-D

1. Check digit exists for P-BAL and C-BAL/Not exist. If "Exist" is selected; A check digit is automatically produced together with the amount of new balance. When entering previous balance (P-BAL) amount or credit balance (C-BAL) amount, the check digit must be entered prior to the amount.



- Sample receipt for previous balance registration

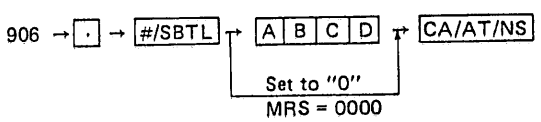
2. Date format: Day-Month-Year or Month-Day-Year
3. Amount leading symbol: * or $.

(1) Check digit	(2) Date format*	(3) Amount leading symbol	KEY ENTRY
Not exist	M-D-Y	$	0
		*	1
	D-M-Y	$	2
		*	3
Exist	M-D-Y	$	4
		*	5
	D-M-Y	$	6
		*	7

*M: Month D: Day Y:Year

[JOB CODE #906]

Key operation:



#906-A.

Tax payment in Food Stamp*

Tax payment in Food Stamp	KEY ENTRY
Enable	1
Disable	2
Tax forgiveness	3

* Food stamp function is enabled via Job #950 (enabling FS SHIFT, FS TEND keys).

#906-B.

1. 99 or 15. clerks
2. Non-add code enforced./Not.
3. Maximum digits of non-add code 14 or 8.

(1) Clerks	(2) Non-add code enforced /Not	(3) Maxinum digits of Non-add code	KEY ENTRY
15	Not	8	0
		14	1
	enforced	8	2
		14	3
99	Not	8	4
		14	5
	enforced	8	6
		14	7

#906-C

1. RS232C interface exist./Not.
2. Print by #/SBTL key./Not.
3. Footer print control
   Only for the case of finalization by the special media key (see JOB #263 in PGM2)./For the all receipt.

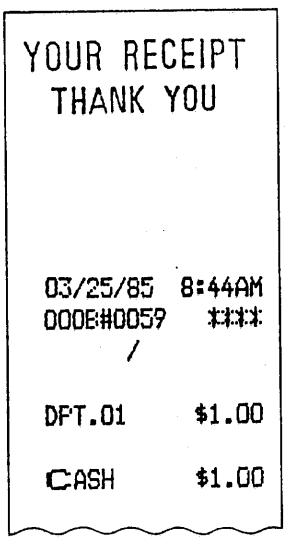
(1) RS232C	(2) SBTL Print	(3) Footer print control	KEY ENTRY
NO	Inhibit	All receipt	0
		Special media key*	1
	enable	All receipt	2
		Special media key*	3
YES	Inhibit	All receipt	4
		Special media key*	5
	enable	All receipt	6
		Special media key*	7

*; Need programming for JOB #263 in PGM2 mode

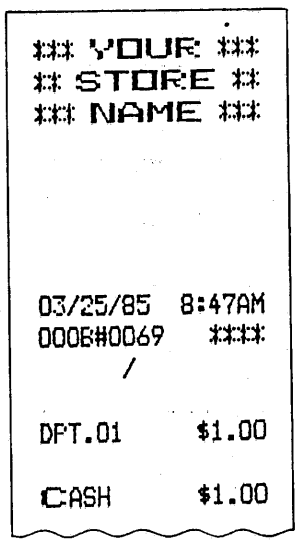
#906-D

Logo message format

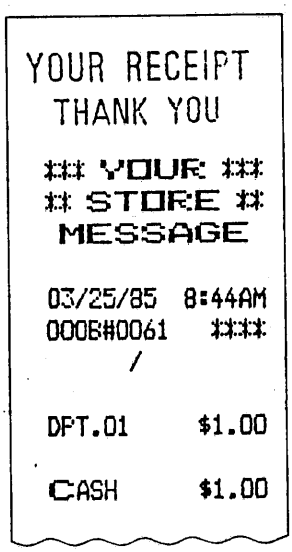
Logo message format		KEY ENTRY
No logo message (logo stamp only)	SMPL 1	0
3 line logo message instead of stamp	SMPL 2	1
Logo stamp and 3 line header message	SMPL 3	2
Six line header message instead of stamp	SMPL 4	3
Logo stamp and 3 line footer	SMPL 5	4
3 line header, 3 line footer and stamp	SMPL 6	6
Logo stamp and six line footer	SMPL 7	8



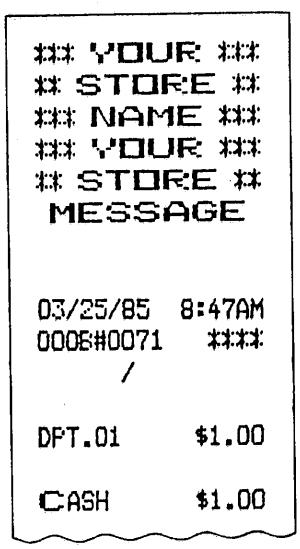
SMPL 1



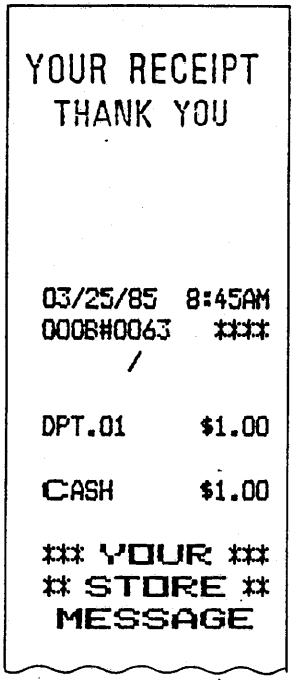
SMPL 2



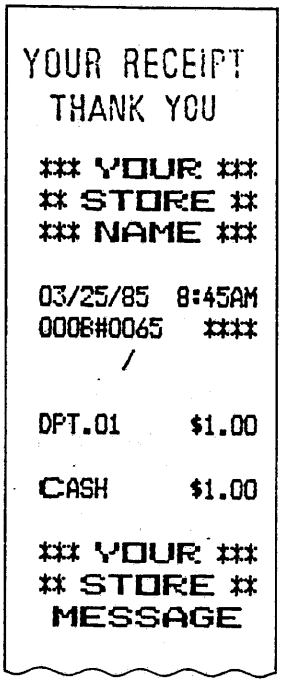
SMPL 3



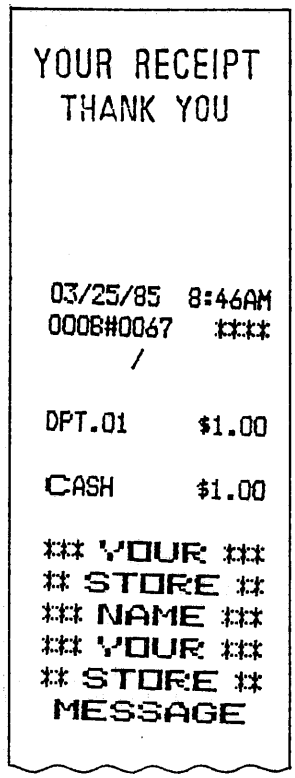
SMPL 4



SMPL 5



SMPL 6



SMPL 7

[JOB CODE #907]

Key operation

907 → [.] → #/SBTL → ABCD → CA/AT/NS

(Set to 0; MRS = 0000)

#907A

1. SLIP printing method
   Through the print buffer/Real time print (alternative printing) = +4/0
2. Maximum number of BF (Balance File) and PLU = +0 –3
   0: 0 BF and 0 PLU, or 0 BF and 350 PLU's**
   1: 320 BF's and 350 PLU's ***, or 320 BF's and 0 PLU*
   2: 625 BF's and 250 PLU's ***
   3: 1344 BF's and 0 PLU***

(1) Slip printing method	(2) Maximum number of balance file (PB look up) and PLU	KEY ENTRY
Real	0 BF and 0 PLU, 0 BF and 350 PLU's	0
	320 BF and 350 PLU, 320 BF and 0 PLU	1
	625 BF and 250 PLU	2
	1344 BF and O PLU	3
Buffer	0 BF and 0 PLU, 0 BF and 350 PLU's	4
	320 BF and 350 PLU, 320 and 0 PLU	5
	625 BF and 250 PLU	6
	1344 BF and 0 PLU	7

#907B

1. TIP totalizer and counter are printed on the each clerk report.*/Not.
2. Slip printer exist./Not.
3. Header (date, time, etc.) printed on SLIP by RO key./Not.

(1) Clerk report TIP TTL counter print	(2) Slip printer exist	(3) Header printed on slip by RO Key	KEY ENTRY
NO	NOT	YES	0
		NOT	1
	YES	YES	2
		NOT	3
YES	NOT	YES	4
		NOT	5
	YES	YES	6
		NOT	7

#907C, D

1. C&D Slip print shifting.
2. Slip print select (short format)./Full print format.

(1) Slip print digit of slip print	(2) Slip print select (short format) full print	KEY ENTRY
No shift	Full print format	0
1 digit		1
≀		≀
16 digit		16
		17
		18
		19
	Short format	20
		≀
		36

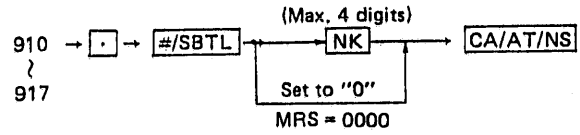
*The feature requires a optional RAM chip at the #1 socket position on the main board (i.e. the restaurant RAM).
**The feature requires a optional RAM chip at the #2 socket position on the main board (i.e. the PLU/SUB RAM).
***The features reqire the both of optional RAM chips at #1 and #2.

(PROGRAMMING PROCEDURE)

[JOB CODE #910]~ [JOB CODE #917]

Z counter setting (Max. 4 digit)

Key operation:

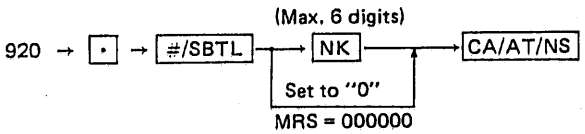


910: Z1 report
911: Z2 report
912: Tax report
913: Hourly report
914: PLU report
915: Cashier report
916: Balance file report
917: Clerk report

[JOB CODE #920]

GT1 upper 6 digits setting

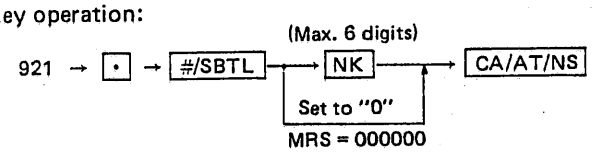
Key operation:



[JOB CODE #921]

GT1 lower 6 digits setting

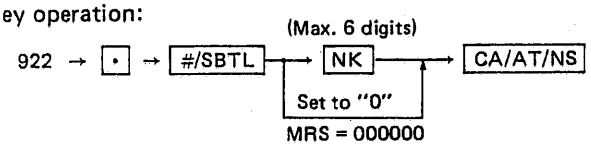
Key operation:



[JOB CODE #922]

GT2 upper 6 digits setting

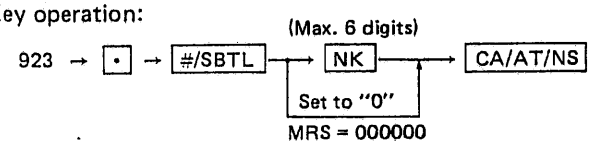
Key operation:



[JOB CODE #923]

GT2 lower 6 digits setting

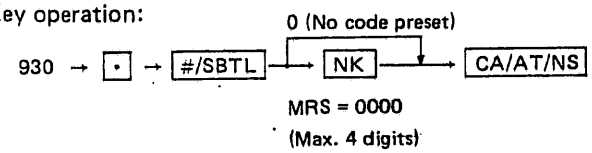
Key operation:



[JOB CODE #930]

Secret code for PGM2 mode.

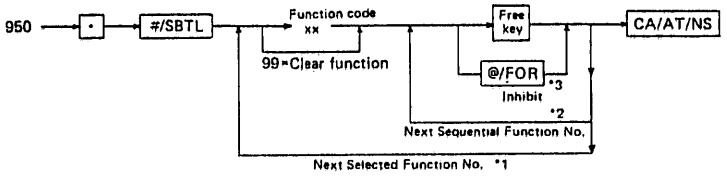
Key operation:



[JOB CODE #950]

Flexible key layout function

Up to 51 positions are reserved for free function keys. The related printing on the general reports are also defined to be printed or skipped by this programming.



① Function codes are as shown in Table 1.

*1. To override the automatic assignment.

*2. To update the function code automatically to a new one.

*3. To inhibit the entered function.

Be sure to inhibit every function that is not to be used.

② The function code for the free key function name LIST

FUNCTION CODE TABLE

Function Code	Free Key Function Name
1 ~ 50	DEPARTMENTS
51	PLU/SUB
52	CASH 2
53	CHARGE 1
54	CHARGE 2
55	CHARGE 3
56	CHARGE 4
57	CHARGE 5
58	CHECK
59	MDSE SBTL
60	TRAY TOTAL
61	VOID
62	REFUND
63	%1
64	%2
65	%3
66	%4
67	⊖1
68	⊖2

Function Code	Free key Function Name
69	TAX SHIFT 1
70	TAX SHIFT 2
71	TAX (MANUAL TAX)
72	RA
73	PO
74	F.S. SHIFT
75	F.S. TEND./ST
76	PRINT
77	RECEIPT
78	SLIP
79	L1 (DEPT. SHIFT)
80	L2 (DEPT. SHIFT)
81	L3 (DEPT. SHIFT)
82	P-BAL
83	C-BAL
84	CLK #
85	TIP
99	OPEN

③ The free key area on the keyboard

The free key area is shown in Fig. 1.

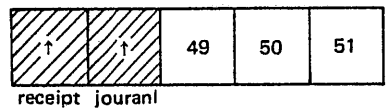
The free key may be assigned with a function and cleared of a previous assignment. There are a total of 51 keys which may be involved in the assignment process. Some of these keys are physically connected together, as indicated in Fig. 1, thus allowing for an actual total of 50 keys to be uniquely defined.

FREE KEY AREA

(NOTE)

1. Numbers 1 thru 3 are assigned to three positions respectively, and numbers 4, 5, 26 thru 29 to two positions respectively.
2. The hatched area is reserved for fixed key positions.

NOTE: The function code is indicated in the display.
1-34: Free keys (Free key position No.)



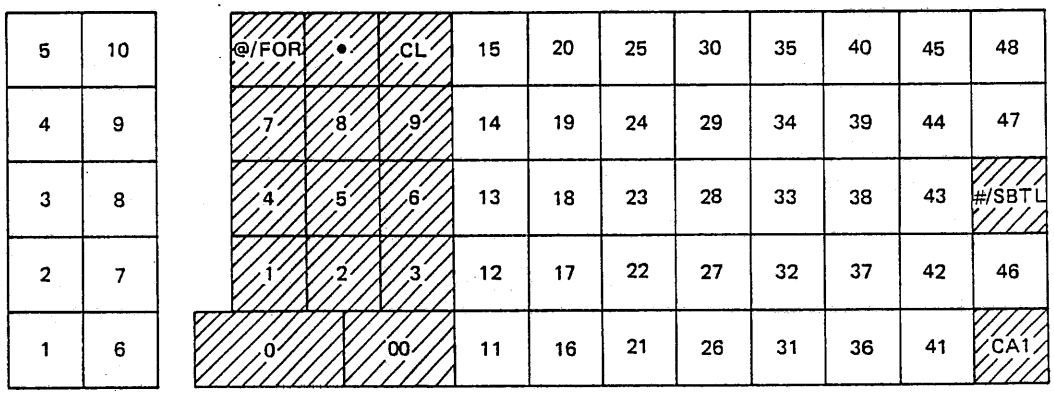


Fig. 1

④ Key assignment procedure

(1) The preparation for entry involves completing the attached form and placing the desired keys on the key board.

(2) ID (identification) of the first function to be assigned to a key according to "The function code for the free key function name LIST".

(3) Department assignments are allowed only to the maximum number specified in JOB CODE #901.

(4) The function code indicated in the display is assigned to a key by simply depressing the function key which is to be assigned. The machine will automatically update the display with the next sequential function code.

(5) The fact that there are no more codes in the table for assignment or that a function code ID (identification) number greater than the largest valid code in the machine is signalled by a "99" in the display. By entering a code number prior to the function key, a new function number may be entered or the CA/AT/NS may be depressed to end the job.

(6) The @/FOR key is used to inhibit the function and up date the ID number to the next one.

(7) Up date to the next sequencial function ID is handled by the machine.

(8) If a large number of function ID's are to be skipped before the next assignment or if a previous entry must be corrected then the new function ID may be entered as indicated.

(9) The code 99 is not incremented and thus may be used to quickly clear any number of keys.

NOTE: For removing key switch and key top, use the special tools (UKŌG-6635RCZZ, UKŌG-6636-RCZZ); refer to page 1.

⑤ Example of the free key assignments

(1) SRV-1 Programming Sample (for key layout shown in Fig. 1 on page 19.)

Key Operation:

950 → [#/SBTL] → [CA/AT/NS]

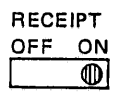
```
03/25/85  8:57AM
000B#0075    ***
      /

#0950

  1 DPT.01 KEY01
  2 DPT.02 KEY02
  3 DPT.03 KEY03
  4 DPT.04 KEY04
  5 DPT.05 KEY05
  6 DPT.06 KEY06
  7 DPT.07 KEY07
  8 DPT.08 KEY08
  9 DPT.09 KEY09
 10 DPT.10 KEY10
 11 DPT.11 KEY16
 12 DPT.12 KEY17
 13 DPT.13 KEY18
 14 DPT.14 KEY19
 15 DPT.15 KEY20
 16 DPT.16 KEY21
 17 DPT.17 KEY22
 18 DPT.18 KEY23
 19 DPT.19 KEY24
 20 DPT.20 KEY25
 21 DPT.21 KEY26
 22 DPT.22 KEY27
 23 DPT.23 KEY28
 24 DPT.24 KEY29
 25 DPT.25 KEY30
```

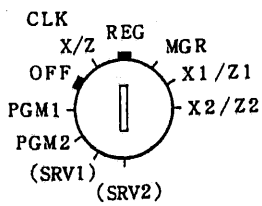
```
 26 DPT.26 KEY31
 27 DPT.27 KEY32
 28 DPT.28 KEY33
 29 DPT.29 KEY34
 30 DPT.30 KEY35
 31 DPT.31  --
 32 DPT.32  --
 33 DPT.33  --
 34 DPT.34  --
 35 DPT.35  --
 36 DPT.36  --
 37 DPT.37  --
 38 DPT.38  --
 39 DPT.39  --
 40 DPT.40  --
 41 DPT.41  --
 42 DPT.42  --
 43 DPT.43  --
 44 DPT.44  --
 45 DPT.45  --
 46 DPT.46  --
 47 DPT.47  --
 48 DPT.48  --
 49 DPT.49  --
 50 DPT.50  --
 51 PLU     --
 52 CASH2 KEY47
 53 CH1     --
 54 CH2     --
 55 CH3     --
```

```
 56 CH4     --
 57 CH5     --
 58 CHECK   --
 59 ST      --
 60 TTL     --
 61 VOID  KEY49
 62 RFND    --
 63 %1      --
 64 %2      --
 65 %3      --
 66 %4      --
 67 (-)1    --
 68 (-)2    --
 69 TX S1   --
 70 TX S2   --
 71 MTAX    --
 72 ***R/A  --
 73 ***P/D  --
 74 FS SFT  --
 75 FS TND  --
 76 PRINT   --
 77 RCPT    --
 78 SLIP    --
 79 L 1   KEY50
 80 L 2   KEY51
 81 L 3     --
 82 **PBAL  --
 83 **CBAL  --
 84 CLK#    --
 85 TIP IN  --
```

Function code — Function name — Free key position No.

(2) Key assignments Sample





↑	↑	VOID	L1	L2
receipt	journal			

5	10	@/FOR	•	CL		15	20	25	30		CA2
4	9	7	8	9		14	19	24	29		
3	8	4	5	6		13	18	23	28		#/SBTL
2	7	1	2	3		12	17	22	27		CA1
1	6	0		00		11	16	21	26		

Fig. 2

7-5. Supplemental Descriptions for SRV Programming

- JOB CODE #901A: Number of department levels.

DEPT. SHIFT

Three kinds of shift keys (i.e. L1/L2/L3) can be provided on the key board by SRV programming.

Each key has the following function.

L1: Shift Dept. level to L1 (Normal level) from L1, L2 and L3.

L2: Shift Dept. level to L2 from L1, L2 and L3.

L3: Shift Dept. level to L3 from L1, L2 and L3.

NOTE: This provides three times the volume of memory for each department related feature (i.e. totalizers, counters and presets).
When the L1 key is depressed in the L1 state, no error occurs. (same for L2 and L3)

PGM2 mode programming selects either the auto return mode in which the Dept. level will be changed automatically to L1 after the each item registration, or the manual change mode in which the Dept. level will be kept in the prior state (i.e. level) until active Dept. shift key depression. The level shift keys can be operated at any time except mid numeric entry for the manual change mode, but they are effective only prior to a department key depression for the auto return mode.

The another PGM2 mode programming selects either to allow or not to allow the Dept. shifting in the REG mode.

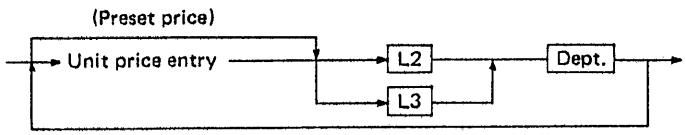
When performing the two PGM2 mode programming, there are four cases available.

Program	Auto/ Manual	Mode Allowed	Application
CASE 1	AUTO	REG/MGR	L/M/S size COKE etc.
CASE 2	AUTO	MGR	Refund for each item (– preset)
CASE 3	MANUAL	REG/MGR	Dept. number expansion
CASE 4	MANUAL	MGR	Menu shift, Happy hour

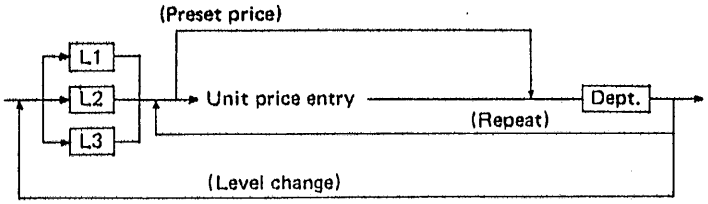
NOTE: L1 key must be installed and enabled via SRV Job #950 when "MANUAL change" mode has been selected.

