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1 INTRODUCTION

Having the dispensers as described on the front page with the Schlumberger Foreman/Forelan kiosk control unit (KCU), comprising an operator keyboard, purchaser display, operator display, receipt ticket printer and computer box. See system block diagram in Figure 1.

2 CONSTRUCTION

2.1 Operator keyboard (Figure 2)

The operator keyboard is formed from a vinyl plastic membrane which is mounted on a Printed Circuit Board (PCB) and the complete assembly is housed in a plastic enclosure.

Across the top of the keyboard is a row of 16 dispenser control keypads, each with an LED in the top left-hand corner which indicate a dispenser which is calling or in use.

The area beneath the dispenser keypads is divided into three blocks. The left-hand block contains keys associated with the normal control of transactions. The centre block contains a numeric keypad and four special function keys and the right-hand block is a "QWERTY" keypad with a row of cursor control keypads.

2.2 Computer box

The computer box houses all of the main PCBs and comprises a folded aluminium chassis within a plain plastic enclosure approximately 425 mm x 360 mm x 320 mm.

2.3 Operator display (Figure 3)

The operator display provides the kiosk operator with status information and transaction data for each dispenser. It is a standard cathode ray tube colour monitor and has a 275 mm screen.

2.4 Purchaser display (Figure 4)

The purchaser display is housed in a plastic box with an integral stand.

2.4.1 Electronic

The display comprises one PCB which is connected by a flying lead to the computer box and has four liquid crystal display elements. See also Section 2.7 below.

2.5 Receipt printer (Figure 5)

The receipt printer is a standard Eaton model 4110 dot matrix impact printer.

2.6 Electrical and electronic

The computer box is powered from a single phase 230 V ac mains supply and also supplies the printer and VDU with a filtered 230 V ac from a mains filter unit.

The system electronics consist of five sub-assembly printed circuit boards housed within the computer box. These are:-

- Power supply module
- Peripheral interface board
- Dispenser interface board
- Video interlace board
- Computer board

The power supply board contains back up Nickel-Cadmium batteries which support the system electronics for approximately one hour during a mains failure. The peripheral interface board provides opto-coupled RS232 interfaces for all of the peripheral devices. The dispenser interface board contains the opto-coupled current loop interface circuits to which the dispensers are connected. The computer board comprises two microprocessors with EPROM and RAM memory.

2.7 Legends and displays

Table 1 Purchaser display legends and displays

Legend	height mm	Associated display	height mm
£ THIS SALE	12	cash total xxxx.xx xxxx.xx	12
LITRES	12	volume delivered xxx.xx xxx.xx	12
PENCE PER LITRE	5	unit price xxx.x	5
CURRENT STORED TRANSACTION TRANSACTION	5	transaction status horizontal bar	12
PUMP	5	dispenser number xx	12

The legends are black on a white background and the displays are black on a grey background.

3 OPERATION

3.1 Controls and features

3.1.1 Operator's display

In the upper two thirds of the screen, a colour graphics display presents the operator with a graphical representation of the current status of each dispenser and in the lower third of the screen, details of the last two transactions for a selected dispenser are displayed.

The graphics display is formed from a series of standard shapes or 'icons' as follows:-

- Icon 1 - Outline of a single hose dispenser
- Icon 2 - Outline of a multi-hose dispenser
- Icon 3 - Outline of a vehicle
- Icon 4 - Outline of a dispensing hose
- Icon 5 - Outline of an extended dispensing hose

In addition, icons 1, 2 and 3 change colour to indicate the status of a dispenser. Icons 1 and 2 are normally green but change to red when a dispenser is authorised for use. Similarly, icon 3 is normally green but changes to red when a dispenser is in use.

Four audible tones are generated to enhance the operator's visual signals:-

- CHIRP - denotes a successful key press
- WARBLE - denotes a calling dispenser
- DING-DONG - denotes a transaction awaiting payment
- SIREN - denotes a fault condition (accompanied by a message on the VDU screen)

3.1.2 Operator keyboard

The dispenser keys form a row across the top of the keyboard and by a single press of the relevant key, the operator may:-

- (i) authorise a calling dispenser, or
- (ii) make the selected dispenser the 'object' dispenser which displays the two most recent transactions in the lower third of the display, and then by pressing a second pad, perform an operation on that dispenser, e.g. display the transaction on the purchaser display, stop the dispenser etc.

The 6 transaction control keys provide for the normal control of dispensers and transactions and are as follows:-

START	pre-authorises a selected dispenser
PAY	displays the current or memorised transaction for a selected dispenser on the Purchaser display. Repeated pressing of the pad toggles between the current and memorised transaction.
CASH	clears an agreed transaction from the purchaser display and prints CASH as the method of payment on the receipt ticket.
CREDIT	clears an agreed transaction from the purchaser display and prints CREDIT as the method of payment on the receipt ticket.
STOP	interrupts the delivery from a selected dispenser
PRINT RECEIPT	prints a receipt ticket for the last transaction cleared for a selected dispenser. See sample receipt tickets, Figure 6.

Numeric keys form a central group and are used only in MANAGER mode or when an operator function requires a numeric input such as in the setting of a pre-pay delivery. A qwerty keypad is provided for setting receipt messages etc.

3.2 Sequence of operation

The sequence of operation is set out in Table 2 below.

Table 2 Sequence of operation for a single purchaser

AT DISPENSER		AT KIOSK	
Action by Purchaser	Response at Dispenser	Action by Operator	Response
removes nozzle			dispenser select keypad LED flashes, VDU shows dispenser icon flashing with dispenser number, warble tone generated.
	all 8s display test sequence starts displays zero and pump motor starts	presses dispenser select keypad	dispenser icon goes to solid red, warble tone off.
delivers fuel	displays increment		LED on constant VDU shows car and hose icon in red.
replaces nozzle	displays remain constant for at least 5 seconds		LED goes off, VDU shows green car icon flashing with dispenser number, ding-dong tone generated.

goes to kiosk to pay		presses relevant dispenser select keypad	VDU shows transaction data in lower section of screen.
		presses PAY keypad	arrow points to THIS SALE purchaser display shows transaction data.
		presses CAST or CREDIT keypad	car icon and arrow blank, ding-dong tone off, purchaser display blanks after 3 secs. Lower screen shows PAID, receipt printed if required.

Table 3 - Sequence of operation for two purchasers (memorised sale)

AT DISPENSER		AT KIOSK	
removes nozzle			dispenser select keypad LED flashes, VDU shows dispenser icon flashing with dispenser number, warble tone generated.
	all 8s display test sequence starts displays zero and pump motor starts	presses dispenser select keypad	dispenser icon goes to solid red, warble tone off.
delivers fuel	displays increment		LED on constant VDLI shows car and hose icon in red.
replaces nozzle	displays remain constant for at least 5 seconds		LED goes off. VDU shows green car icon flashing with dispenser number, ding-dong tone generated.
second purchaser removes nozzle			dispenser select keypad L.ED flashes, VDU shows dispenser icon flashing with dispenser number, warble tone generated.
	all 8s display test sequence starts displays zero and pump motor starts	presses dispenser select keypad	dispenser icon goes to solid red, warble tone off.

AT DISPENSER		AT KIOSK	
Action by Purchaser	Response at Dispenser	Action by Operator	Response
delivers fuel	displays increment		LED on constant VDU shows car and hose icon in red. Car icon is displaced or is shown on other side of dispenser.
replaces nozzle	displays remain constant		LED goes off, VDU shows 2nd green car icon flashing with dispenser number, ding-dong tone generated.
second purchaser goes to kiosk to pay		presses relevant dispenser select keypad	VDU shows transaction data in lower section of screen for each purchaser
		presses PAY keypad	arrow points to the STORED SALE, purchaser display shows transaction data.
		presses PAY keypad again	arrow points to THIS SALE, purchaser display shows transaction data.
		presses C'ASII or CREDIT keypad	car icon and arrow blank, ding-dong, continues. Purchaser display blanks after 3 secs. Lower screen shows PAID, receipt printed if required.
first purchaser goes to kiosk to pay		presses PAY keypad	arrow points to the STORED SALE, purchaser display shows transaction data.
		REMAINDER OF SEQUENCE IS AS FOR A SINGLE PURCHASER - SEE TABLE 2.	

3.3 Interlocks and security features

3.3.1 If a mains power failure occurs, the kiosk equipment is battery supported to enable transactions to be cleared. Deliveries in progress are terminated in the normal manner and although the operator VDU is not supported, the keyboard tones and the purchaser display continue to function normally.

3.3.2 If a unit price change is made during a delivery, the dispenser retains the original unit price until the nozzle has been replaced and the 5-second display guard time has elapsed.

3.3.3 The preset/prepay facility is inhibited. The operation of preset/prepay may be authorised at a later date by separate certification.

4 AUTHORISED ALTERNATIVES

4.1 Having the receipt ticket printer removed.

4.2 having two purchaser display units, the second display being a remote display for night window operation.

4.3 Having an alternative purchaser display as shown in Figure 7.

4.4 Having a Normond fibre optic interface connected to the Foreman computer box. The interface is connected to the computer box by a wire link no more than 1 metre long. The fibre optic outputs are labelled "For connection to tank gauging equipment" and may be connected to any compatible tank gauging system.