Registration in the REG and MGR modes

1. AUTO RETURN MODE



2. MANUAL CHANGE MODE



- JOB CODE #903B(2): Singapore tax
Tax amount will be rounded as shown below (Ex. Round off)

BEFORE ROUNDING	AFTER ROUNDING
0.000 ~ 0.004	0.00
0.005 ~ 0.054	0.05
0.055 ~ 0.099	0.10

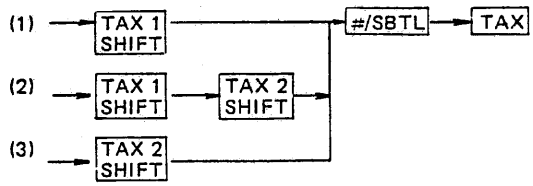
NOTE: Rounding procedure depends on programming in JOB #903.

- JOB CODE #903C(1); Tax delete operation

TAX DELETE:

If the "TAX" key is depressed without a numeric entry after obtaining a taxable sub-total, the itemizer that corresponds to a specified displayed tax sort is reset to 0 and a related message is printed.

KEY OPERATION (in the REG, MGR modes):



Notes:

(1) Taxable 1 and refund taxable 1 sub-totals are reset to 0.

(2) Taxable 1, refund taxable 1, taxable 2 and refund taxable 2 sub-totals are reset to 0.

(3) Taxable 2 and refund taxable 2 sub-totals are reset to 0.

8. PGM1, PGM2 (PROGRAM) MODES

The ER-3241 allows programming in two modes: PGM1 and PGM2.

The PGM1 mode is used for programming those items that need to be changed often: Unit prices of departments, plus, and percentage.

The PGM2 mode is used for programming all PGM1 mode Programs and those items that require no frequent changes such as date, time, tax table, tax rate, and the function of each key. The programming or setting procedures of various items is described below. Program every item necessary for the store into the machine following the corresponding procedures.

* To set the mode switch to the PGM1 position, use the manager or submanager key. To set to the PGM2 position, use the manager key.

GENERAL ENTRY SEQUENCE (PGM1 and PGM2 MODE Programming)

xxx (JOB CODE #) → [·] → [#/SBTL] → (DATA) → [CA/AT/NS]

When the secret code has been designated, it would not permit subsequent programming unless the secret code is given for the PGM1 and PGM2 modes.

8-1. Job Code List

110 Department price preset.
210 Department functions – 1.
211 Department functions – 2.
212 Department functions – 3.
213 Department functions – 4.
214 Department label assignments
120 PLU price preset (HALO preset for SUB).
121 PLU programming – 1.
221 PLU programming – 2.
224 PLU/SUB label assignments
130 % rate programming for %1 ~ %4
230 MISC. keys programming – 1.
231 MISC. keys programming – 2.
232 MISC. keys programming – 3.
234 MISC. keys label assignments
235 % ITEM/% SBTL selection
236 Store/Vender coupon selection
140 Clerk number registration
240 Tax tables.
241 % tax rate.
144 Clerk name presetting
145 Cashier name presetting
250 Date.
251 Time.
252 Machne number.
253 Consecutive number.
254 Logo massage (Header and Footer)
255 Print time limitation for validating.
256 Optional feature selection.
257 Sentinel amount setting.
260 Media keys programming – 1.
261 Media keys programming – 2.
(High amount limitation forcheck change and check cashing.)
262 Media keys programming – 3.
263 Media keys programming – 4.
264 Media keys label assignments
274 Check validation message

The jobs which have 100 lavel code numbers may be programmed in both PBM1 and PGM2 mode.

The jobs which have 200 level code numbers may be programmed in the PGM2 mode only.

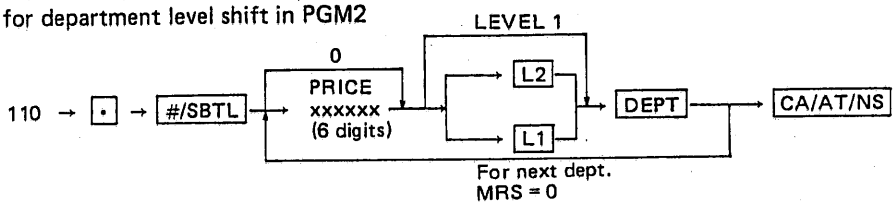
280 Secret code for PGM1 mode
281 Secret code for X1/Z1 mode
282 Secret code for X2/Z2 mode
284 MISC. text assignments
286 Stack report

8-2. Programming

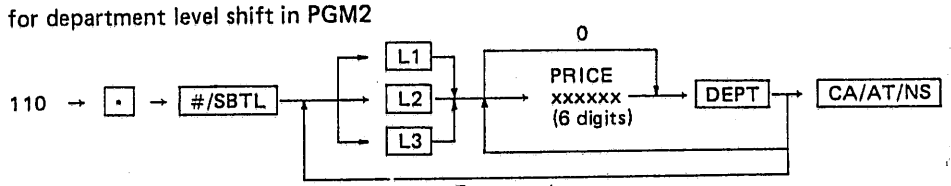
[JOB CODE #110]

DEPARTMENT PRICE PRESET
Up to 6 digits ($9999.99)

If programmed the "Auto return mode" for department level shift in PGM2



If programmed the "Manual change mode" for department level shift in PGM2



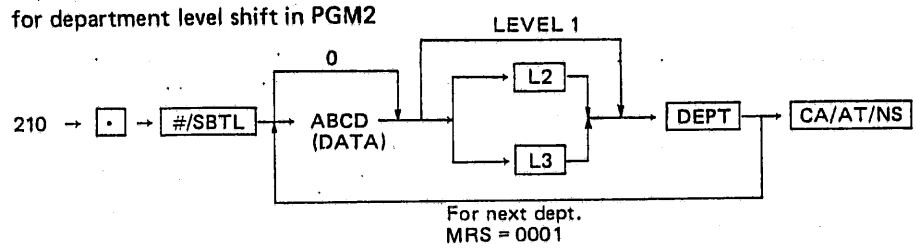
[JOB CODE #210]

DEPARTMENT FUNCTIONS – 1

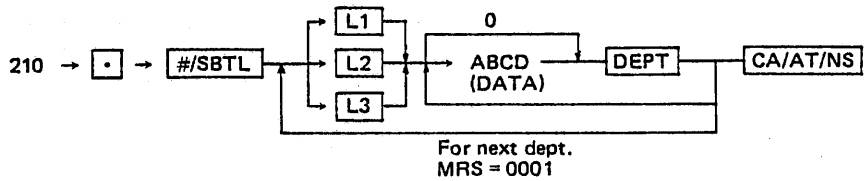
A. Hash/Normal = 1/0
B. Validation enforced.*1 /Optional. = 1/0
C. Single item finalize./Single item sale./Normal. = 2/1/0
D. Open & preset./Preset./Open./Inhibit = 3/2/1/0*2

*1. The "enforced" is effective only when the validation print counter has been preset to a number (1-9, JOB #255) other than zero.
*2. If you select "Inhibit", the dept. item is print skipped on X/Z report.

If programmed the "Auto return mode" for department level shift in PGM2



If programmed the "Manual change mode"
for department level shift in PGM2



[JOB CODE #211]

DEPARTMENT FUNCTIONS – 2

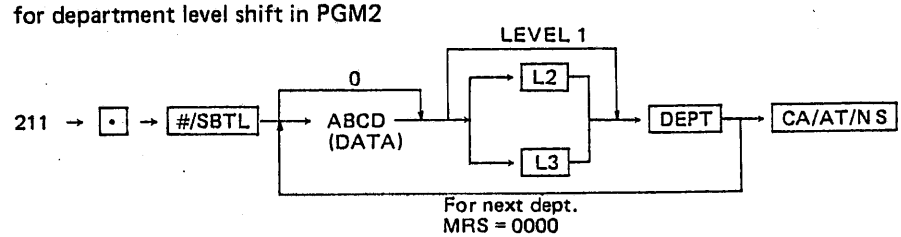
A. –./+. sign = 1/0

B. Food stampable./Not. = 1/0

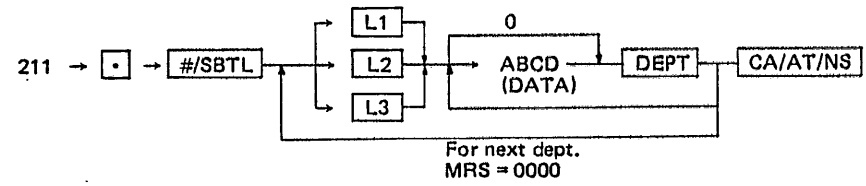
C. Taxable 2./Not. = 1/0

D. Taxable 1./Not. = 1/0

If programmed the "Auto return mode"
for department level shift in PGM2



If programmed the "Manual change mode"
for department level shift in PGM2



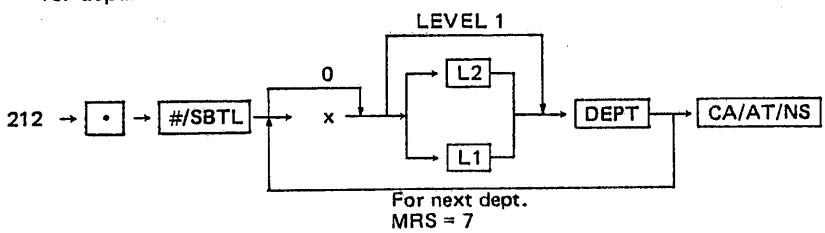
[JOB CODE #212]

DEPARTMENT FUNCTIONS – 3

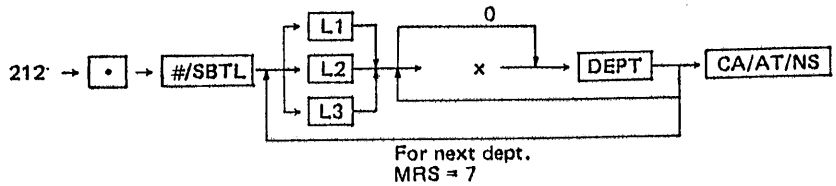
HALO digits (x) = 0 – 7

The HALO preset will be overridden in the MGR. mode.

If programmed the "Auto return mode"
for department level shift in PGM2



If programmed the "Manual change mode"
for department level shift in PGM2

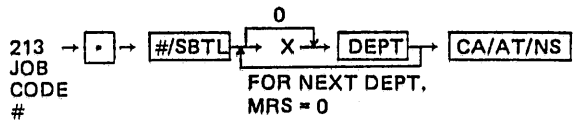


[JOB CODE #213]

DEPARTMENT FUNCTIONS – 4

SBTL (Sub total) PRINT ON THE GENERAL REPORT

0: Regular department
1: Extra one line feeding
2: Add to the special sub-total
3: Print the special sub-total

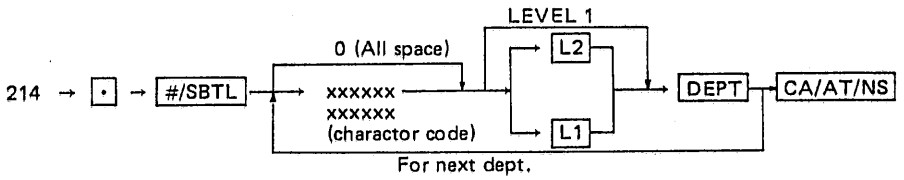


(Note)
The department needs a definition of the level.
The method of the level shift is decided by the PGM2 programming JOB #256A.

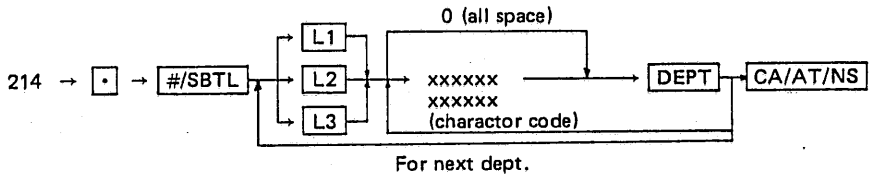
[JOB CODE #214]

DEPARTMENT LABEL ASSIGNMENTS
(6 characters)

If programmed the "Auto return mode"
for department level shift in PGM2



If programmed the "Manual change mode"
for department level shift in PGM2

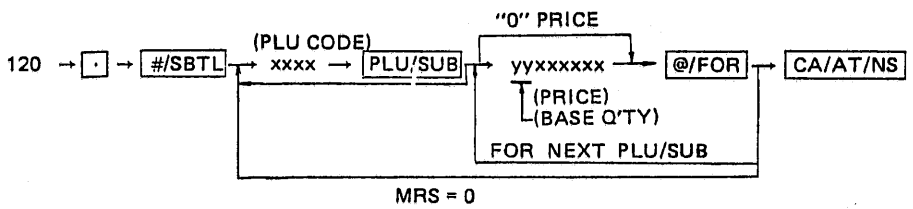


* Up to 12 digits; even digit entry only.

[JOB CODE #120]

PLU PRICE PRESET (HALO PRESET FOR SUB DEPTs)
The PLU number must have been preset by JOB #121

- Up to 6 digits for price or HALO: xxxxxx
- 2 digits for split base quantity: yy



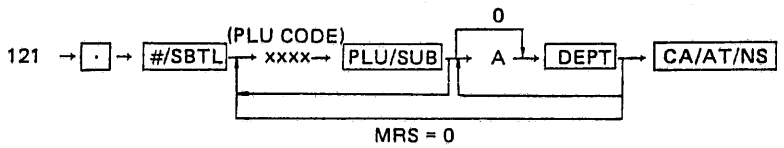
[JOB CODE #121]

PLU PROGRAMMING – 1

A. Clear out/PLU./Sub-dept./Inhibit. = 3/2/1/0

The Dept. to be used with the PLU/SUB is preset by this programming.

The "clear out" makes all the data tird to the PLU zero.

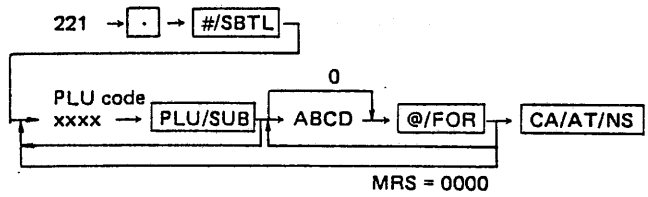


JOB CODE #221]

PLU PROGRAMMING – 2

(The PLU number must have been preset by JOB #121)

A. –./+. sign = 1/0
B. Food stampable/Not. = 1/0
C. Taxable 2./Not. = 1/0
D. Taxable 1./Not. = 1/0

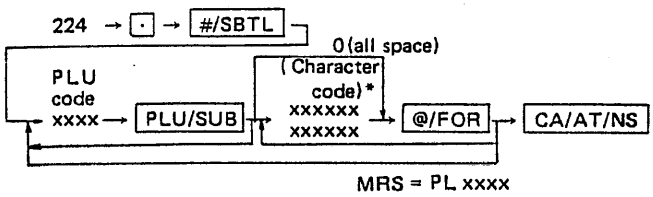


[JOB CODE #224]

PLU/SUB LABEL ASSIGNMENTS

(6 characters)

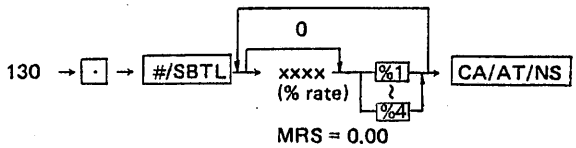
(The PLU number must have been preset by JOB #121)



[JOB CODE #130]

% RATE PROGRAMMING FOR %1 AND %4

% rate: 0.01% – 99.99%

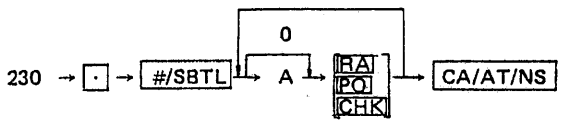


[JOB CODE #230]

MISC. KEYS PROGRAMMING – 1

A. Validation enforced./Optional. for RA and PO. = 1/0

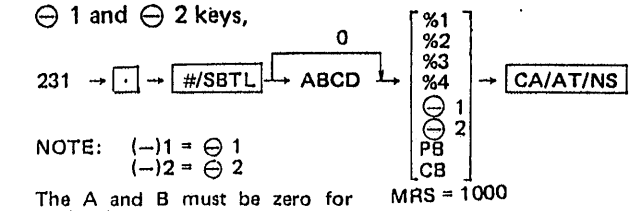
A. Non add code print enforced/Optional for cash check operation (CHK) = 1/0



[JOB CODE #231]

MISC. KEYS PROGRAMMING – 2

A. –./+. sign = 1/0
B. Food stampable./Not. = 1/0
C. Taxable 2./Not. = 1/0
D. Taxable 1./Not. for %1, %2, %3, %4, = 1/0
⊖ 1 and ⊖ 2 keys,



NOTE: (–)1 = ⊖ 1
(–)2 = ⊖ 2

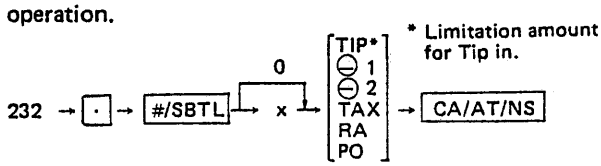
The A and B must be zero for PB (RO) and CB.

[JOB CODE #232]

MISC. KEYS PROGRAMMING – 3

HALO digits for (–)1, (–)2, TAX, TIP, RA and PO. = 0 – 7

The HALO preset will be overridden in the MGR. mode operation.



MRS = 7 for the all

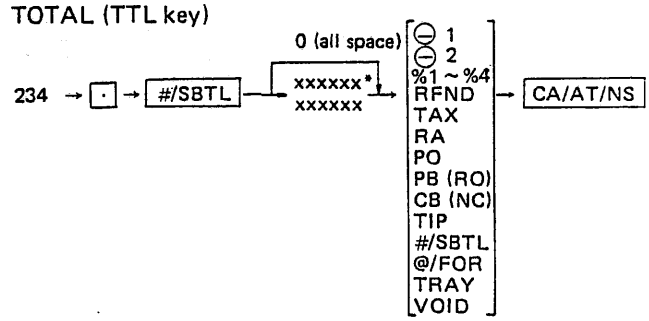
[JOB CODE #234]

MISC. KEYS LABEL ASSIGNMENTS

(6 characters)

for (–)1, (–)2, %1 ~ %4, RFND, TAX, RA, PO, PB and CB.

TIP IN (TIP key is used for the programming), TIP PAID (#/SBTL key), split pricing format (@/For key) and TRAY TOTAL (TTL key)

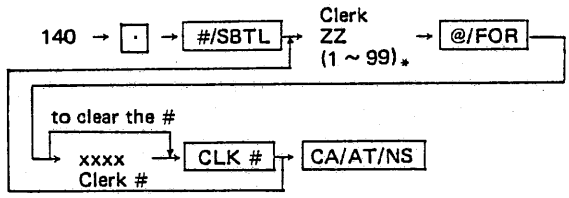


Ref. the default pattern of general report for the MRS.

[JOB CODE #140]

CLERK NUMBER REGISTRATION

(Four digits for each of up to 15 clerks for standard feature and 99 clerks with optional RAM)



The machine rejects the CLK# entry when the same number has been preset for a clerk.

* Up to 15 clerks for standard feature and 99 clerks with optional RAM.

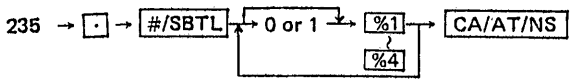
[JOB CODE #235]

%ITEM/%SBTL selection for %1, %2, %3 and %4.

0: % SBTL

1: % ITEM

(PROGRAMMING PROCEDURE)



MRS = 0

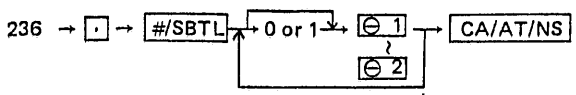
[JOB CODE #236]

Vender/Store coupon selection for ⊖ 1, ⊖ 2.

0: Vender

1: Store

(PROGRAMMING PROCEDURE)



MRS = 0

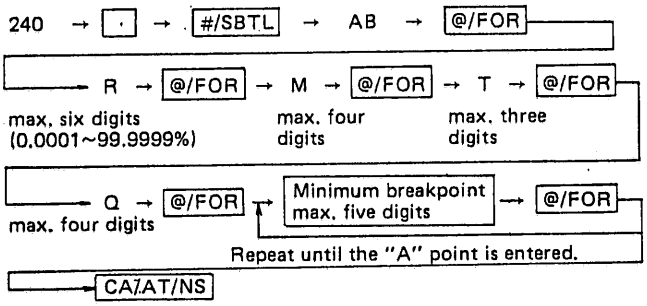
[JOB CODE #240]

TAX TABLES

72 break points can be shared for two tables.

A. The difference between a break point and the next one is $1.00 or more./Less than $1.00. = 1/0

B. Table 1 programming./Table 2. = 1/2



NOTE: If you make an incorrect entry before entering the M in programming a tax table, cancel it with the CL key; and if you make an error after entering the M, cancel it with the #/SBTL key. Then program again from the beginning correctly.

(1) Programming the tax table

① For this example, refer to the New Jersey tax table below (column A) New Jersey tax table: 6% rate

Tax	A		B	C
	Minimum breakpoint	Maximum breakpoint	Breakpoint difference(¢)	
.00	.01	.10	–	Non-cyclic
.01←T	.11←Q	.22	10	
.02	.23	.38	12	Cyclic (I)
.03	.39	.56	16	
.04	.57	.72	18	
.05	.73	.88	16	
.06	.89	1.10	16	
.07	1.11←"A" point	1.22	22	
.08	1.23	1.38	12	Cyclic (II)
.09	1.39	1.56	16	
.10	1.57	1.72	18	
.11	1.73	1.88	16	
.12	1.89	2.10	16	
.13	2.11	2.22	22	

The information which must be supplied to the ECR for tax table oriented calculations include the following:

R: The Rate (R) is entered as a six-digit number (2-digit integer and 4-digit decimal). Thus, a 6% rate would be entered as 60000. If the rate is fractional (e.g. 4 3/8%), then the fractional portion (3/8) would be converted to its decimal equivalent (i.e. 3750) and the resulting rate of 43750 would be entered. Note that the nominal rate (R) is generally indicated on the tax table.

The other values which must be entered for correct table-based tax calculations are as follows:

Q: The smallest amount for which tax must be collected. In come states, there are amounts which are not subject to tax (e.g. if amounts of $0.01 to $0.10 are not taxed, the value of Q – being the smallest taxable amount – would be $0.11).

T: The amount of tax which is associated with the amount Q.

M: The value is associated with the cyclical nature of many tax tables. In fact, the need to support tax tables as opposed to the use of a straight percentage calculation is because there are amounts where the result of applying the percentage calculation does not result in a tax amount which is the same as the related table amount. The table must, therefore, be used to obtain the data (i.e. the value M) necessary for the register to obtain the correct tax amount. The procedures to obtain this value are as follows:

The tax table must be examined in order to find repeating cycles in terms of the breakpoint differnces as indicated in the preceding tax table (Note that a 'breakpoint' is that amount at which a tax amount increment takes place).

As you can see from the table, the breakpoint differences indicated by Cycle I repeat in Cycle II. I indicates the tax table's cyclical pattern and thus the value for M is determined by adding the breakpoint difference amounts associated with I (i.e. for purposes of the sample table, this value is 100).

The value of M may be viewed as the taxable amount which is covered by the cycle. Thus, it can be determined by adding all of the breakpoint differences in a cycle or by simply taking the difference between the first breakpoint of the cycle and the first breakpoint of the next cycle.

Example: Programming the sample tax table show above as tax table 1.

Key operation	
240 [·]	[#/SBTL]
1	[@/FOR]
R→ 60000	[@/FOR]
M→ 100	[@/FOR]
T→ 1	[@/FOR]
Q→ 11	[@/FOR]
The first cyclic portion { 23	[@/FOR]
39	[@/FOR]
57	[@/FOR]
73	[@/FOR]
89	[@/FOR]
"A" point→ 111	[@/FOR]
	[CA/AT/NS]

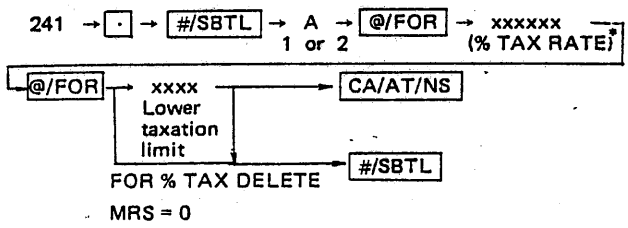
[JOB CODE #241]

% TAX RATE

A. For TAX 1 (A = 1) and TAX 2 (A = 2)

Presettable TAX RATE range = 0.0000 – 99.9999%

Maximum lower taxation limit = $99.99



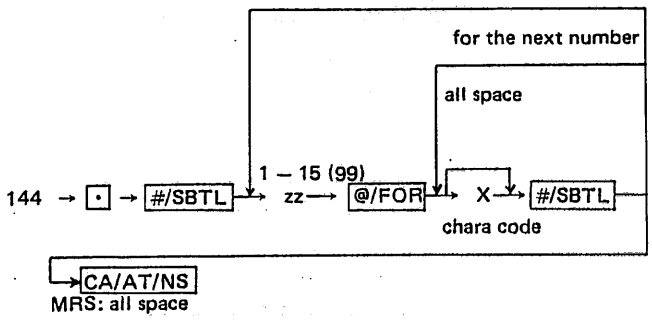
* No decimal point key is required.

[JOB CODE #144]

CLERK NAME PRESET

Six charactors for each of up to 15 clerks for standard feature and 99 clerks with optional RAM.

(PROGRAMMING PROCEDURE)

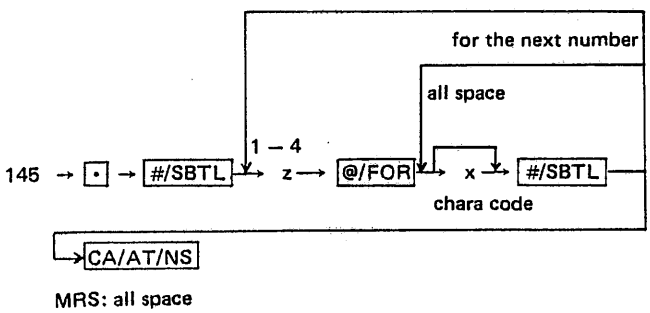


[JOB CODE #145]

CASHIER NAME PRESET

Six charactors for each of four cashiers

(PROGRAMMING PROCEDURE)

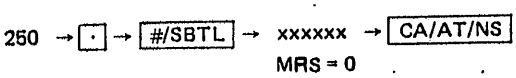


(NOTE) Chshier code (z); 1:A, 2:B, 3:D, 4:E

[JOB CODE #250]

DATE

MM/DD/YR or DD/MM/YR (Ref. to SRV. program #905D)

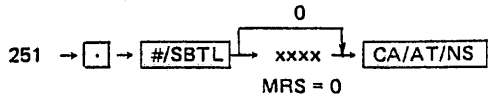


[JOB CODE #251]

TIME

Enter the time in 24-hour format.

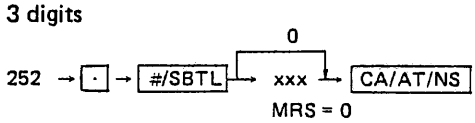
1 AM = 100 1 PM = 1300



[JOB CODE #252]

MACHINE NUMBER

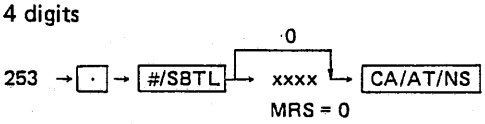
3 digits



[JOB CODE #253]

CONSECUTIVE NUMBER

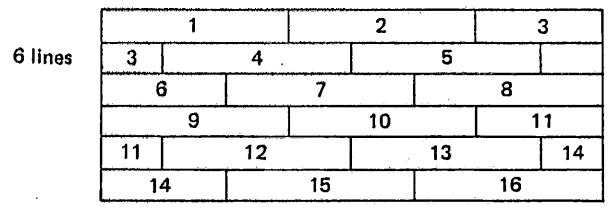
4 digits

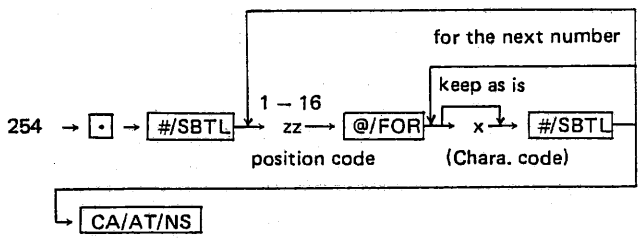


[JOB CODE #254]

LOGO MESSAGE

6 characters for 16 blocks





The cycle number relates to the potion of the message to be programmed.

NOTE:

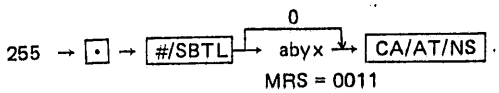
1. The programmed logo message is printed on receipt only when logo printing is enabled via PGM2 mode JOB #256.
2. The cycle number relates to the portion of the message to be programmed.

[JOB CODE #255]

LIMIT ON THE NUMBER OF TIMES OF SLIP AND VALIDATION

A number of 0 through 9 (0 means inhibition.) is presettable for slip and validation. The print starting point (i.e. lines from the top position of print area on a slip paper) is presettable for 0 to 64.

(PROGRAMMING PROCEDURE)
The "ab" stands for initial slip feed lines.
The "y" stands for slip print times.
The "x" stands for validation times.



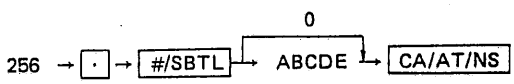
MRS = 0011

[JOB CODE #256]

OPTIONAL FEATURE SELECTION

A. Dept. shift method. = 0 – 3
- 0: Auto, REG & MGR mode
- 1: Auto, MGR mode only
- 2: Manual, REG & MGR mode
- 3: Manual, MGR mode only

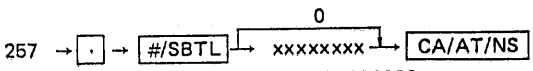
B. "CLK X/Z" mode inhibited./Exists. = 1/0
C. Inhibit past item void in REG. mode./Not. = 1/0
D. Inhibit refund in REG. mode./Not. = 1/0
E. Journal select./Full print. = 1/0



MRS = 00000

[JOB CODE #257]

SENTINEL AMOUNT SETTING
$0.00 – $999999.99 (Up to 8 digits)

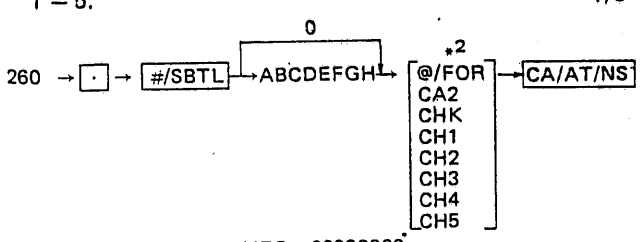


MRS = 99999999

[JOB CODE #260]

MEDIA KEYS PROGRAMMING – 1

A. PB or CB compulsory./Not. = 1/0
B. SLIP compulsory./Not. = 1/0
C. VALIDATION compulsory. *1/Not. = 1/0
D. TAX 2 delete./Not. = 1/0
E. TAX 1 delete./Not. = 1/0
F. DRAWER open./Not. = 0/1
G. #/SBTL key compulsory./Not. = 1/0
H. AMOUNT TENDERING comulsory/Optional. for cashes and check. or Compulsory.*3/Inhibited.*4 for charges 1 – 5. = 1/0



MRS = 00000000

the "A" must be "0" always for CA1, CA2 and CHK

*1 The "compulsory" is effective only when the validation print counter is preset to a number (1 – 9, JOB #255) other than zero.

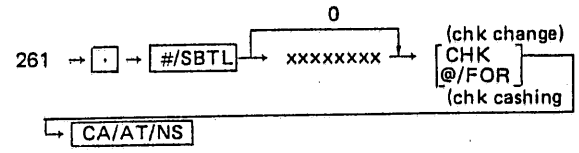
*2 The "@/FOR" key is used for "CA1" (i.e. CA/AT/NS) key programming.

*3 Credit card type function will be selected.

*4 House charge or new balance key type function will be selected.

[JOB CODE #261]

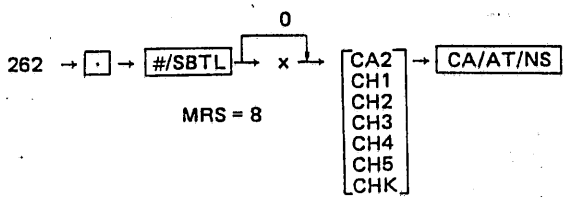
MEDIA KEYS PROGRAMMING – 2
HIGH AMOUNT LIMITATION FOR CHECK CHANGE AND CHECK CASHING
$0.00 – $999999.99



MRS = 99999999

[JOB CODE #262]

MEDIA KEYS PROGRAMMING – 3
HALO digit for 5 media keys. = 0 – 8
(CA/AT/NS key has no limitation.)
The HALO preset will be overridden in the MGR. mode.

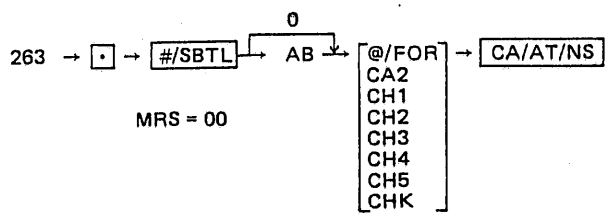


MRS = 8

[JOB CODE #263]

MEDIA KEYS PROGRAMMING – 4

A: Footer print exist./Not. = 1/0
B: ST print selection
ST PRINT ON THE GENERAL REPORT
- 0: Regular format
- 1: Extra one line feeding
- 2: Add to the special sub-total
- 3: Print the special sub-total

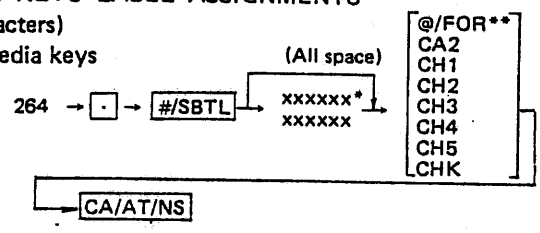


MRS = 00

@/FOR key is used for CA1 (i.e. CA/AT/NS) key programming.

[JOB CODE #264]

MEDIA KEYS LABEL ASSIGNMENTS
(6 characters)
for 8 media keys

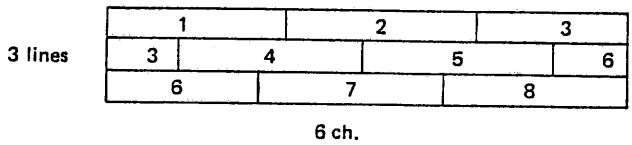


* Refer to following "CODE TABLE".

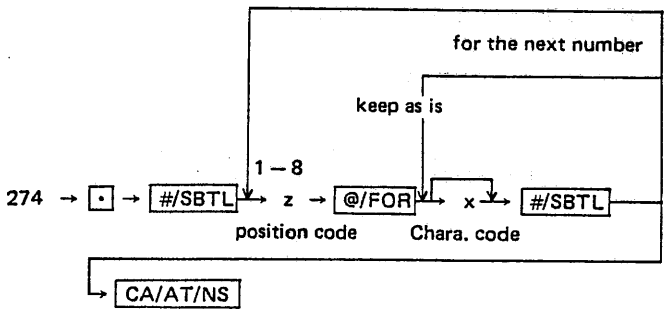
** @/FOR key is used for CA1 (i.e. CA/AT/NS) key programming.
Ref. the default pattern of general report for the MRS.

[JOB CODE #274]

CHECK VALIDATION MESSAGE
For the validations by using the slip printer only.
6 characters for 16 blocks.



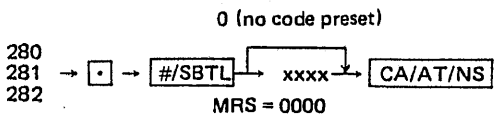
(PROGRAMMING PROCEDURE)



MRS = (SPACE)
(SPACE)
FOR DEPOSIT ONLY

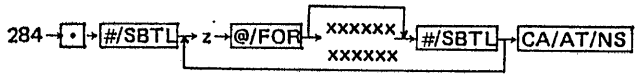
[JOB CODE #280, 281 and 282]

Secret code (4 digits) for
PGM1 mode: #280
Z1 (X1/Z1 mode): #281
Z2 (X2/Z1 mode): #282



[JOB CODE #284]

MISC. TEXT ASSIGNMENTS
(6 characters)

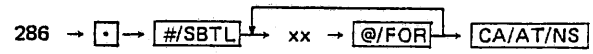


(NOTE):
The z indicates code number entry (i.e. 1 to 4), which stands for the each of the followings.
1: Taxabele sub-total 1 (MRS = TX1 ST)
2: Tax 1 corrected (MRS = TAX 1)
3: Taxabele sub-total 2 (MRS = TX2 ST)
4: Tax 2 correcte (MRS = TAX 2)

[JOB CODE #286]

STACKED REPORT
Maximum 5 reports can be memorized in the stack report.

(PROGRAMMING PROCEDURE)



xx: Report JOB # of 1, 4, 5, 6, 20, 30 or 60.
MRS = 1, 4, 5 and 6

8-3. Code Table for Alpha Descriptor Programming

CODE	CHARA	CODE	CHARA	CODE	CHARA	CODE	CHARA	CODE	CHARA	CODE	CHARA
00	0	10	(sp)	20	J	30	T	40	&	50	+
01	1	11	A	21	K	31	U	41	'	51	–
02	2	12	B	22	L	32	V	42	.	52	→
03	3	13	C	23	M	33	W	43	F	53	←
04	4	14	D	24	N	34	X	44	*	54	DC
05	5	15	E	25	O	35	Y	45	/	55	UD
06	6	16	F	26	P	36	Z	46	@	56	UD
07	7	17	G	27	Q	37	#	47	!	57	UD
08	8	18	H	28	R	38	$	48	(	58	UD
09	9	19	I	29	S	39	%	49	)	59	UD

CHARA: Character

DC: Double character code.
UD: Undefined code.
(SP): Space

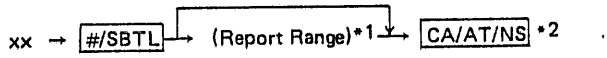
Two figures have to be entered to designate one character.
Ex. 1 CASH = 13 11 29 18
Ex. 2 CASH = 54 13 11 29 18

NOTES:
1. In the case of example 2, character "C" will be printed in double character format because code #54 is entered just before code #13.
2. Alpha descriptor programming is available for the following functions.

DEPT. keys (1 to 90)	(–)1 – 2
PLU/SUB	%1 – 4
P BAL	TAX (TX1ST, TX2ST,
C BAL	NTTX1 & NTTX2)
RA	TAX (manual tax)
PO	RFND (for report only)
CASH	Q @
CA2	TIP IN
CH1 – 5	TIP PD
CHK	VOID
CASHIER name	
CLERK name	
LOGO message (Receipt)	
Check validation (Slip)	

8-4. Program Reading (PGM1 or PGM2 mode)

LIST OF PROGRAM READING



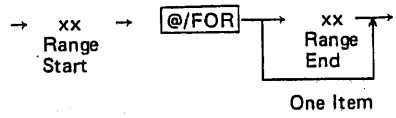
JOB #	REPORT NAME
110 *1	DEPARTMENT PRESETS
120 *1	PLU/SUB PRESETS
130	% RATE AND THE OTHER MISCELLANTOUS FUNCTION PRESETS (INCLUDING MEDIAS)
140	CLERK NUMBER LIST
240	TAX TABLE
900	FULL SRV MODE REPORT
950	KEY LAYOUT REPORT

The jobs which have 100 level code numbers are allowed to be read in both PGM1 and PGM2 modes. The jobs which have 200 level code numbers are allowed to be read in PGM2 mode only.

The jobs which have 900 level code numbers are allowed to read in the SRV mode only.

(NOTES)

*1 A reportinhg range must be specified for those reports indicated in the table. The standard sequence to indicate range is:



NOTE:

*1. The clerk number reporting list is availabe only when the SRV program #902B is selected, "APPEAR NUMBER".

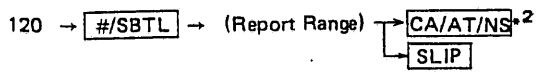
*2. The CA/AT/NS key causes the report to be generated on both receipt and journal. By depressing the SLIP key instead of the CA/AT/NS key, the reports can be printed by the slip printer (i.e. the reports are printed on the slip paper and jouranl instead of the receipt and jouranl for the CA/AT/NS key case).

[JOB CODE #110]

DEPARTMENT PRESET REPORT

[JOB CODE #120]

PLU/SUB PRESETS REPORT

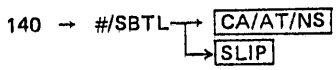


[JOB CODE #130]

% RATE and the other MISCELLANEOUS functions presets (including MEDIAS)

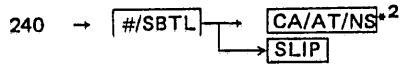
[JOB CODE #140]

CLERK NUMBER LIST



[JOB CODE #240]

TAX TABLES READING



[SLIP RELEASE]

Depress "SLIP" key (in the PGM1 or PGM2 mode).

In case of emergency, slip paper may be released by hitting the "SLIP" key in the PGM1 or PGM2 mode.

9. PRINT SKIPPING ON X/Z REPORT VIA SRV/PGM2 MODE PROGRAMMINGS

9-1. Manual Selection Print Skipping List.

ITEMS TO BE PRINT SKIPPED		JOB CODE #
GT1	T	904A
GT2	T	904A
GT3 on Z report	T	904A
GT3 on X report	T	904B
Coupon PLU	Q, T	904B
Net sales SBTL	T	904B
Net txbl 1 SBTL	T	904C
TAX 1 TTL for + sales & TAX 1 TTL for refunds	2T	904C
Net TAX 1 TTL	T	904C
Net tabl 2 SBTL	T	904D
TAX 2 TTL for + sales & TAX 2 TTL for refunds	2T	904D
Net TAX 2 TTL	T	904D
Manual TAX for + sales & Manual TAX for refunds	2T	905A
Net manual TAX TTL	T	905A
Total TAX	T	905A
CHCG (Check change) TTL	T	905B

(NOTE)
Q: counter
T: total
%: percent share

9-2. Automatic Selection Print Skipping List

No.	ITEMS TO BE PRINT SKIPPED		RELATED KEY OR FEATURE	JOB # FOR FEATURE SEL.
1	DEPARTMENTS	Q, T, %	# of DEPT.	901
2	"–" DEPT. TTL	T	– preset D.	211
3	⊖ 1 – ⊖ 2	Q, T	⊖ 1, ⊖ 2 keys	950
4	%1 – %4	Q, T	%1 – 4 keys	950
5	VOID 1	Q, T	VOID key	950
6	VOID2 & VOID 3	2Q, 2T	VOID mode	902A
7	REFUND	Q, T	REFUND key	950
8	VAL. P. counter	Q	PRINT key	950
9	CA2	Q, T	CASH 2 key	950
10	PO	Q, T	PO key	950
11	RA	Q, T	RA key	950
12	CH1 – CH5	Q, T	CH1 – 5 keys	950
13	CHK	Q, T	CHK key	950
14	No Sale counter	Q	NS function	903D
15	VD (H) & RF (H)	2Q, 2T	HASH	901
16	Hash Dept. TTL	T	Hash Dept.	210
17	Hash – Dept. TTL	T	Hash – Dept.	210 & 211
18	CA/CHK	Q, T	zero HALO	261
19	Level 2 Depts.	30Q, 30T	L2 key	950
20	Level 3 Depts.	30Q, 30T	L3 key	950
21	SLIP P. counter	Q	SLIP key	950
22	TIP	32Q, 32T	TIP key	950

9-3. Example of Print Skipping

NOTE:
1. The parts which have JOB # are print skipped via the programming of the JOB #.
2. The jobs which have 200 level code numbers may be programmed in the PGM2 mode.
3. The jobs which have 900 level code numbers may be programmed in the SRV1 mode.
4. The amount on this sample is incorrect.

10. READING & RESETTING MODES (CLK X/Z, X1/Z1, X2/Z2)

1. REPORTS

The following categories of reports can be printed by the ECR;

(1) CLK/ X/Z mode reports (clerk and cashier reports)
(2) X1/Z1 mode reports (daily sales reports)
(3) X2/Z2 mode reports (periodic sales reports)

To print reports, use the following key entry sequences:

(X report)
xxx → [·] → [#/SBTL] → (DATA) → [CA/AT/NS]
JOB # (Z report)

The report will be printed on journal and receipt tapes with this procedure.