4.5 Having the Veeder Root TLS200R tank gauge system connected to the Foreman computer box. There may be an expansion fitted which increases the number of probes from 8 to 16.

4.6 Forelan system

Having up to four Foreman consoles interconnected such that any one of up to 48 dispensers can be authorised from any console. The facility to prohibit the authorisation of any dispenser from any console is available, as is the facility to limit the maximum number of dispensers that can be authorised at any one time from any console.

4.6.1 Construction

The operator keyboard is modified as shown Figure 8 to facilitate the control of 48 dispensers. The computer box is now housed in a black metal case 250 mm by 296 mm. The purchaser display connected to each computer box may be any of those described in this certificate.

4.6.2 Operation

To authorise a dispenser the dispenser number is selected via the numeric keyboard. To view any transaction(s) for a particular dispenser, once the dispenser has become inactive, the dispenser number is selected on the numeric keyboard.

4.6.3 Payment

Having a dispenser selected and if it has two transactions outstanding, i.e. a memorised transaction, the dispenser information is then 'locked' to the particular console that requested the information and is not available at any other console. If the dispenser has only one transaction, or has had one of its transactions paid out, the remaining transaction information can be accessed by any of the consoles. Once the transaction has been agreed with the purchaser a method of payment is selected as described at Section 3.2.

4.6.4 Receipt printer

There may be connected to each Foreman console a receipt printer.

5 RECONIMENDED TESTS

The following tests may be performed in addition to those specified in the Regulations to assist in determining conformity with the approved pattern.

5.1 Metrology

5.1.1 Verify the accuracy of computations at the dispenser using unit prices ranging from current to near the maximum possible.

5.2 System features

5.2.1 Check that the preset/prepay facility is inhibited.

5.2.2 Check that the unit price at the dispenser cannot be changed whilst a delivery is in progress.

5.2.3 Check that the hack up battery supplies to the kiosk equipment and the dispenser displays function when a mains power failure occurs.

5.2.4 Check the display test on the purchaser's display in the following way:-

From the main menu (screen 1). select screen 6 (RUN DIAGNOSTICS) and from this select option 0 (CUSTOMER DISPLAY). The display test shows all eights and all other used characters for approximately 4 seconds.

5.2.5 Check that memorised transactions are correct and that it is not possible to release a dispenser to a third purchaser.

5.2.6 Check that the transaction data on the dispenser, kiosk operators and purchaser's displays and the printed receipt ticket are identical when they relate to the same transaction.

5.3 Forelan System

5.3.1 Check that it is not possible to view transaction information from any of the remaining consoles. for a dispenser with a current and memorised sale, if the sales information is being viewed at another console.