By depressing the SLIP key instead of the CA/AT/NS key in the above key sequence, the reports can be printed on slip papers and the journal.

The (DATA) part will be described in the "LIST OF REPORT".

(NOTE) – GENERAL RULE –

If the [·] key is depressed following a JOB code number entry with these procedures, data inside of the ECR will be cleared (i.e. Z reports).

(Some job code numbers do not allow the [·] key to follow.)

If the [·] key is not depressed following a JOB code number, data inside of the ECR will be maintained (i.e. X reports).

The [·] key is allowed only after a secret code entry when the mode switch position has been changed (i.e. when the mode switch is turnd and an effective entry is enterd, the effect of secret code entry is disappeared).

LIST OF REPORTS

JOB CODE #	REPORT NAME	MODE			(DATA FORM)
		CLK X/Z	X1/Z1 DAILY	X2/Z2 PERIODIC	
1	General Report		X1/Z1	X2/Z2 *1	– *4
2	Individual Cashier Report	X/Z	X1/Z1		Cashier key
3	Individual Clerk Report	X/Z	X1/Z1		clerk No. (Up to 4 digits)
4	Hourly TTL Report		X1		(RANGE)2 *6
			X1/Z1 *3		– *4
5	Daily All Cashier Report		X1/Z1		– *4
6	Daily All Clerk Report		X1/Z1		– *4
9	Stacked Report		X1/Z1		–
12	Manual Group Report		X1	X2 1	Dept. keys with level difinition
20	PLU Report by Range		X1/Z1 *2		(RANGE)1 *5
30	CID		X1		– *4
40	TAX Report			X2/Z2	–
60	PB LOOK UP		X1		(RANGE)3*7
	Report*1 or 2		Z1		–

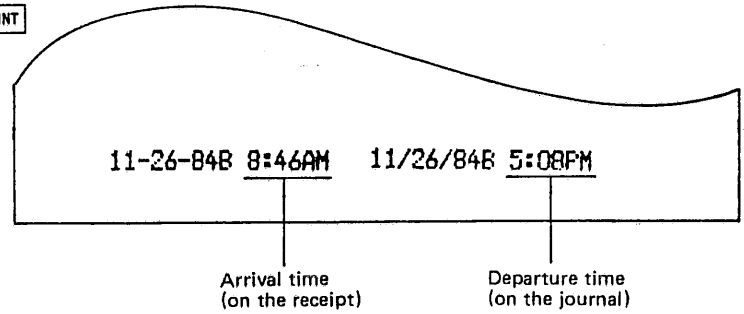
*1 PLU/SUB RAM (#2 RAM) option required
*2 Restaurant RAM (#1 RAM) option required
*3 Zero Skip Printing
*4 –: No entry required
*5 (RANGE)1: xx @/FOR (xx)
*6 (RANGE)2: (xx) @/FOR (xx); xx = 0 – 23; No entry for 0 data
*7 (RANGE)3: (xx) @/FOR (xx); xx = 0 – 1344; No entry for 0

xx: 0 ~ 23, No entry for "0" data
yy: 1 ~ 99

2. VALIDATION PRINTING OF CHECK IN AND CHECKOUT TIME

The ER-3241 allows the operator to print the employee arrival and departure times, etc. using the validation printing function. (See page 117.)

(1) Turn the mode switch to the "CLK X/Z" position.
(2) Put a card into the paper chute and perform the following key operation.
  1) Arrival time (printed on the receipt)
    Numeric key 1 ⟶ [PRINT]
  2) Departure time (printed on the journal)
    Numeric key 2 ⟶ [PRINT]
(3) Sample printout



11. OUTLINE OF FUNCTIONS

11-1. Function List

FEATURES		NUMBER
Number of Departments		20
Department Expandability Max. Number of Departments		OPTION 50
Number of PLU Expandability Max. Number of PLU's		OPTION 350
Number of Clerks/Cashiers		99/4
Number of Media CASH, CA2, CHECK, CHARGE1~5		8
Number of Free Key Positions		51
Number of Different Free Key Function Except Department		29
Number of Digits in The Operator Display		11
Number of Digits in The Customer Display		7
Type of Receipt/Journal Printer (Dot)		M-220F
Number of Drawers (Additional remote drawer)		1 (+3)
Number of Different reports		10 (+2)
Number of Different Reports by Option		3
Print Skip on Reports		Yes
Department: No. of Digits in Unit Price Preset		6
Department: +/–		Yes
Department: HALO digits		0 ~ 7
Department: Tax Sort		2
Department: (SIS) Single Item Sale		Yes
Department: (SIF) Single Item Finalize		Yes
Department: Inhibit and Preset		Yes
Department: Validation Enforce		Yes
Department: No. of Digits of Totalizer		8
Department: No. of Digits of Counter		6
Department: Food Stamp sort		Yes
Department shit level ER-45PL4 (max. 72 depts)		(3)
Customer display		Revolv.
Slip printer ER-46SP1		Yes
Clerk & Cashier	Clerk (1 ~ 99)	CLK # key
	Cashier (A, B, D, E)	One hole
	Clerk code preset	4Dgx99
	Totalizer for cashiers	15x4
	Totalizer for clerk	99
Printer	Roll paper near-end sensor	Yes
	Validation paper sensor	Yes
Drawer Open/close sense SW		Yes

FEATURES		NUMBER
PLU	No. of Digits of Totalizer	8
PLU	No. of Digits of Counter	6
PLU	No. of Digits of Unit Price	6
PLU	+/–	Yes
PLU	HALO	Yes
PLU	Kind of Tax Sort	2
PLU	Inhibit and Preset	Yes
PLU	Sub Department	Yes
PLU	No. of Digits of Split Price Base	2
PLU	Number of Departments	2
PLU	Food stamp sort	Yes
MEDIAS	Number of CASH Keys	2
MEDIAS	CHECK	1
MEDIAS	CHARGE	5
MEDIAS	CHECK CHANGE TOTAL	1
MEDIAS	Drawer OPEN DETECT (SRV SETTING)	Yes
MEDIAS	Validation Enforce (PGM SETTING)	Yes
MEDIAS	Tax Delete (PGM SETTING)	Yes
MEDIAS	Food stamp tender	1
KEY	Departments (Max)	50
KEY	PLU/SUB	1
KEY	CASH	2
KEY	CHECK	1
KEY	CHARGE	5
KEY	MDSE ST	1
KEY	VOID	1
KEY	REFUND	1
KEY	%1 ~ %4	each 1
KEY	⊖1, ⊖2	each 1
KEY	TAX SHIFT 1	1
KEY	TAX SHIFT 2	1
KEY	MANUAL TAX	1
KEY	RA	1
KEY	PO	1
KEY	PRINT	1
KEY	JOURNAL – FEED	1
KEY	RECEIPT – FEED	1
KEY	NUMERIC 0 ~ 9	10
KEY	00	1
KEY	DECIMAL POINT	1
KEY	CLEAR	1
KEY	RECEIPT	1

FEATURES		NUMBER
KEY	@/FOR	1
	#/SBTL	1
FUNCTIONS	MULTIPLICATION	Yes
	SPLIT PRICING	Yes
	⊖ 1 or 2 (NOT NET DEPT)	Yes
	⊖ 1 or 2 (NET DEPT)	Yes
	%1~4 (NOT NET DEPT)	Yes
	%1~4 (NET DEPT)	Yes
	PAST VOID, LAST VOID	Yes
	VOID MODE	Yes
	SENTINEL	Yes
	P-BAL, C-BAL	Yes
	CLOCK	Yes
	OVERRIDE	Yes
	CASH CHECK	Yes
	SEPARATE ITEMIZERS	Yes
	FOR REFUND	Yes
	NO. OF TAX TABLES	2
	NO. OF DIGITS OF % TAX	6
REPORTS	CLERK	Yes
	DAILY GENERAL	Yes
	PLU/Sub-department	OPTION
	CASH IN DRAWER	Yes
	HOURLY	Yes
	MONTHLY GENERAL	Yes
	MANUAL GROUP	Yes
	MONTHLY MANUAL GROUP	Yes

No. = Number

MONTHLY = Periodic total

11-2. New Function

SECRET CODE ENTRY

After entering the secret code by the following procedure, the Z reports are available to be printed by adding the key depressing in the report reading procedure.

The secret code is preset in the PGM2 mode.

Different codes are presettable from each other of Z1 and Z2 for the individual controlling.

Once the secret code has been entered, the re-entry is not necessary to take the multiple number of Z-reports in the same mode.

If the secret number has been preset as zero, no secret code entry is necessary to print Z-report.

(PROCEDURE)

In the X1/Z1 or X2/Z2 mode.

CA/AT/NS → xxxx → [CA/AT/NS]

(Secret Code)

PB/CB

Manual balance pick up registration is available by using "PB" and "CB" keys in REG. and MGR. mode.

CB : For negative balance pick up.

PB : For positive balance pick up.

Maximum allowable entry digits for the amount are seven (total entry digits are eight including a check digit). The check digit is selectable to exist or not by a SRV mode preset.

No numeric entry prior a PB key depression makes zero balance entry. (This operation is not allowed for the CB key.)

PB or CB registration can be initiated at any timing before entering the tendering stage.

Allowable times of "CB" or "PB" registration is no limited in one transaction. If "PB" registration are performed twice in one transaction, totals of two previous balance will be added together.

The keys can be preset as taxable (or non-taxable), but tax shift key operations (in REG/MGR mode) are not effective to change them.

Balance file:

New check (CB) and Re-order and Settlement (PB) entries (option)

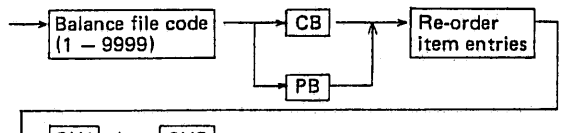
This function requires the installation of the ER-46PL1 RAM memory chip (option).

Charge sales data can be stored in a maximum of 1344 balance files (which can be specified by using 4-digit free codes 1–9999).

The stored data can be read for additional entries.

- New check key (CB):
  Pressing this key after entry of a balance file code causes the ECR to open a new file.
- Re-order key (PB):
  Pressing this key after entry of a balance file code causes the ECR to access a file having a non-zero balance (i.e a file that is already in use).
  This key allows additional sales to be registered to a balance file.

(Procedure)



* One of the charge keys which is programmed as a service key.

TRAY TOTAL

When the TRAY TTL key is depressed during a transaction in REG or MGR mode, the contents of the TRAY TOTAL itemizer which accumulates the merchandise sub-total is printed, displayed and cleard.

If the TRAY TTL key has been depressed before the operation in the transaction, the sub-total of the registration after the prior TRAY TTL key is printed.

If the TRAY TTL key has been depressed in a transaction (i.e. not at the top of a transaction), the amount is printed

with a fixed descriptor.
The display for the other sub-totals is not affected by the depression of the TRAY TTL key (i.e. show the whole total amount).

EXAMPLE

DPT.02	$1.50	
DPT.08	$2.50	
T+TL	$4.00	Tray total
DPT.07	$8.75	
DPT.01	$1.25	
T+TL	$10.00	Tray total
S+T+	$14.00	Whole total
TAX1	$0.35	
TAX2	$0.10	
TOTAL	$14.45	

STACKED REPORT

The machine has the stacked report feature, which issues multiple kinds of report by one sequencial operation.
This report can not include the job number of 2, 3 12 or 40. If the numbers are included in an operation the steps for the numbers are ignored (i.e. the reports for the numbers are not printed but the other reports are printed).
For reports 4 and 20, no range can be specified (i.e. allways all items are printed with zero skipping).
Up to 5 kinds of report can be printed consecutively by an operation. Same report number can be included in the an operation, but if the data is changed after the former one's printing, the latter report prints the changed data (i.e. consecutive number or Z report)

12. TEST FUNCTION (IN THE SRV1 MODE)

12-1. General

1) This test function is designed to test various machine operations in the production line and during field servicing. Test programs are implemented in the ROM of the ER-3241 and executed by the CPU (UPD7801G220). The following conditions are required for the proper operation of the test program:
   a) Normal voltage levels to the logic system (+5V, $\overline{POF}$).
   b) All I/O signals and CPU logic should be in normal operating condition, except for PA, PB, INT0, INT2, and $\overline{WAIT}$ of the CPU. An entire KDC and part of the address decoder, address bus, data bus, and RAM1 should be in normal working condition.
2) After program initiation, test status or test command code will be printed on the receipt and journal of the M220F main printer as well for indicating execution of the test program, regardless of the RECEIPT ON/OFF switch position.
3) If power interrupt occurs during program execution, one of the following actions will take place depending on the MODE switch position at the time of power restoration:
   a) SRV1: Program Reset is performed.
   b) Other than SRV1 and SRV2: Continues program execution.
   c) SRV2: CPU does not start. Program will be reset when the mode switch is turned to SRV1.

1-2. List of test commands

Test commands must be entered in the following format in the SRV1 mode.

JOB # (xxx) → CA/AT/NS

No.	JOB #	Test item	
1	100	M220F printer test	
2	101	M240 printer test	Option
3	102	M220F printer aging test	
4	103	Display test	
5	104	Key test	
6	105	Free key position code read test	
7	106	Mode/clerk switch test	
8	107	Receipt on/off switch test	
9	108	Validation paper sensor test	
10	109	Paper near-end sensor test	
11	110	BOF/TOF sensor test	Option
12	111	Drawer open sensor test	Service option
	112	Drawer open sensor test	
	113	Drawer open sensor test	
	114	Drawer open sensor test	
15	118	M240 printer aging test	Option
16	200	System ROM (7801G-220 internal ROM) test	
	201	ROM1 test 27128-029 or 27128R021A	
	202	ROM2 test 27128-130 or 27128R022A	
	203	ROM3 test 2732R001A and ER32RS ROM (2732R031A)	
17	300	RAM1 test	
	301	RAM2 test	
	302	Restaurant RAM test	Option*
	303	M-TTL RAM test (Periodic total RAM)	Option*
18	119	RS232C test	Option
19	115	Patch circuit test	

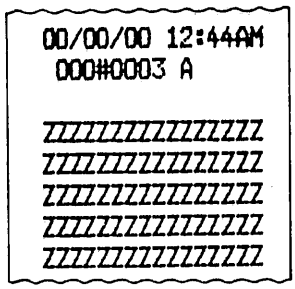
NOTE*: After optional RAM has been installed, you must clear the RAM via the respective RAM test function.

[1] M220F printer test

(1) **Key operation:** 100 → CA/AT/NS

(2) **Test function**

Regardless of the RECEIPT ON/OFF switch, 16 digits of "Z" are printed on 5 lines of both the receipt and journal.



(3) **Check items**

a) Check to see that all lines begin on the same vertical alignment.

b) Check to see that nothing is printed outside of the margins on both the receipt and journal. Pay special attention to the right margin of the receipt and the left margin of the journal.

c) Check print quality.
It is preferable to check print quality using JOB # 102.

d) Check paper feed and stamping actions.

(4) **Test termination**

Test will terminate automatically without printing the test end message.

[2] M240 printer test

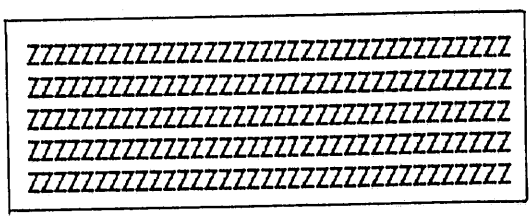
(1) **Key operation:** 101 → CA/AT/NS

NOTE: Begin the test with the slip set in the printer.

(2) **Test function**

Regardless of whether paper is set properly in the printer or not, 35 digits of "Z" are printed on 5 lines of paper.

Upon completion of printing, the slip will stop and release.



(3) **Check items**

1) Check to see that all lines are started on the same vertical alignment.

2) Check print quality.

3) Ensure that the paper has been released and that the slip can be inserted and removed smoothly.

(4) **Test termination**

Test will terminate automatically with "0.00" on the display. The end message will be printed on the main printer.

Hint

If the release lever was not up in inserting the slip, use of the test command JOB #110 is suggested to lift the release lever up.

[3] M220F printer aging test

(1) **Key operation;** 102 → CA/AT/NS

NOTE: Set the RECEIPT ON/OFF switch to the ON side.

(2) **Test function**

This test command performs the M220F printer aging test. All internal characters are printed in order with individual characters printed repeatedly on a single line. The position of the RECEIPT ON/OFF switch is checked upon printing an entire character set. If the switch is at the OFF side, the test will terminate after performing paper feed and stamping. If the switch is at the ON side, the test will be repeated again from the beginning.

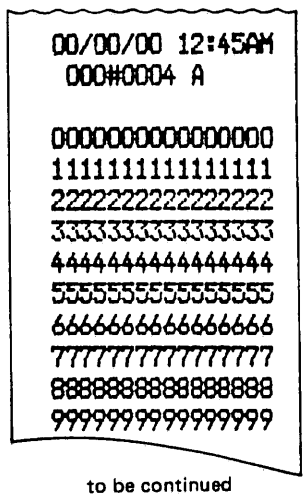
(3) **Test termination**

To terminate the test, set the RECEIPT ON/OFF switch to the OFF side.

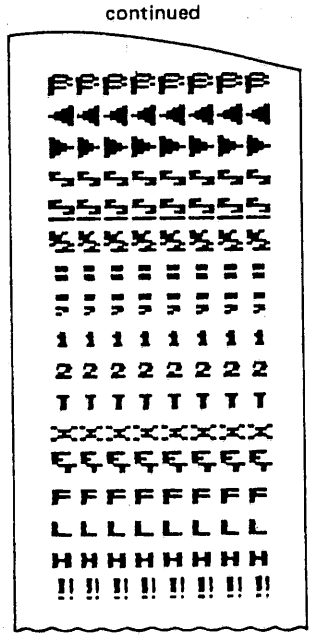
NOTES:

1. Character code of the character printed on a line is indicated on the display in hexadecimal. This character code, however, is the hardware code that is processed by the CPU and is therefore not the character code used for character setup. In the case of a double size character, a decimal point will be placed between the first and second digits.
2. Perform JOB #107 before this test to ensure that the receipt switch is functioning properly.

JOB #102 Sample Print



continued

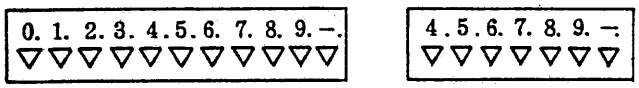


[4] Display test

(1) Key operation: 103 → CA/AT/NS

(2) Test function

The following is displayed.



Operator side　　Customer side

(3) Check items

a) Check to see that display contents is correct.

b) Check to see that display is free of blur, omission, and unevenness.

(4) Test termination

Journal key depression will terminate the test.

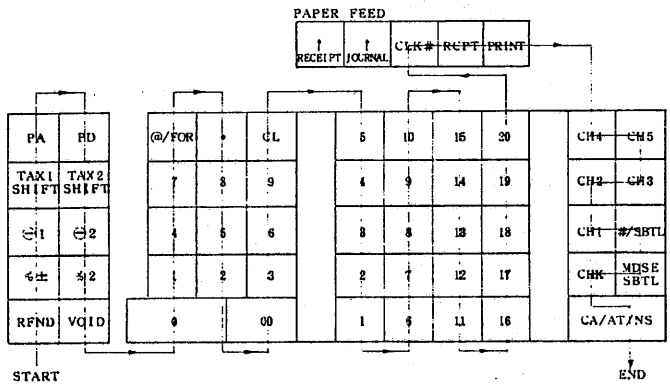
Test end message printing.

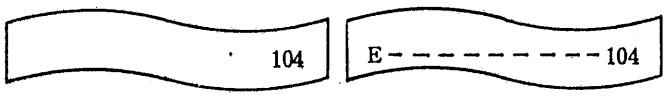
[5] Key test (standard keyboard layout)

(1) Operation: 104 → CA/AT/NS

(2) Test function

Because this test command is applicable only for the standard keyboard layout, it cannot be applied for the ER-3241 if the function key layout or key size has been changed by the free key layout function. In this test mode, keys on the keyboard must be pushed in order indicated in Figure 1. When the test is successful, the test terminates with the message on the printer. Occurrence of an error during the test will immediately produce the error message on the printer, then the test will terminate by the depression of CA/AT/NS or a series of specific keys.





End message print　　Error message print

[6] Free key position code read test

(1) Key operation: 105 → CA/AT/NS

(2) This test command is used to check key position (key contact number).

When a key is depressed after the preliminary key operation (Step (1) above), the key position code of the respective key is displayed. This function is used for the creation of the check table during free key setup.

(3) Test termination

Test will terminate by the depression of CA/AT/NS.

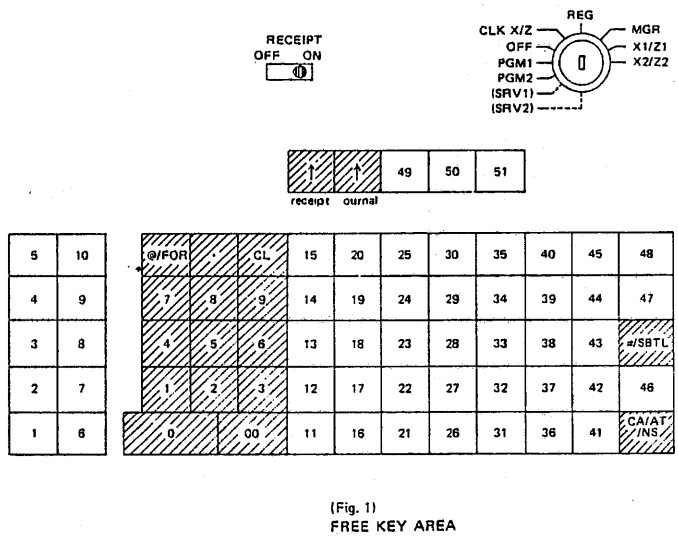
End message print

NOTE: The following chart shows the key position codes. Depression of a fixed position key (0–9, @/FOR, ., #/SBTL, etc.) will result in an error operation.* The following will result in a second type of error operation**: If two keys in the free key area are depressed simultaneously, or if two key switches are installed where one should be a key stem, when using a large sized key (1 x 2 or 2 x 2).

*: Depression of the fixed position key will put "—" on the display.

**: Simultaneous depression of more than two keys will result in "EE".

FREE KEY POSITION CODE



(Fig. 1)
FREE KEY AREA

(NOTE)

1. 51 unique key assignments.
2. Asterisked areas are reserved for fixed position keys.

Fig. 2

(1) ~ (51): Free key position codes.

NOTE: Hatched area is reserved for fixed position keys.

[7] Mode/clerk switch test

(1) Key operation: 106 → CA/AT/NS

NOTE: Perform the above command entry with clerk key "A" selected or no clerk key. Otherwise, it may result in error.

(2) **Test function**

- After the above command entry, test starts for the mode/clerk keys. Though the display may appear darkened somewhat with occassional flickering, the operation is normal.
- Change clerk key setup in order of A, B, D, and E, set the clerk switch to other than E or OFF, then proceed to change the mode switch position in the order of: SRV1 → PGM2 → PGM1 → CLK X/Z → REG → MGR → X1/Z1 → X2/Z2 → X1/Z1 → MGR → REG → CLK X/Z → PGM1 → PGM2 → SRV1. With this, the display changes from 00 in SRV1 mode to 01 in PGM1 mode, and so on until 07 is displayed at the X2/Z2 mode position. The test will terminate when it returns to the SRV1 position. Should proper sequence be ignored or a hardware error is encountered in the middle of an operation, it will immediately end with an error message printed. Hardware code is displayed.

Clerk/Mode switch	A	B	D	E	SRV 1	PGM 2
Display	01	02	03	04	00	01

PGM 1	CLK X/Z	REG	MGR	X1/ Z1	X2/ Z2
02	03	04	05	06	07

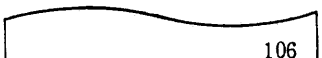
The mode switch must be rotated carefully. Since there is a possible activation of the power interrupt procedure in moving the switch over the OFF position from the PGM1 position to the CLK X/Z position, it becomes necessary before going into the REG mode to ensure activation of the display while it is in the CLK X/Z mode. Because no check is carried out after rotation past the X2/Z2 through SRV1 mode, there is no need to continue careful rotation, however care must be exerted not to pass over to the SRV2 position.

(3) **Check items**

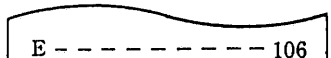
Check to see that the end message has been printed.

(4) **Test termination**

To terminate the test, move the mode switch to a position other than SRV1 or SRV2, then return it again to the SRV1 position.



Normal message print



Error message print

*The test may also be terminated if the mode switch is set to a position other than SRV1 during the clerk key test.

[8] Receipt on/off switch test

(1) **Key operation:** 107 → CA/AT/NS

(2) **Test function**

The state of the RECEIPT ON/OFF switch is displayed. Though the display may be darkened somewhat and flickers, this does not indicate irregular machine performance.

Receipt ON stage: 0 is displayed in the first digit.
Receipt OFF stage: F is displayed in the first digit.

(3) **Check item**

Change the RECEIPT ON/OFF switch position and check to see that display is correct.

(4) **Test termination**

Journal key depression will terminate the test.

End message print

[9] Validation paper sensor test

(1) **Key operation:** 108 → CA/AT/NS

(2) **Test function**

Stage of the validation paper sensor is displayed.

- Validation paper in: CO is displayed.
- Validation paper not in: CF is displayed.

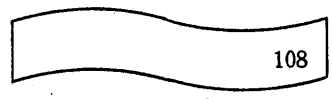
NOTE: However, CO will be displayed regardless of paper insertion, when it has no validation paper sensor.

(3) **Check item**

CO will be displayed when the paper is inserted.

(4) **Test termination**

Journal key depression will terminate the test.



End message print

[10] Paper near-end sensor test

(1) **Key operation:** 109 → CA/AT/NS

(2) **Test function**

State of the paper near-end sensor is displayed.

- Paper near-end on: PE is displayed in the first and second digits.
- Paper near-end not on: PO is displayed in the first and second digits.

(3) **Check item**

PO is displayed when the roll paper is loaded on the journal paper roll holder. PE will be displayed when it is not. PO is displayed at all times when it does not have the paper near-end sensor.

(4) **Test termination**

Journal key depression will terminate the test with the end message on the printer and becomes ready to receive key entry.

End message print

[11] BOF/TOF sensor test for Slip Printer (M-240) . . . option ER-46SP1

(1) **Operation:** 110 → CA/AT/NS

(2) Test function

With the above command entry, the state of BOF/TOF is displayed after a paper release.

TOF sensor	BOF sensor	Display
w/o paper	w/o paper	– –
w/o paper	w/paper	– 0
w/paper	w/paper	0 0
w/paper	w/o paper	0 –

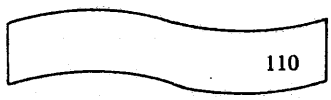
For the BOF, TOP sensor, refer to page 8 (Fig. A).

(3) Check item

Insert paper by hand and check the display for sensor response.

(4) Test termination

Journal key depression prints the end message and becomes ready for the next key entry. The end message will be printed on the M220F printer.



End message print

[12] Drawer open sensor test

(1) Key operation: 111 thru 114 → CA/AT/NS

(2) Test function

The specified drawer opens and the state of the drawer open sensor is displayed.

Drawer open: 0 is displayed in the first digit.

Drawer closed: C is displayed in the first digit.

111: Drawer 0 (main drawer)

112: Drawer 1 (option drawer 1)

113: Drawer 2 (option drawer 2)

114: Drawer 3 (option drawer 3)

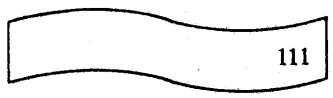
(3) Check item

Appearance of C on the display must be confirmed after closing the drawer.

All drawers must be tested when option drawer is installed.

(4) Test termination

Journal key depression will terminate the test and becomes ready for the next key entry.



End message print

[13] M240 printer aging test . . . option ER-46SP1

(1) Key operation: 118 → CA/AT/NS

NOTE: Set the receip switch to the ON side.

(2) Test function

This test command carries out the M240 printer aging test.

All internal characters are printed in their order with individual character printed repeatedly on a single line.

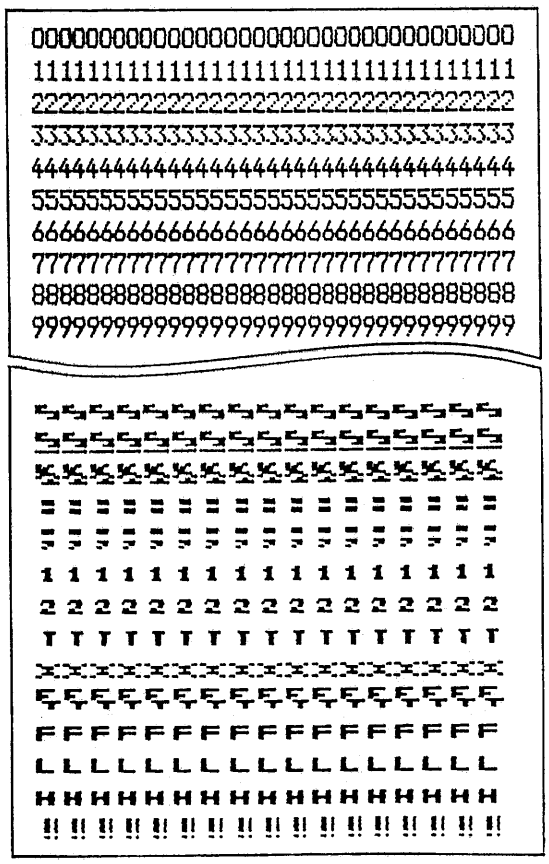
The position of the RECEIPT ON/OFF switch is interrogated upon printing an entire character set. If the switch is on the OFF side, the test will terminate. If the switch is on the ON side, the test will be repeated all over again from the beginning.

(3) Test termination

To terminate the test, set the RECEIPT ON/OFF switch to the OFF side.

NOTES:

1. Character code on display, however, is the hardware code.
   In the case of a double size character, a decimal point will be placed between the first and second digits.
2. Perform the test command JOB #107 before this test to ensure that the receipt switch is properly functioning.
3. Paper detecting is not performed during the M240 printer aging test. The printing is done even without paper in the M240 printer.



[14] ROM test

(1) **Key operation:** 2xx → CA/AT/NS

(2) **Test function**

The specified ROM is tested.

ER3241

Job #	Address	ROM
200	0000(H)~0FFF(H)	Internal ROM of UPD7801-220
201	1000(H)~3FFF(H) & E000(H)~EFFF(H)	PROM1 27128-029* or 27128R021A
202	4000(H)~7FFF(H)	PROM2 27128-030* or 2712R022A
203	8000(H)~9FFF(H)	PROM3 2732R001A*

* OCT. PRO ONLY (ER3241) (H): Hexadecimal

ER3231

Job #	Address	ROM
200	0000(H)~0FFF(H)	Internal ROM of UPD7801-220
201	1000(H)~3FFF(H) & E000(H)~EFFF(H)	PROM1 27128030-C
202	4000(H)~7FFF(H)	PROM2 27128032-C
203	8000(H)~9FFF(H)	PROM3 (NOT INSTALLED)

(H): Hexadecimal

(3) **Check item**

Check to see that the end message is printed normally.

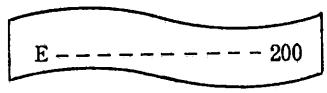
(4) **Test termination**

The terminates automatically and becomes ready for the next key entry.

EX.

Normal message print

EX.



Error message print

[15] RAM test

(1) **Key operation:** 3xx → CA/AT/NS

NOTE: As test command 300 and 301 are for the test of the basic RAM, the master reset will be carried out automatically after this test. Therefore, after printout occurs, there is a slight delay before the display changes.

(2) Read/write test is carried out using the test data of 55(H) and AA(H). When the test is successful, the chip select function is then tested to ensure proper chip accessing. Different data consisting of one byte is written to all RAMs to check correct recording of the data. After completion of the test, data is restored for all but the specified RAMs and the specified RAMs are cleared. However, RAM area of 9800(H) thru 99FF(H) and 9F81(H) thru 9FFF(H) is not cleared.

Job #	Address	RAM	
300	9800(H)-9FFF(H)	Basic RAM1	Special Service Preset programming will be erased after master reset or JOB#301 has been executed. Before entering Special Service Preset for the unit already programmed with SSP, it needs to clear the RAM contents.
301	9000(H)-97FF(H)	Basic RAM2	
302	A000(H)-BFFF(H)	Restaurant RAM	Cleared to 0.
303	C000(H)-DFFF(H)	PLU RAM	PLU is initialized after the test.

M-TTL: Monthly (Periodic) total (H): Hexadecimal

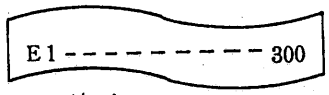
(3) **Check item**

When an error is encountered during the read/write test or chip select test, the test is immediately terminated with the error message on the printer.

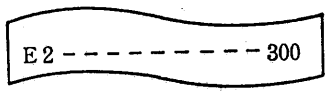
Check to see that the end message is printed correctly.

An example of RAM1 test

Normal ending message



Read/write error message



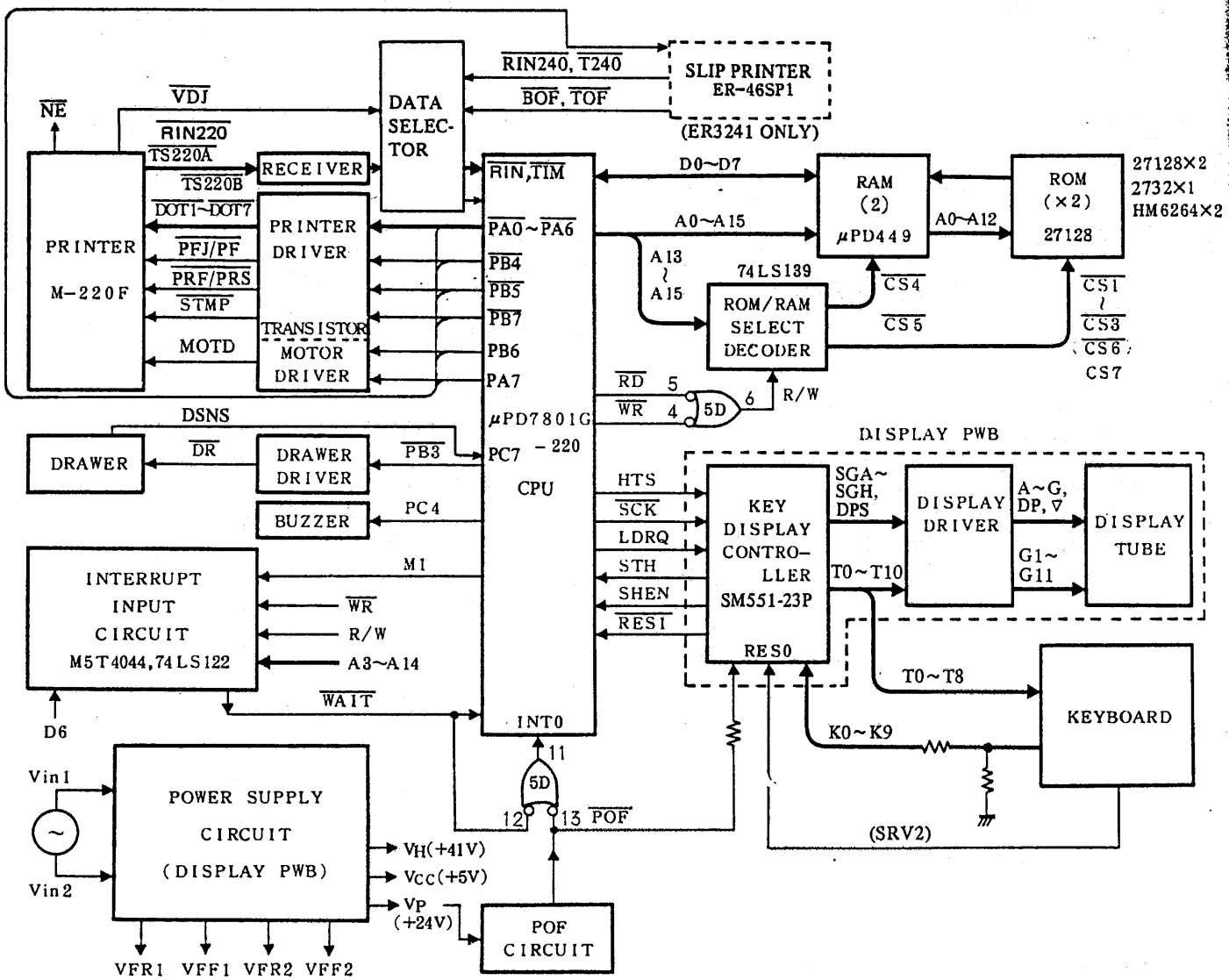
Chip select error message

(4) **Test termination**

The test terminates automatically with the end message on the printer.

NOTE: AFTER INSTALLING OPTIONAL RAM (PLU RAM, MONTHLY TOTAL RAM or DEPT. SHIFT RAM), YOU MUST CLEAR/INITIALIZE THE RAM VIA THE RESPECTIVE RAM TEST FUNCTION.

13. CIRCUIT BLOCK DIAGRAM



SIGNAL DESCRIPTION

$\overline{RIN}$:	Reset pulse
$\overline{TIM}$:	Timing pulse
$\overline{DOT1}$ ~ $\overline{DOT7}$:	Dot wire magnet drive ($\overline{PA0}$ ~ $\overline{PA6}$)
$\overline{PFJ/PF}$:	Journal paper feed ($\overline{PB4}$)
$\overline{PRF/PRS}$:	Receipt paper feed ($\overline{PB5}$)
$\overline{STMP}$:	Stamp drive ($\overline{PB7}$)
MOTD:	Motor drive (PB6)
$\overline{DR}$:	Drawer drive ($\overline{PB3}$)
$\overline{POF}$:	Power off detect
A~G, DP, ▽:	Display segment drive
G1~G11:	Display digit drive
T0~T10:	Display digit drive & key scan
D0~D7:	Data bus
A0~A15:	Address bus
$\overline{RD}$:	Read
$\overline{WR}$:	Write
R/W:	Read/write
HTS:	Serial input data (SI)
$\overline{SCK}$:	Serial shift clock
LDRQ:	Load request
STH:	Serial output data (SO)
SHEN:	Shift enable
$\overline{RES1}$:	Reset
K0~K9:	Key return
DS:	Drawer open/close sense (PC7)
$\overline{NE}$:	Roll paper near-end sense
$\overline{VDJ}$:	Validation paper sense
$\overline{TOF}$:	Top of form sense (Slip)
$\overline{BOF}$:	Bottom of form sense (Slip)

14. μPD7801G AND SM-551-23P TERMINAL SIGNALS

14-1. μPD7801G-220

Pin No.	Terminal Name	Descriptions	In/ Out
1	PE15	Address bus (A15)	Out
2	φOUT	Clock output (NU)	Out
3~10	D7~D0	Data bus	In/out
11	INT2	Interrupt request ($\overline{TIM}$ from printer) (TS)	In
12	INT1	Interrupt request (SHEN from 7507C)	In
13	INT0	Interrupt request ($\overline{POF}$, $\overline{WAIT}$)	In
14	$\overline{WAIT}$	Wait	In
15	M1	Machine cycle (M1)	Out
16	$\overline{WR}$	Write	Out
17	$\overline{RD}$	Read	Out
18	PC7	Drawer open/close sense (DS)	In
19	PC6	Not used	Out
20	PC5	Not used.	Out
21	PC4	Buzzer	Out
22	PC3	Load request (LDQR to CKDCII)	Out
23	PC2	Shift enable (SHEN from CKDCII)	In
24	PC1	Shift clock (SCK to CKDCII and Pin 26 of 7801G)	Out
25	PC0	Printer timing signal (TIM)	In
26	$\overline{SCK}$	Shift clock (from terminal PC1)	In
27	SI	Serial input data (STH from CKDCII)	In
28	SO	Serial output data (HTS to CKDCII)	Out
29	$\overline{REST}$	System reset (RES1 from CKDCII)	In
30	X2	Basic clock pulse	—
31	X1	Basic clock pulse	—
32	GND	Power source (0V)	—
33	$\overline{PA0}$	Printer dot wire magnet-1 ($\overline{DOT1}$)	Out
34	$\overline{PA1}$	Printer dot wire magnet-2 ($\overline{DOT2}$)	Out
35	$\overline{PA2}$	Printer dot wire magnet-3 ($\overline{DOT3}$)	Out
36	$\overline{PA3}$	Printer dot wire magnet-4 ($\overline{DOT4}$)	Out
37	$\overline{PA4}$	Printer dot wire magnet-5 ($\overline{DOT5}$)	Out
38	$\overline{PA5}$	Printer dot wire magnet-6 ($\overline{DOT6}$)	Out
39	$\overline{PA6}$	Printer dot wire magnet-7 ($\overline{DOT7}$)	Out
40	PA7	Motor drive ($\overline{MOT}$)	Out
41	PB0	Reset pulse ($\overline{RIN}$ from printer)	In
42	PB1	Near end sense/$\overline{BOF}$	In
43	PB2	Validation sense/$\overline{TOF}$	In
44	$\overline{PB3}$	Drawer open enable ($\overline{DR}$)	Out
45	$\overline{PB4}$	Journal paper feed ($\overline{PFJ}$/$\overline{PF}$)/Slip feed	Out
46	$\overline{PB5}$	Receipt paper feed ($\overline{PFR}$/PRS)/Slip release	Out
47	PB6	Printer select (M220/$\overline{240}$)	Out
48	$\overline{PB7}$	Stamp drive ($\overline{STMP}$)	Out
49	PE0	Address bus (A0)	Out
50	PE1	Address bus (A1)	Out
51	PE2	Address bus (A2)	Out
52	PE3	Address bus (A3)	Out
53	PE4	Address bus (A4)	Out
54	PE5	Address bus (A5)	Out
55	PE6	Address bus (A6)	Out
56	PE7	Address bus (A7)	Out
57	PE8	Address bus (A8)	Out
58	PE9	Address bus (A9)	Out
59	PE10	Address bus (A10)	Out
60	PE11	Address bus (A11)	Out
61	PE12	Address bus (A12)	Out
62	PE13	Address bus (A13)	Out
63	PE14	Address bus (A14)	Out
64	Vcc	Power source (+5V)	—

■ MAJOR FUNCTIONS OF μPD7801G-220 (CPU)

1. Control of printer M-220F
2. Control of RAMs and ROMs (The CPU executes program in ROMs)
3. Buzzer drive
4. Drawer drive
5. Control of SM551-23P (Key/Display controller)
6. Power off detect ($\overline{POF}$: Low) and process for power off.

14-2. SM551-23P (CKDCII)

Pin No.	Terminal Name	Description	IN/ OUT
1	CK1	CK1	—
2	CK2	CK2	—
3	VRAM	VRAM	—
4	OSCin	OSCin	—
5	OSCout	OSCout	—
6	$\overline{LDRQ}$	Load request	IN
7	INTB	VRAM	—
8	GND	GND	—
9	φ	φ out	OUT
10	T0	Key scan and Display 1st digit	OUT
11	T1	Key scan and Display 2nd digit	OUT
12	T2	Key scan and Display 3rd digit	OUT
13	T3	Key scan and Display 4th digit	OUT
14	T4	Key scan and Display 5th digit	OUT
15	T5	Key scan and Display 6th digit	OUT
16	T6	Key scan and Display 7th digit	OUT
17	T7	Key scan and Display 8th digit	OUT
18	T8	Key scan and Display 9th digit	OUT
19	T9	Display 10th digit	OUT
20	T10	Display 10th digit	OUT
21	T11	Display 12th digit	OUT
22	SHEN	Shift enable output	OUT
23	SGJ	Indicator	OUT
24	$\overline{RES1}$	$\overline{RES1}$	OUT
25	—	Not use	—
26	HTS	Serial data	IN
27	$\overline{SCK}$	Shift clock for serial	IN
28	STH	Serial data	OUT
29	$\overline{SCK}$	Reset order	IN
30	MODR	Mode return	IN
31	CLRKR	Clerk reseipt switch return	IN
32	IVR	Event read cancel	IN
33	$\overline{LDRQ}$	$\overline{LDRQ}$	IN
34	SCAN0	Scan digit select	IN
35	SCAN1	Scan digit select	IN
36	—	Not use	IN
37	$\overline{POF}$	$\overline{POFF}$	—
38	GND	GND	—
39	TEST	TEST	—
40	KR0	Key return input 0	IN
41	KR1	Key return input 1	IN
42	KR2	Key return input 2	IN
43	KR3	Key return input 3	IN
44	KR4	Key return input 4	IN
45	KR5	Key return input 5	IN
46	KR6	Key return input 6	IN
47	KR7	Key return input 7	IN
48	KR8	Key return input 8	IN
49	KR9	Key return input 9	IN
50	KR10	Key return input 10	IN
51	KR11	Key return input 11	IN
52	SGA	Display segment "a"	OUT

Pin No.	Terminal Name	Description	IN/OUT
53	SGB	Display segment "b"	OUT
54	SGC	Display segment "c"	OUT
55	SGD	Display segment "d"	OUT
56	SGE	Display segment "e"	OUT
57	SGF	Display segment "f"	OUT
58	SGG	Display segment "g"	OUT
59	DPS	Display segment "DP	OUT
60	$\overline{RES0}$	$\overline{RES0}$	OUT

■ MAJOR FUNCTIONS OF SM551-23P (KDC)DC)

1. Keyboard control
2. Display control
3. Clock/calendar function
4. Power-on ($\overline{POF}$: High) start function

15. CIRCUIT DESCRIPTIONS

15-1. μPD7801G (CPU) AND SM551-23P (CKDCII)

(CKDCII: Key, Display Controller)

Basic functions of the CPU and CKDCII are as listed in Section 14-1 and 14-2.

FOR THE DESCRIPTION OF μPD7801G(μCOM87), REFER TO CHAPTER 16 (μPD7802G) OF THE CASH REGISTER BASIC MANUAL.

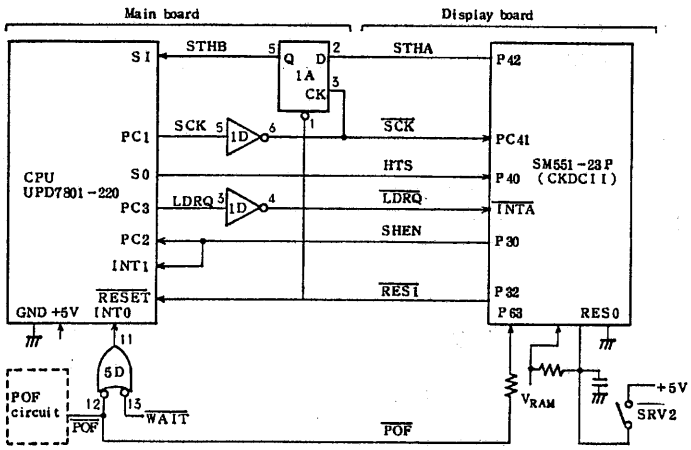


Fig. 1

STHA: Serial input
HTS: Serial output
SCK: Shift clock
LDRQ: Load request
SHEN: Shift enable
$\overline{RES1}$: System reset (for CPU, RAM, I/O)
$\overline{POF}$: Power off detect

15-2. Action at Power On and Off

(1) At power off

Even after power is turned off, the contents of the CKDCII (SM551-23P) is retained by VRAM supplied from the Ni-Cd battery backup power source, during which time the CKDCII continues the following operation.

1) Time keeping of the clock/counter
2) Detection of $\overline{POF}$ level

AC power	VRAM
ON	+5V
OFF	+3.6V, to +4.2V

- The $\overline{POF}$ signal checks for a power failure in intervals of 1 sec until it goes high.
- CKDCII (SM551-23P) operating voltage range: +3V to +7V
- Illustrated below is the waveform of the CKDCII basic clock (CK1/CK2) during power off.

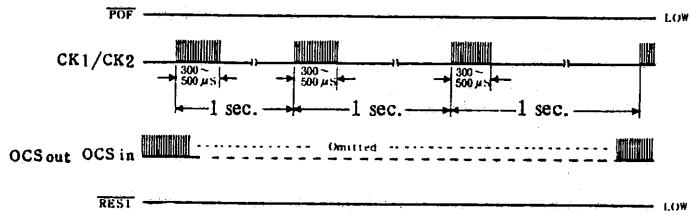


Fig. 2

The CPU (7801G) is at a complete halt because Vcc (+5V) is not supplied during power off.

(2) At power on (OFF to ON)

By examining $\overline{POF}$ every one second, the CKDCII monitors the power supply condition (ON or OFF). As $\overline{POF}$ rises from low to high state when the +5V supply became stable after power on, the CKDCII performs mode scan* and key scan* at (1).

NOTE (*): Mode scan

Mode at the time of power on is interrogated. If it is in the SRV1 mode, it proceeds to check if the journal key is in depression in order to discriminate whether it be program reset or master reset.

At Power on:

If the journal key is in depression in the SRV1 mode, master reset is sensed.

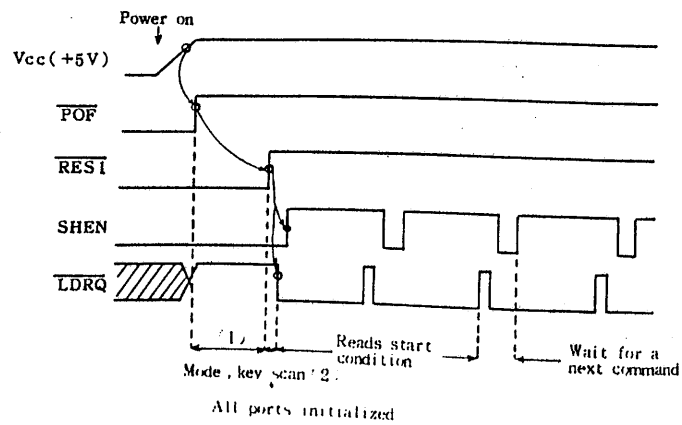
If the journal key is not in depression in the SVR1 mode, program reset is sensed.

If not in the SRV1 mode, it reads the mode.

Then, a high state of $\overline{RES1}$ appears on #24-pin of the CKDCII to cancel reset to the CPU.

After cancellation of reset, the CPU initializes all ports at (2) and reads the start condition.

The CKDCII displays the data in the display buffer until a display related command is received from the CPU.



(3) At power off (ON to OFF)

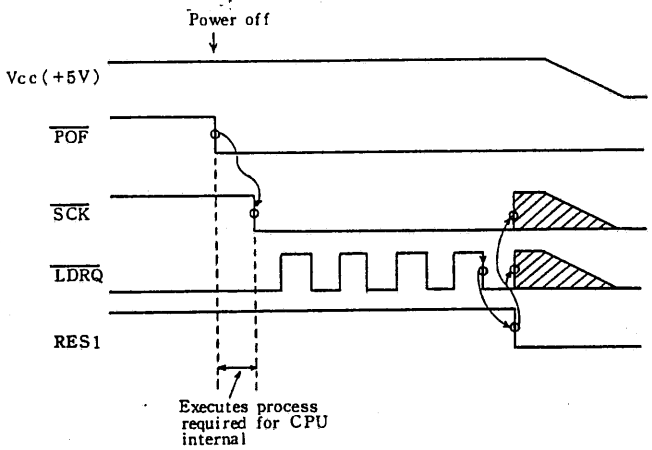
When power is turned off, $\overline{POF}$ turns from high to low state and directly inputted to the CPU. The CPU receiving a low state of $\overline{POF}$ inssues a reset request to the CKDCII after excuting necessary internal processing.

CPU procedure required for a reset request:

1) All CPU interrupt lines are disabled.
2) Set $\overline{SCK}$ to low level.
3) $\overline{LDRQ}$ is kept high for more than 30 microseconds, then forced low.
4) 1) through 3) repeated.
5) $\overline{LDRQ}$ continues to appear until $\overline{RES1}$ goes low.

Having received a reset request, the CKDCII issues a low state of $\overline{RES1}$ to the CPU to reset it. The CKDCII goes into the following state.

All ports go high impedance except, $\overline{RES1}$, SHEN, SGA thru SGG, DPS, and T0 thru T11 which are all in 0 volt level.



15-1-2. Action at the time of CKDCII reset ... RES0

As shown in Fig. 1, the CKDCII contains the reset pin (RES0). A high state on this line resets the CKDCII, after which time each of pins are brought to the following conditions:

T0-T9: Low, SA-SH: low, RES1: low, SHEN: low,
Other pins: high impedance

As RES0 turns to high level (VDD) with the mode switch at the SRV2 position, it resets the CKDCII. As RES1 turns low level at this point, it cause the CPU to reset and halt. Turning the mode switch to the SRV2 mode, even while power is on, causes the CKDCII and the CPU to reset and halt their operation. When the mode switch is turned from the SRV2 to SRV1 position, it makes RES0 of the CKDCII turn low and releases the CKDCII from the reset state, and, at the same time, the CKDCII changes RES1 from low to high state to free the CPU and RAMs from their reset state. Then, the same procedure as in "at the time of power on" of 15-2-(2) takes place. In other words, the following are two ways of "program reset" and "master rest".

1) Plug the ac cord in to the wall outlet while in the SRV1 mode: (The CKDCII is not initialized.)
2) With the ac cord connected to the wall outlet, turn the mode switch from the SRV2 to SRV1 position, which will initialize the CKDCII.

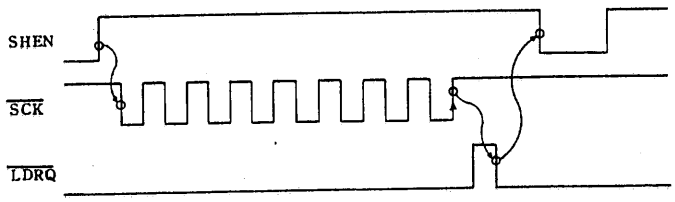
Although the above procedures are for program reset, simultaneous depression of Journal paper feed key performs master reset (all memories clear).

Since all CKDCII internal circuits are also reset when the CKDCII is in the reset state, all signal output pins become high impedance.

15-1-3. Data transfer (SHIFT) between the CPU and CKDCII

Data transfer between the CPU and CKDCII

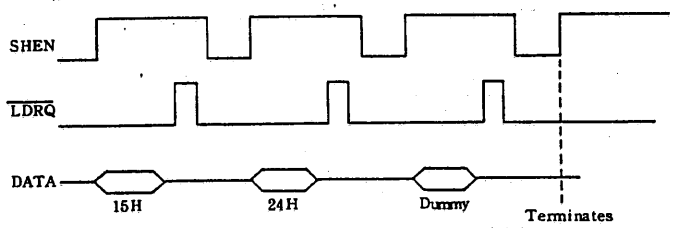
Data are transferred in synthronization with $\overline{SCK}$ from the CPU. $\overline{SCK}$ becomes effective with a high state of SHEN. Because one byte consists of eight bits, data transfer terminates at a high to low transition of $\overline{LDRQ}$ after completely shifting eight bits.



a) Transfer from the CPU to CKDCII

It requires one dummy byte in addition to transferring bytes. A low to high transition of SHEN is senses as an end of transmission after sending of the dummy byte.

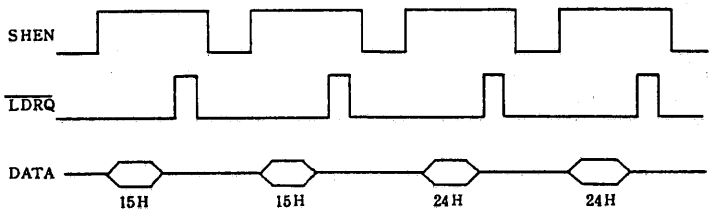
(Ex): To send two bytes of 15H and 24H.



b) Transfer from the CKDCII to CPU

To send two same data.

(Ex): To send 15H, 15H, 24H and 24H.



15-1-4. Oscillator circuit for CPU (μPD7801G)

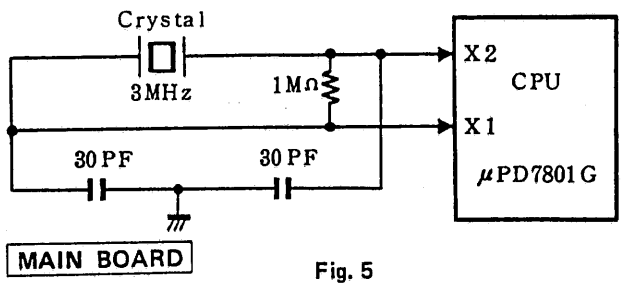


Fig. 5

The basic clock frequency is generated from a 3 MHz crystal oscillator. Output from the oscillators is connected

directly to the CPU.
Waveforms for X1 and X2 are shown below.

Waveform NU: Not used

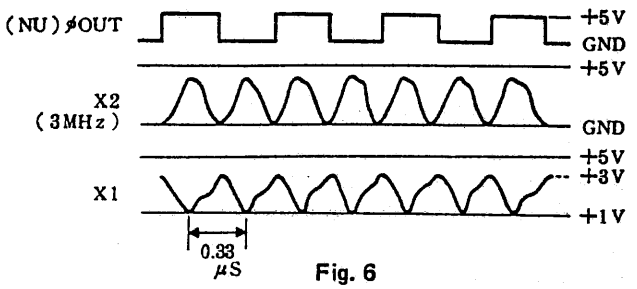
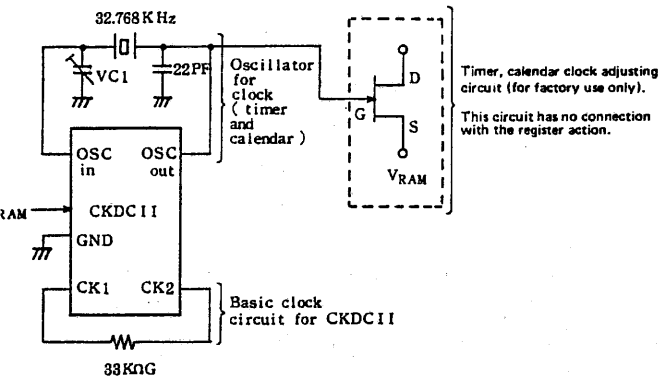


Fig. 6

15-1-5. Oscillator circuit for CKDCII (SM551-23P)



This circuit generates the CKDCII basic clock frequency and timer and calendar clock frequency.

1) CKDCII basic clock
Insertion of the 33Kohms resistor causes the oscillation circuit in the CKDCII to operate to oscillate the prescribed frequency (0.8 to 1.3 microseconds).

2) Timer, calendar clock
OSCin and OSCout calibrated by the trimmer capacitor (VC1) is input to the CKDCII.
The timer and the calendar are operated by VRAM which is supplied to the CKDCII even during power is off to the register.

NOTE: Since the trimmer capacitor had been adjusted precisely using a special instrument at the factory, it should not never be tried to manipulated on field. In case it should be manipulated incidentally, it has to be sent to Sharp factory service for adjustment.

15-2. Power Off (POF) Circuit, VRES Circuit

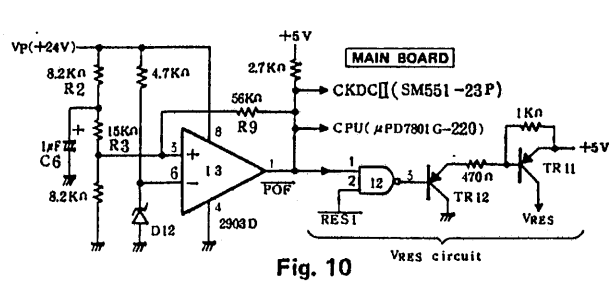


Fig. 10

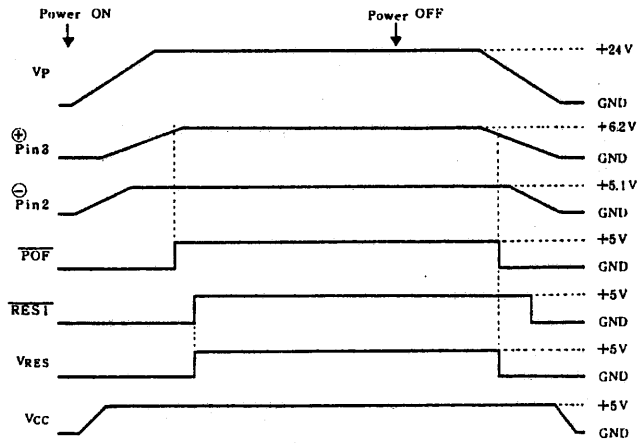


Fig. 11

(1) POF Circuit

ACTION OF COMPARATOR

- When (+) input level is higher than (–) input level: $\overline{POF}$ is at a high level.
- When (+) input level is lower than (–) input level: $\overline{POF}$ is at a low level.

The signal $\overline{POF}$ is a signal which represents condition of the AC power source.
Its level becomes a high level when AC power source is turned on, and becomes low level when the AC power source is disconnected or drops to 0 (zero).

ACTION OF THE CIRCUIT

1. With Power ON
The signal $\overline{POF}$ changes from a low level to a high level when the potential of (+) input becomes higher than the (–) input (+5.1V) after turning on the AC power source. As soon as the signal $\overline{POF}$ becomes a high, the CPU will start its operation.
2. With Power OFF
The signal $\overline{POF}$ changes from a high level to a low level as the potential of (+) input becomes a low faster than (–) input after turning off the AC power source. As soon as the signal $\overline{POF}$ becomes a low, the CPU will stop its operation.

(2) V_{RES} Circuit

V_{RES} is a +5V power source which is controlled by the signal $\overline{POF}$ and is developed from V_{DD}.
V_{RES} is supplied to the printer and drawer circuits in order to prevent a malfunction of these circuits at the time of power up and down.

15-3. NI-CD Battery Circuit

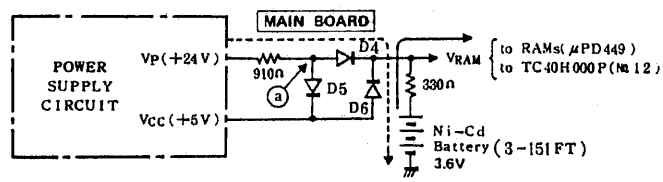


Fig. 12

----→: Charge current of the battery
——→: Discharge current of the battery

The voltage level at each point is as follows.

AC Power	Power @	VRAM
OFF	0V	+3.6V ~ +4.2V
ON	+5.7V	+5V

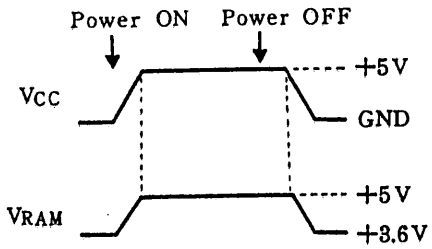
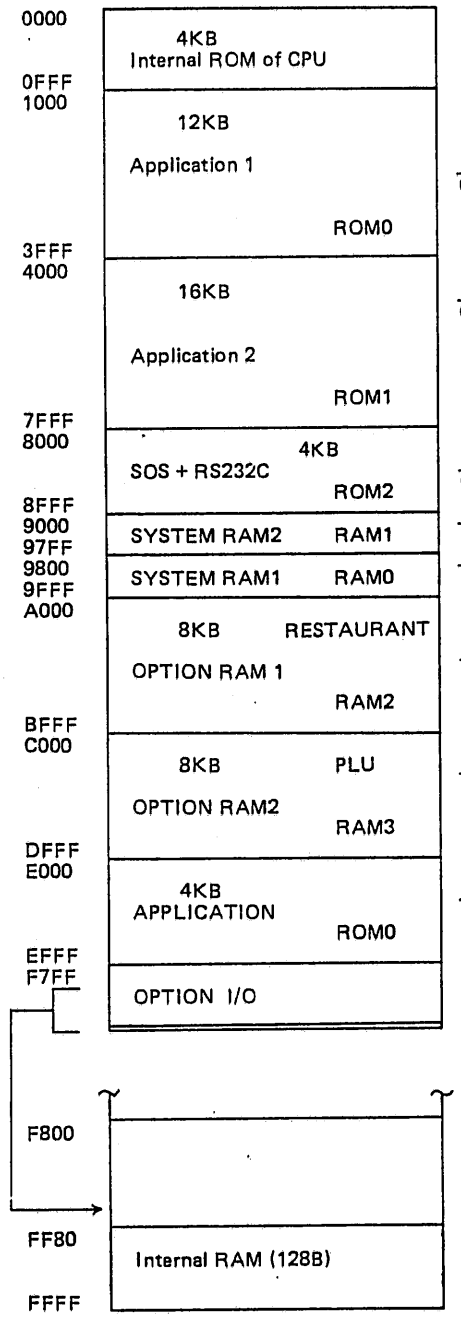


Fig. 13

D15: Reverse flow prevention diode
D16: +5V clamp diode
D17: $V_{CC} - V_{RAM}$ sequence compensation diode

2) Memory Address Map



3) RAM chip select

Basic RAM: 9800(H) ~ 97FF(H)
Option RAM1: A000(H) ~ BFFF(H)
Option RAM2: C000 (H) ~ DFFF(H)

ROM for ER-3241

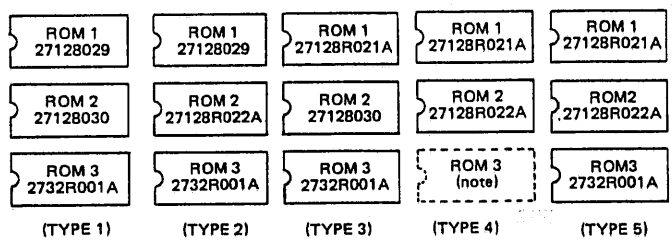
Different type of ROM's are used in October, 1984 production for model ER-3241.

ROM chip select & ROM numbers

Memory address		1000 – 3FFF	40000 – 7FFF	8000 – 9FFF
OCT. Prod.	ROM # & position	(8F) 27128029-C	(7F) 27128030-C	(8G) M2732R001A
	Chip select	$\overline{CS1}$	$\overline{CS2}$	$\overline{CS3}$
From NOV. Prod.	ROM # & position	(8F) 27128R021A	(7F) 27128R022A	
	Chip select	$\overline{CS1}$	$\overline{CS2}$	

ROM combinations

The following combinations can be used.



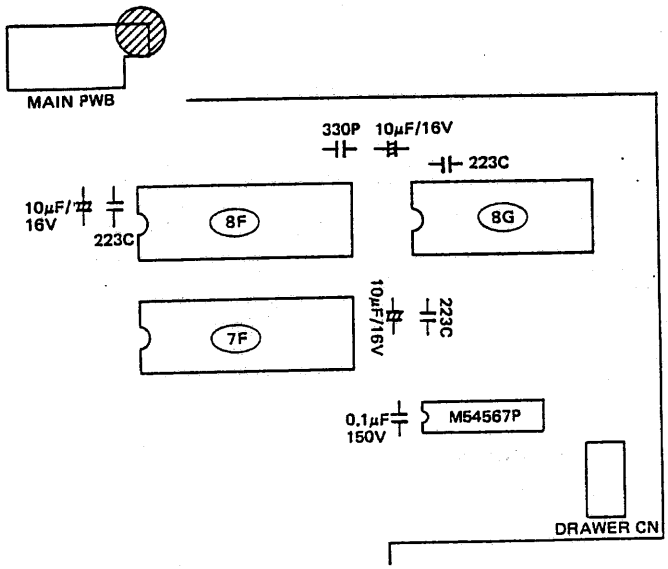
NOTE: Doted line is not installed on the main board.

Parts informations

	Current type		New type			
	OCT. Prod.		From NOV Prod.		Interchange-ability	Parts supply
	Parts code	Rank	Parts code	Rank		
ROM 1	VHi27128029-C	BN	VHi27128R021A	BN	*1	*2
ROM 2	VHi27128030-C	BN	VHi27128R022A	BN	*1	*2
ROM 3	VHiM2732R001A	BA	Not used	–	–	*3

*1: Current type (Oct. prod.) cannot be used in place of new type (from Nov. prod.).
New type can be used in place of current type.
2: New parts will be in immediate supply
New parts:
VHi27128R021A (in place of VHi27128029-C)
VHi27128R022A (in place of VHi27128022-C)
*3: Current parts are in stock.
This change is only applicable for model ER-3241. (NOT FOR ER-3231)

ROM's location



15-5. Key and Switch Scanning

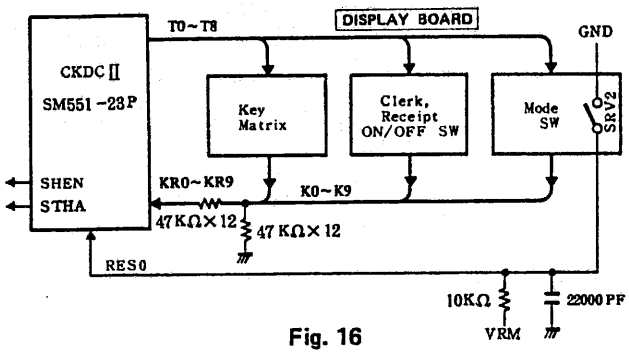


Fig. 16

Signal Descriptions

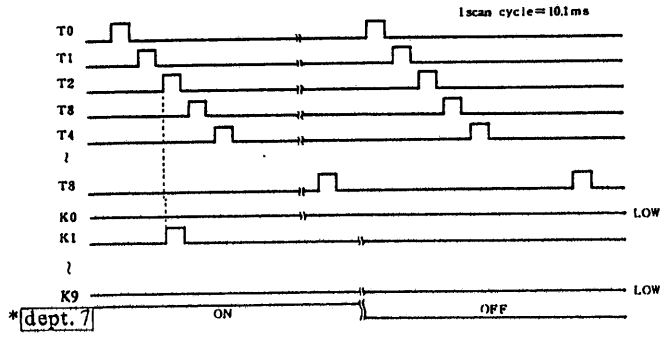
T0~T9: Key/switch scan
K0~K6: Key/switch return
RESO: CKDCII initialize (reset)

CKDCII output signals T0~T8 are not only used for key/switch scan signals, but also for the display digit signals as mentioned in the paragraph to follow.

As shown in Fig. 17, the CKDCII continuously strobes T0 ~T8 high.

At the same time the CKDCII checks for appearance of high state signal on key return lines (K0~K9).

- If there is any high state on K0~K9, it means that one of keys has been depressed.
- If there is no high state signal on K0~K9, it means that no key has been depressed.



*Standard key layout

Fig. 17

The CKDCII sends the key/switch data to the CPU via STH in response to the request from the CPU.

15-6. Display Control

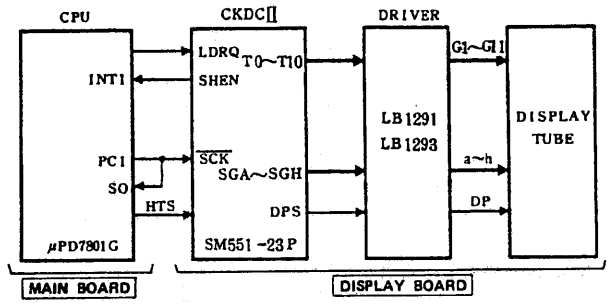
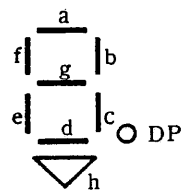


Fig. 18

Signal Descriptions

T0~T10 (G1~G11): Display digit signal
SGA~SGH (a~h): Display segment signal
DPS (DP): Decimal point segment signal

Display Segment Arrangement



- Display data is directly sent from the CPU to the CKDCII via HTS. The CKDCII controls the display tube via the driver (LB1291/1293), in accordance with the display data sent from the CPU.
- That is, once the CKDCII receives the display data from the CPU, it will be able to perform independent control of the display without CPU intervention.
- When a numeric key is pushed or when the operational result is put on the display, the CPU sends new display data to the CKDCII.

Display tube driver (LB1291/LB1293)

A fluorescent display tube is used for the display. It activates with a +41V digit signal or segment signal.

The driver (LB1291/LB1293) is used to convert the digit signal and segment signal from GND, +5V to GND, +41V.

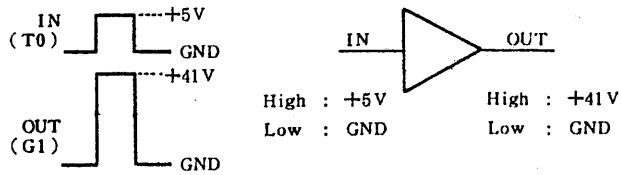


Fig. 19

LB1291: Driver x 8 circuits
LB1293: Driver x 6 circuits

For the operational theory of the fluorescent display tube, refer to Chapter 9-4 of "Cash Register Basic Manual.

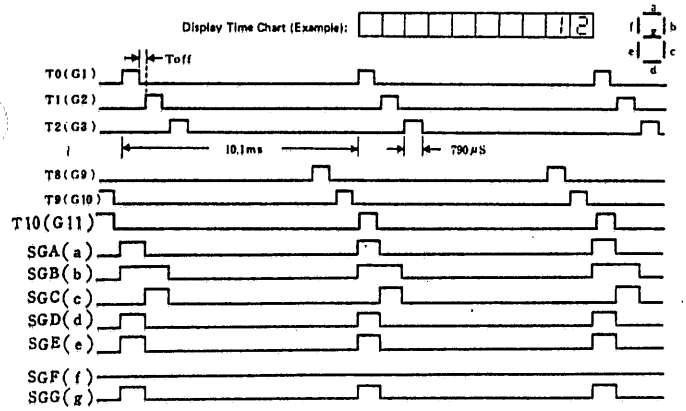


Fig. 20

Toff: Display blanking time (for preventing blur caused by changing digital column designation)

15-7. Printer Control

1) Block Diagram

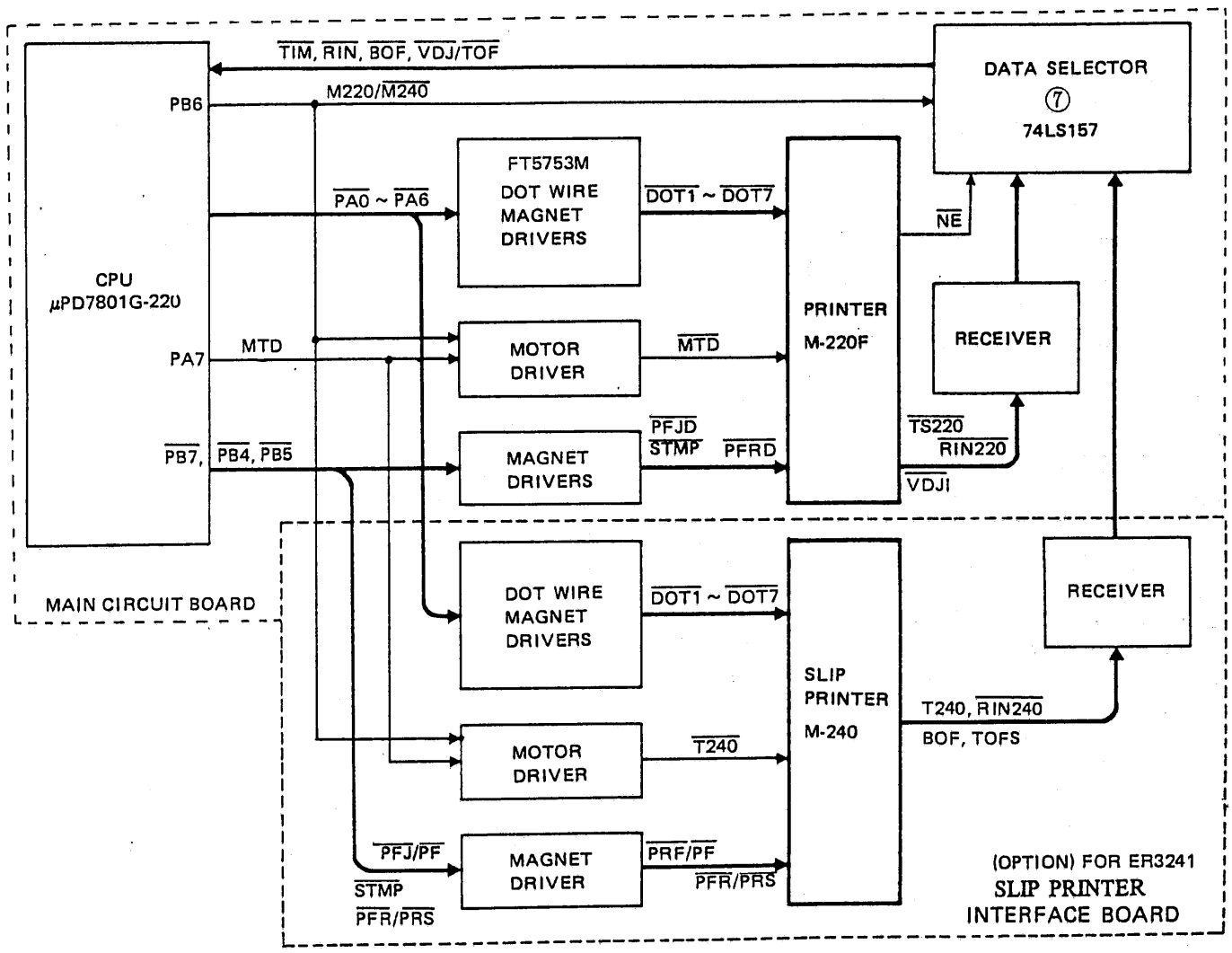


Fig. 21

2) Signal Descriptions

RIN220/RIN240 (RIN): Printer reset pulse
TS220/TS240 (TIM): Printer timing pulse
PB6 (M220/M240): Printer select (High: M-220F)
PA7 (MTD): Motor drive
PA0~PA6 (DOT1~DOT7)/SDT1~SDT7): Dot wire drive
PB4 (PFJ/PF): Journal paper feed/Slip feed
PB5 (PFR/PRS): Receipt paper feed/Slip release
PB7 (STMP): Stamp drive

FOR THE PRINTER CONTROL TIME CHART, REFER TO THE PRINTER MODEL-220F SERVICE MANUAL (00ZM220F-SM-E).

3) M-220F Printing Mechanism

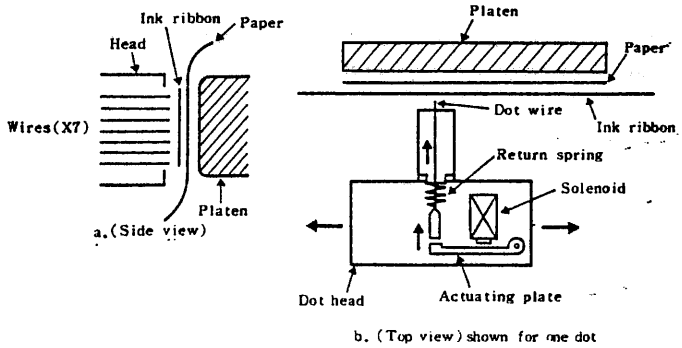


Fig. 22

1) When the motor signal is issued, causing the motor to rotate, the print head (hereinafter called the head) moves left to right.
2) When the motor is rotating, with the head in motion, the printer is always generating timing pulses $\overline{\text{RIN220}}$, $\overline{\text{TS220A}}$ and $\overline{\text{TS220B}}$.
   $\overline{\text{RIN220}}$: Is developed when the head starts to move from the left side to the right.
3) Print operation may start from the left side (receipt).
4) Seven dot wires are contained in the head and when the appropriate solenoid is energized, the actuating plate is pulled toward the solenoid. The dot wire will be ejected to print on the paper (dot printing) through the ink ribbon. When the solenoid de-energizes, the wire will be restored to its original position by the return spring.
5) At the time the head is moving to the right, the energizing of the wire solenoids will be selected according to the generation of timing pulses $\overline{\text{TIM}}$. These selections will result in printing various types of characters.
6) The wire solenoid will be energized one time (wire will hit the paper one time) per two generations (Tn + Tn') of the timing pulses.

4) Dot Solenoid Driver (Solenoids 1 ~ 7)

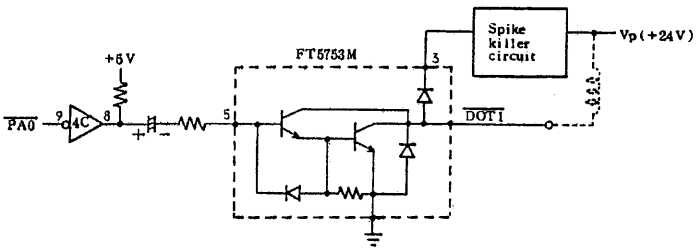


Fig. 23

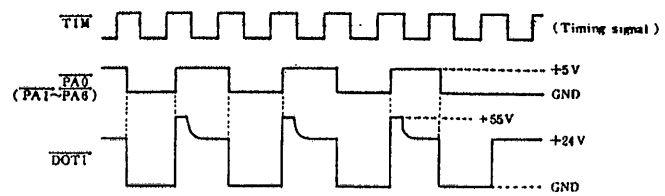


Fig. 24

- The $\overline{\text{PA0}}$ is issued by the printer controller as a low.
- The low is inverted twice, giving a low to the $\overline{\text{DOT1}}$.
- Current flows through solenoid → solenoid energized.
  NOTE: When the solenoid becomes de-energized, the spike (produced by the collapsing magnetic field around the solenoid) will be absorbed by the SPIKE KILLER CIRCUIT which is connected between Vp (+24V) and the spike killer diode of the magnet drivers (FT5753M).
- The spike-killer circuit is described in the next section.

5) Spike Killer Circuit for Solenoid

Spike killer circuit

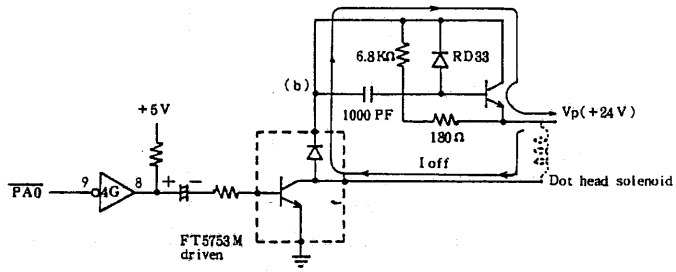


Fig. 25

A counter-electromotive force generated in the coil when the solenoid is energized. When point (b) reaches about 57V by the counter-electromotive force, it makes the zener diode RD33 active which turns on the transistor Q1, which constitutes a current route (Ioff) that cuts the counter-electromotive force as shown in the figure.

6) Motor Drive Circuit

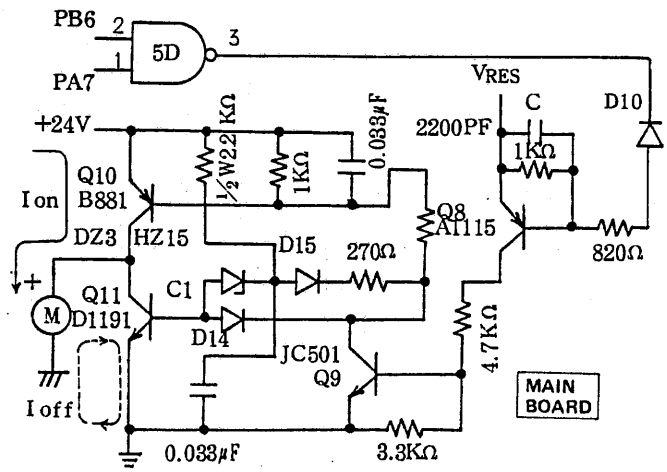


Fig. 26

PB6: Printer select (High: M-220F)
PA7: Motor drive (MOT)
V_{PE}: Printer enable power
Ⓜ : Printer motor
→ Ion: Current flow when motor is on.
⇢ Ioff: Current flow when motor is off.

(1) Motor on

The motor drive circuit turns on the motor by providing a voltage necessary to allow current to flow through the motor.

1. The PB6 and PA7 signals are issued as a high.
2. The output of NAND gate (5D-3) goes low, putting a low on the base of transistor Q8, turning it on.
3. A high on the base of Q9, will turn it on, which turns Q10 on and Q11 off.
4. With Q10 on, Vp will be provided to one side (+) of the motor. Current (Ion) is now allowed to flow through the motor. Motor turns on.

(2) Motor off and braking

In turning off the motor, we want to insure that the motor is turned off as quickly as possible. This circuit accomplishes that by putting a direct short across the motor, thus, giving us a braking effect.

1. PB6 and PB7 signals are issued as a low.
2. The output of the NAND gate (5D-3) goes high, putting a high on the base of Q8, turning it off.
3. A low on the base of Q9, will turn it off, which turns Q10 off and Q11 on.
4. With Q11 on, this provides a direct short across the motor, causing it to go off very quickly.

7) Timing Signal Generation

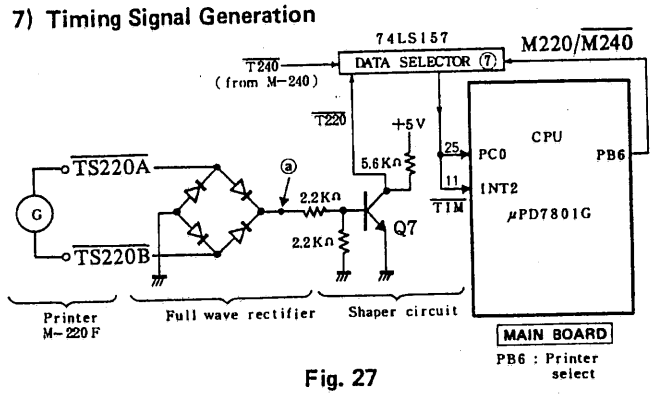
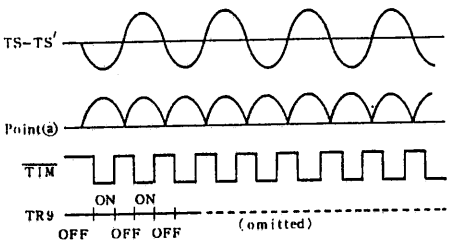


Fig. 27



(While the printer motor is rotating, the timing generator Ⓖ generates timing pulse (TS).

Fig. 28

When the motor is on and rotating, a generator within the motor will produce the timing pulse, TS ($\overline{TS220A}$, $\overline{TS220B}$). This TS pulse is rectified and shaped to the timing signal $\overline{TIM}$. Dot wire selection will occur in relation to the timing signal $\overline{TIM}$.

8) Printer Reset Signal Generation

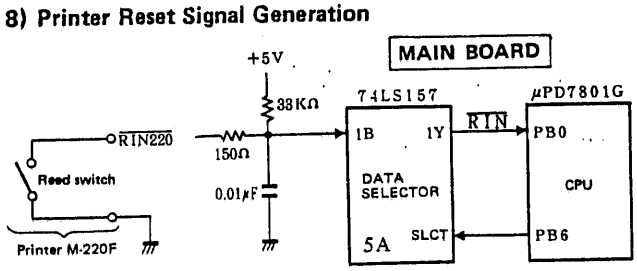


Fig. 29

Reset signal ($\overline{RIN220}$) is generated every one print cycle.

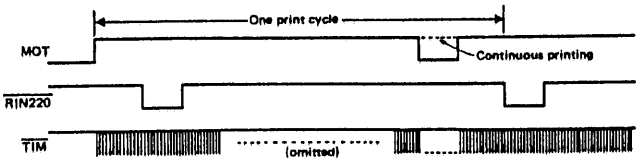


Fig. 30

9) Validation Paper Sense Circuit

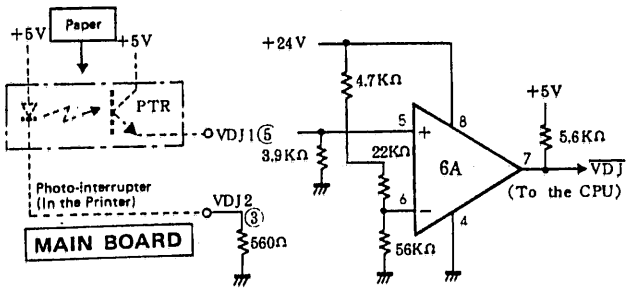


Fig. 31

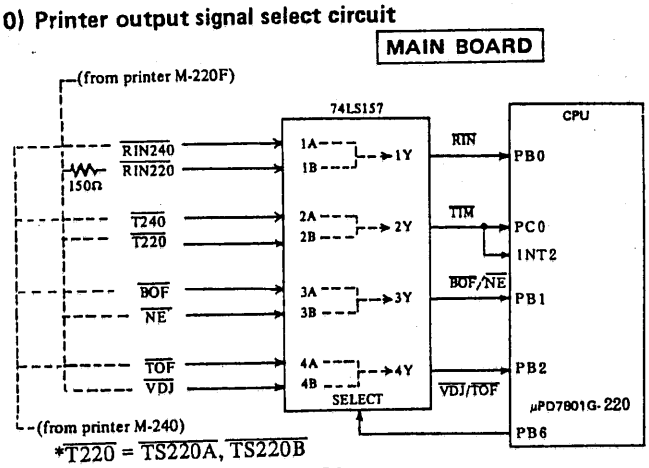
$\overline{VDJ}$: Validation paper sense (Journal side)

ACTION OF THE CIRCUIT

1) No slip;
   - ① PTR (photo-transistor) is turned on.
   - ② VDJ1 goes to high which is higher than (–) input.
   - ③ $\overline{VDJ}$ goes to high level.

2) Slip inserted;
   - ① PTR is off.
   - ② VDJ1 goes to low which is lower than (–) input.
   - ③ $\overline{VDJ}$ goes to low level.

10) Printer output signal select circuit



*$\overline{T220}$ = $\overline{TS220A}$, $\overline{TS220B}$

Fig. 32

ACTION OF THE CIRCUIT

- Signal PB6 is a printer select signal.
  PB6: High → Selects the Printer M-220F.
  PB6: Low → Selects the Printer M-240.
- When the signal PB6 is at a high level, signals of the M-220F are selected and they are output from the output terminals "1Y thru 4Y".
- When the signal PB6 is at a low level, signals of the M-240 are selected and they are output from the output terminales "1Y thru 4Y".
- Slip detect signals $\overline{BOF}$ and $\overline{TOF}$ from the M-240 are generated by photo-interrupters.
  Low: Detected, High: Not detected

15-8. Drawer Drive

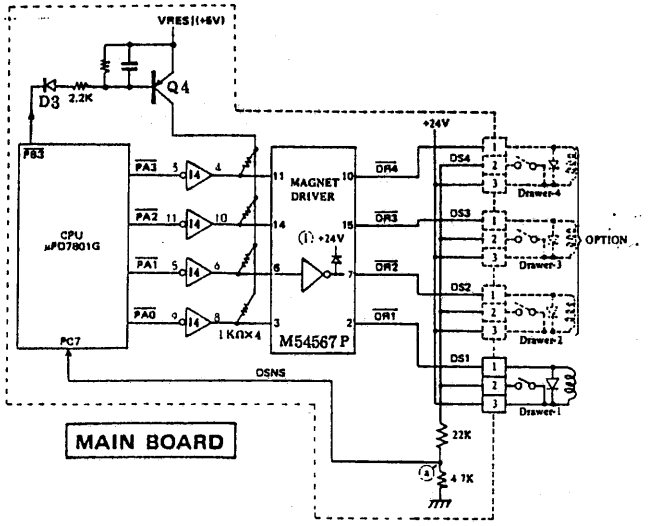


Fig. 33

$\overline{PA0}$ ~ $\overline{PA3}$: Drawer open signals
PC7: Drawer open/close sense (DSNS)
$\overline{PB3}$: Drawer open enable

- Drawer switch is closed with drawer open.
- Drawer-1 is the main drawer.
- Drawer-2 ~ 4 are optional remote drawers – ER-34DW3/34DW5/34DW7.
- When any one of the drawer switches are closed, the voltage potential of point ⓐ will be +4.2V (High level).

VOLTAGE POTENTIAL OF POINT ⓐ	DRAWER
GND (Low)	Closed
+4.2V (High)	Open

- The condition of the drawer is read by the CPU from the terminal PC7.

15-9. Buzzer Drive

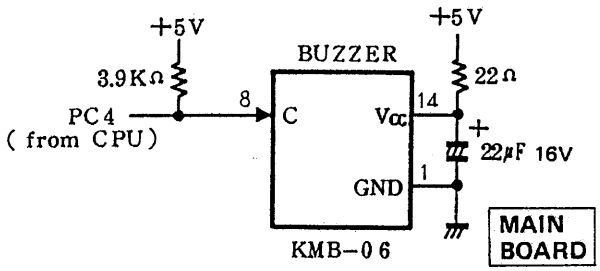


Fig. 34

When the signal PC4 is at a high level, 2150Hz tone is produced from the buzzer.

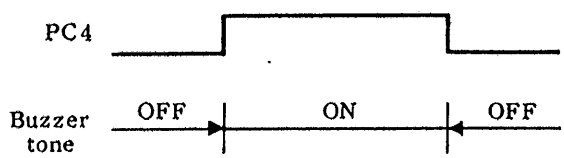


Fig. 35

The capacitor 22μF and resistor 22Ω have no effect on the frequency of the buzzer tone.
This capacitor and resistor are used to reduce ripple on Vcc (+5V) line.

15-10. Interrupt Input Circuit

RAM (M5T4044S30) of 4096 bits capacity is used in this circuit, and corresponds to one step of address.
The Chip Select signal pin ($\overline{CE}$) of the RAM (M5T4044S30) is connected to address bus A15, so that the RAM (M5T4044S30) may be selected at any time when one of ROM1 ~ ROM3 is selected.
AB3 ~ AB14 is the address bus input to the RAM (M5T4044S30), and each RAM bit (address) corresponds with ROM address in the following manner.

RAM (M5T4044S30): 4096-bit RAM (1 address = 1 bit)

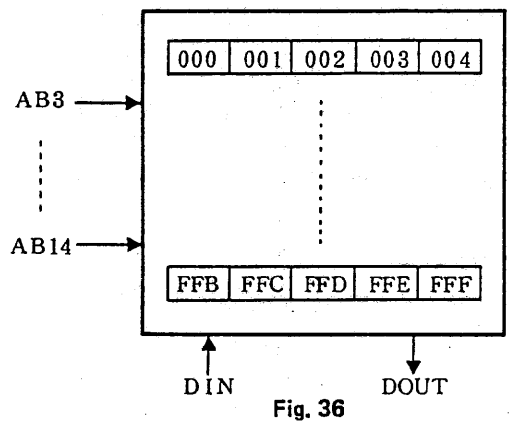


Fig. 36

Each bit of RAM (M5T4044S30) corresponds with program address in the following manner:

RAM address	Program address
000	0000-0007 (8 addresses)
001	0008-000F (8 addresses)
002	0010-0017 (8 addresses)
•	•
•	•
•	•
FFD	7FE8-7EEF (8 addresses)
FFE	7FF0-7FF7 (8 addresses)
FFF	7FF8-7FFF (8 addresses)

Fig. 37

Pin DIN (D6) of the RAM (M5T4044S30) is the data input pin to M5T4044S30, it becomes necessary to turn the pin $\overline{WE}$ ($\overline{WR}$) to low level in order to write data in the RAM. When pin $\overline{CE}$ turns to low level with the pin $\overline{WE}$ at high level, the data (0 or 1) stored in the address specified by AB3 ~ AB14 is sent out from the pin DOUT.

1. **When the data in the specified address is "1":**
   Since the trigger input (negative edge trigger input) of monomultivibrator (74LS122) shown in Fig. 33 is in a high state in this case, it does not activate the 74LS122. This keeps its output $\overline{Q}$ ($\overline{WAIT}$) in a high state and so the CPU interrupt request pin INT0 (active high) is held at a low level, as well. Consequently, it does not effect the CPU.

2. When the data in the specified address is "0":

The trigger input (negative edge trigger input) of the monomultivibrator (74LS122) shown in Fig. 33 turns to low level triggering the 74LS122 (4) so that the output pin $\overline{Q}$ ($\overline{WAIT}$) goes low for a period of about 10 microsecond. This makes the CPU interrupt request INT0 (active high) turn high to apply the interrupt to the CPU. With this, the program branches to the specified program address.

Data (0 or 1) stored in the M5T4044S30 depends on key entry.

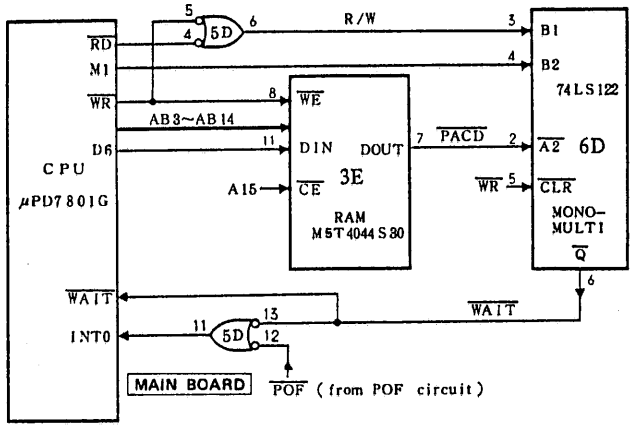


Fig. 38

TIME CHART (Ex. Specified address is 5000)

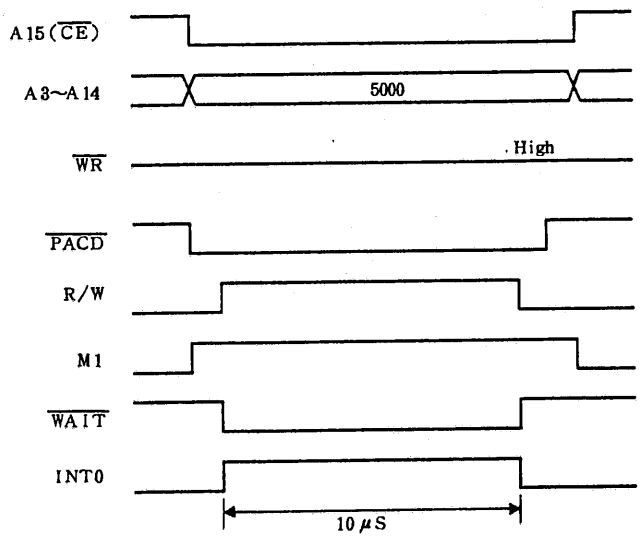


Fig. 39

15-11. Power Supply

(1) Block Diagram

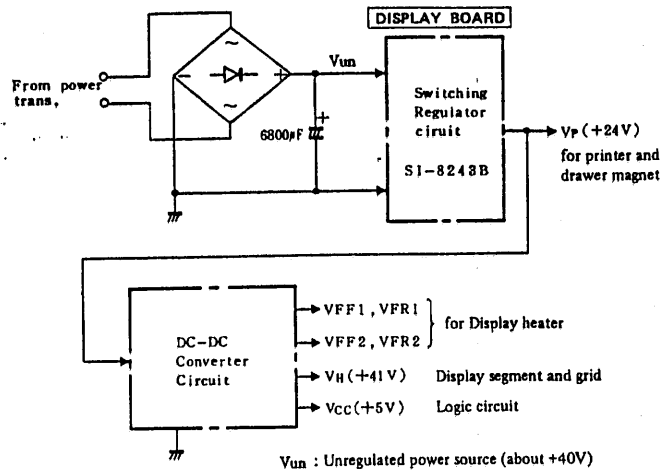


Fig. 40

FOR THE DC-DC CONVERTER REFER TO CHAPTER 8 "8-1-3. (ii). 8-1-6. (2)" OF THE "CASH REGISTER BASIC MANUAL".

(2) Switching Regulator Circuit (Vp, Vcc Power Source)

- Vp Power Source (+24V)

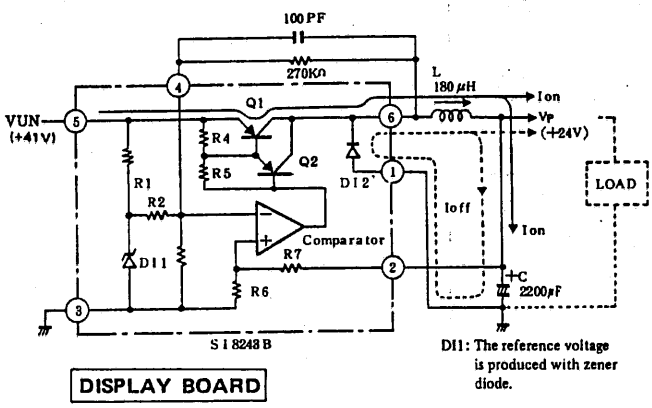


Fig. 41

V_{UN} (+41V) is an unregulated DC power source which is supplied to the switching regulator circuits (Vp, Vcc). The power is supplied intermittently to the coil (180μH) from the V_{UN} (+41V) by the switching action of Q1 to obtain DC power (Vp) via L.C. network. The output Vp is held to a constant voltage by controlling the ratio of on/off period of Q1.

Ion: The current when Q1 is turned on.

Ioff: the current when Q1 is turned off. ... (induced counter electromotive force of coil "180μH")

(i) When Q1 is turned on, provided Vp is 0V or below +24V

Vp is 0V or below +24V → "+" input level of the comparator is lower than the "−" input level (reference voltage) → Output level of the comparator goes low → Q2 and Q1 are turned on → V_{UN} (+41V) is supplied to the coil (180μH) and the load → Vp is increased.

(ii) When Q1 is turned off, provided Vp is above +24V

Vp is above +24V → "+" input level of the compara-

tor is higher than the "–" input level (reference voltage) → Output level of the comparator goes high → Q2 and Q1 are turned off → Supplying V_{UR} power is topped, and at the same time, counter-electromotive force is generated in the coil (180μH) in the direction (arrow mark) as shown in Fig. 36, which is supplied to capacitor 2200μF and the load. → Vp is decreased.

As the above steps (i) and (ii) are repeated and the ratio of on/off of Q1 is controlled according to the amount of the load, constant voltage Vp is obtained.

NOTE*: The feed back resistor (270kΩ) and capacitor (100pF) are used to keep the switching operation.

WAVEFORMS AT THE TERMINALS OF S18243B

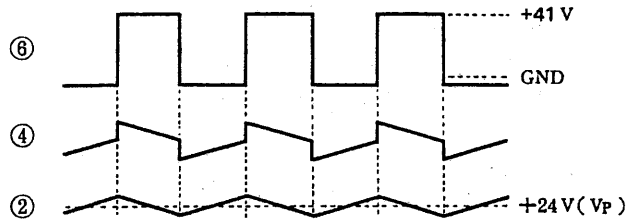


Fig. 42

- Vcc Power source (+5V) ... Voltage limitation diode

16-2. Replacement of the printer dot wire driver IC (FT5753M)

Replace the dot wire driver (FT5753M) after observing the following procedures.

- Measure the resistance of the Printer dot wire solenoid by using an ohmmeter.

PRINTER CONNECTOR TERMINAL ASSIGNMENT (M-220F)

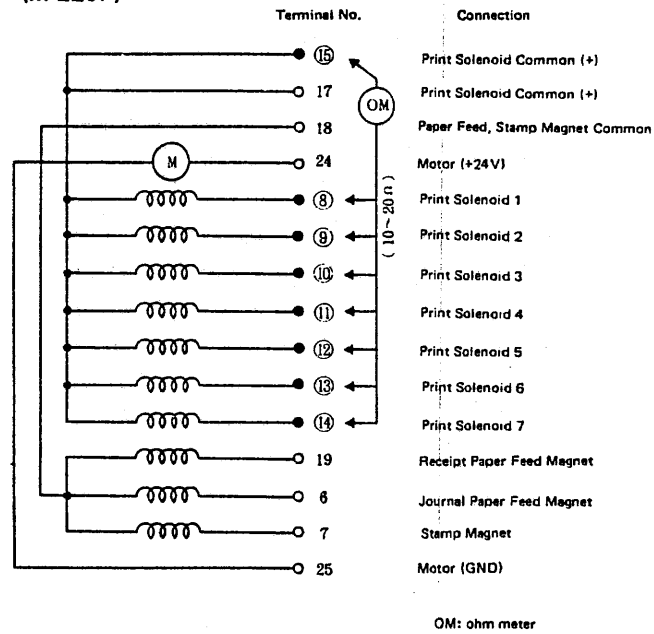


Fig. C

Replacement will be necessary if the resistances between terminal 1 and terminals 5 thru 11 are within a range of 10 to 20 ohms, respectively.

Should there be any terminal showing zero ohms with respect to terminal 1, the associated solenoid has to be replaced with the new one first before the replacement of the FT5753M driver, since that solenoid must be shorted.

16. SERVICE PRECAUTIONS

16-1. Printer connector

Since a flexible flat cable (FFC) is used for the printer, it must be handled with cautions mentioned below.

(1) To disconnect the FFC cable, hold both edges of the cable with your hands and lift it straight up.

(2) To place the FFC cable into its connector, hold both edges of the cable with your hands and insert it straight down. Exert care in this case to make sure of proper connection.

(3) In case it has to be installed after replacement of the printer connector, install as shown in Fig. B.

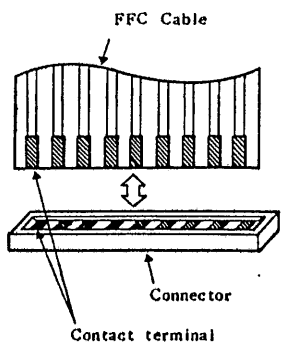


Fig. A

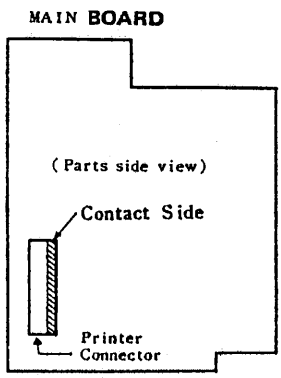


Fig. B

16-3. Replacement of IC and LSI protection diode DZ1 (RD6.2EB1)

In order to protect ICs and LSIs from destruction by an irregular rise of VCC due to a failure in the DC-DC converter, diode DZ1 becomes shorted when such an irrgular voltage rise occurs. After troubleshooting the DC-DC converter, be sure that DZ1 is not shorted. If it is, it has to be replaced with a new one, otherwise, it may damage the DC-DC converter after troubleshooting.

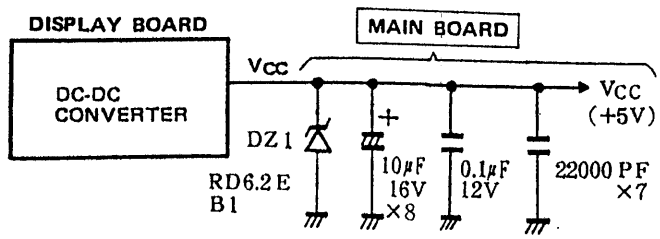


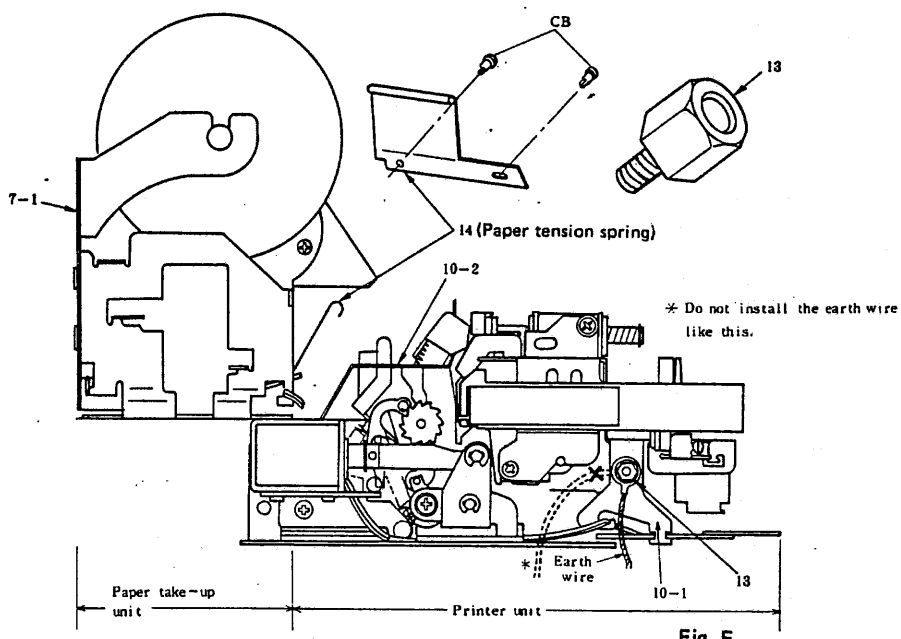
Fig. D

16-4. Interchangeability of printer (M-220F)

- The M-220F used for the ER-3241 may be used for the ER-3231. But the M-220F used for the ER-3231 can not be used for the ER-3241.
  REASON:
  The ER-3241's printer (M-220F) has roll paper near-end sensor and validation paper sensor, but the ER-3231's printer (M-220F) does not have them.
- There is no interchangeability between the M-220F used for the ER-3241 and the M-220F used for the ER-4230 because of the following reasons.
  REASONS:
  1: The receipt paper tension spring is located in a different area.
  2: For the others, refer to the comparison table below.

COMPARISON TABLE FOR ER-3241'S PRINTER AND ER-3231'S PRINTER

MODEL		ER-3241	ER-3231
(1)	Printer unit code	Ki-ŌB6681RCZZ	Ki-ŌB6680RCZZ
(2)	Location of the paper tension spring	On the paper take up unit (by screws)	On the paper take up unit (by screws)
(3)	Validation paper sensor	Yes	No
(4)	Roll paper near end sensor	Yes	No
No.	Description	Parts code	Parts code
7-1	Paper take-up frame assy	00BF204711001	00BF204711001
10-1	Head cover	00BF204531000	00BF204531000
10-2	Covering	00BF204511000	00BF204511000
13	Screw for earth wire	00BF204500080	00BF204500080
14	Paper tension spring	00BF211710010	00BF211710010
CB	Screw	00BB040950211	00BB040950211



Printer M-220F (For ER-3241/3231)

Fig. E

Model-220F PRINTER PARTS FOR ER-3241 AND ER-3231

NO.	PARTS CODE	PRICE RANK	NEW MARK	PARTS RANK	DESCRIPTION
7-1	00BF204711001	A Z		C	Paper take-up frame assy
10-1	00BF204531000	A W		C	Head cover
10-2	00BF204511000	A W		C	Covering
13	00BF204500080	A F		C	Screw for earth wire
14	00BF211710010	A G		C	Paper tension spring
CB	00BB04095021 1	A B		C	Screw for paper tension spring

For the other parts not listed in the above list, refer to the Printer M-220F Service Manual (00ZM220F-SM-E)

16-5. Removing the Power Cord from the Wall Outlet

The power cord has to be disconnected from the wall outlet when the cabinet is to be removed or connectors are to be inserted or removed. Even though the mode switch is in the OFF position, voltage is still supplied to the power transformer and a part of the Main PWB circuit.

16-6. Confirming Power Source VP (+24V)

After repairing power supply, verify that VP equal 24V, if voltage regulator SI-8243B is internally shorted VUR voltage of 35 to 50V may appear at VP. Althought machine may function normally for a while, damage to peripheral circuits may occur later.