5.3.2 Check that it is not possible to authorise a dispenser for a third customer from any of the consoles.

5.3.3 Check that the preset/prepay facility is inhibited.

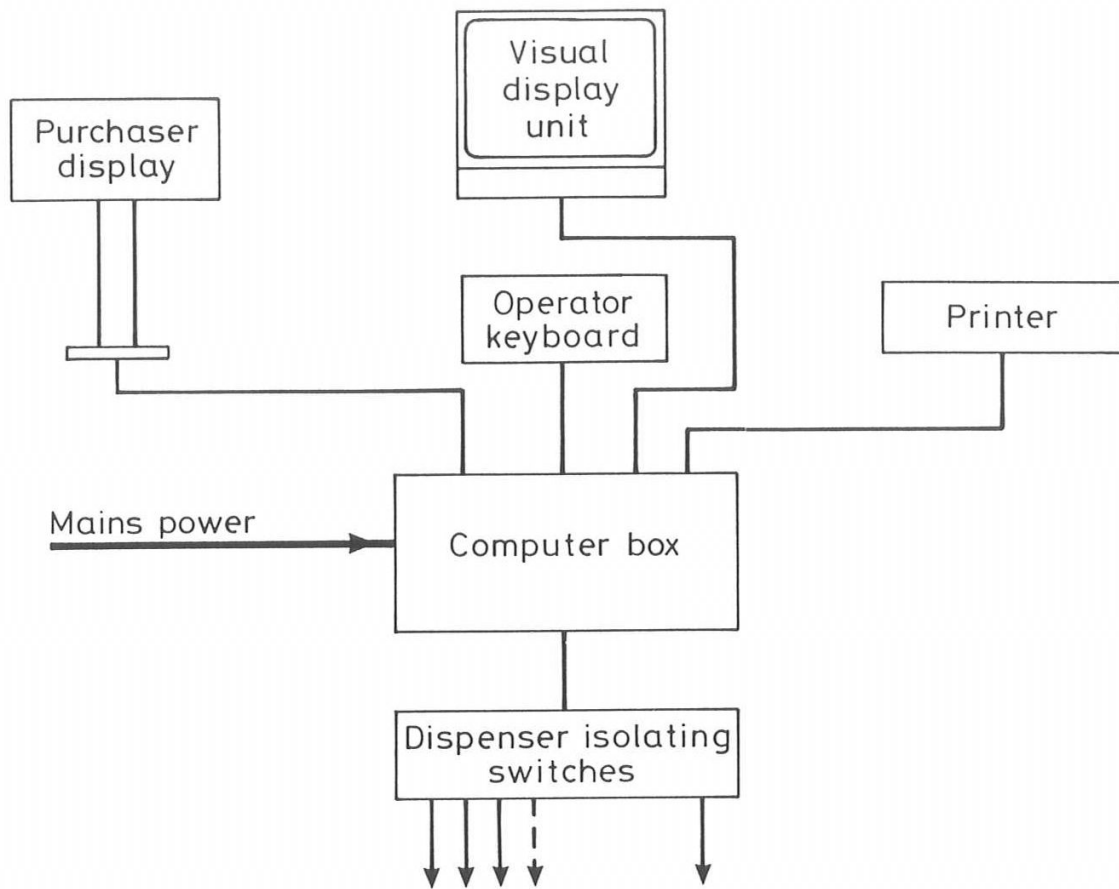


Figure 1 System block diagram

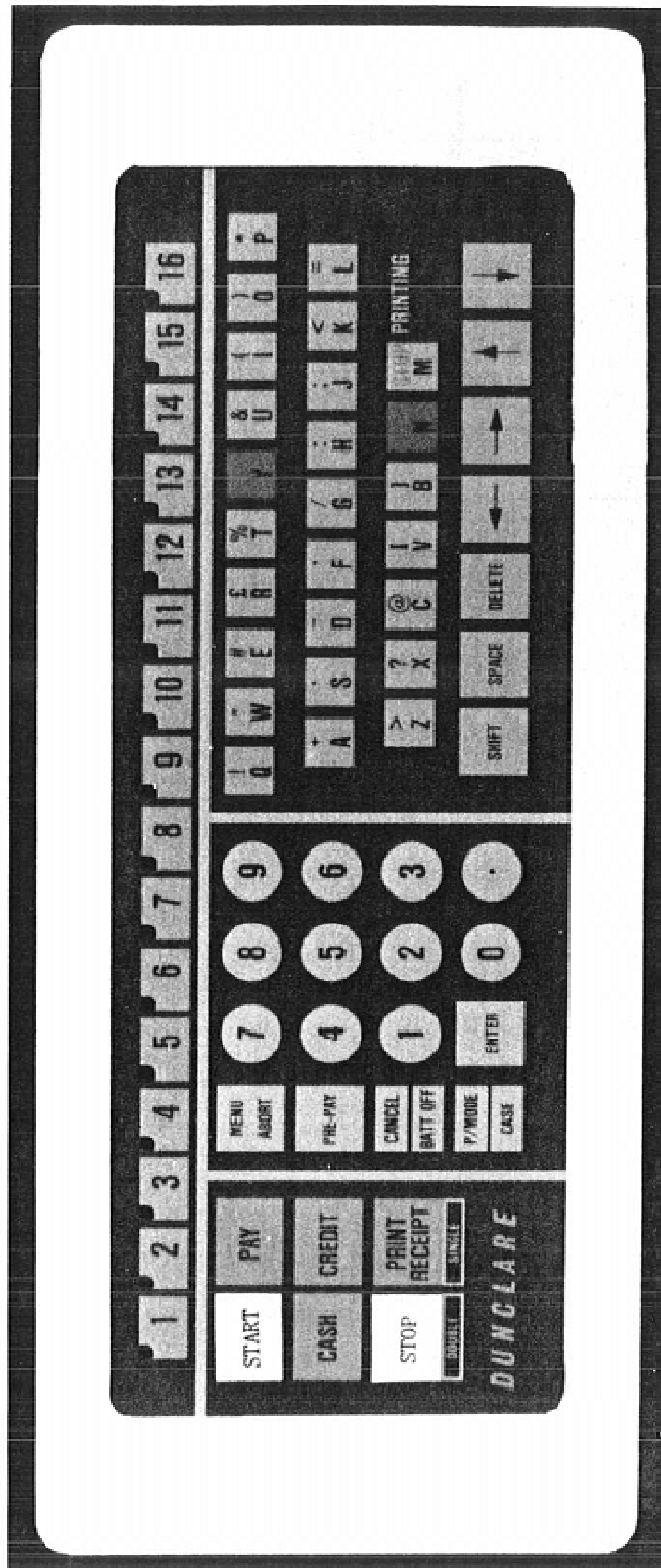


Figure 2 Operator Keyboard

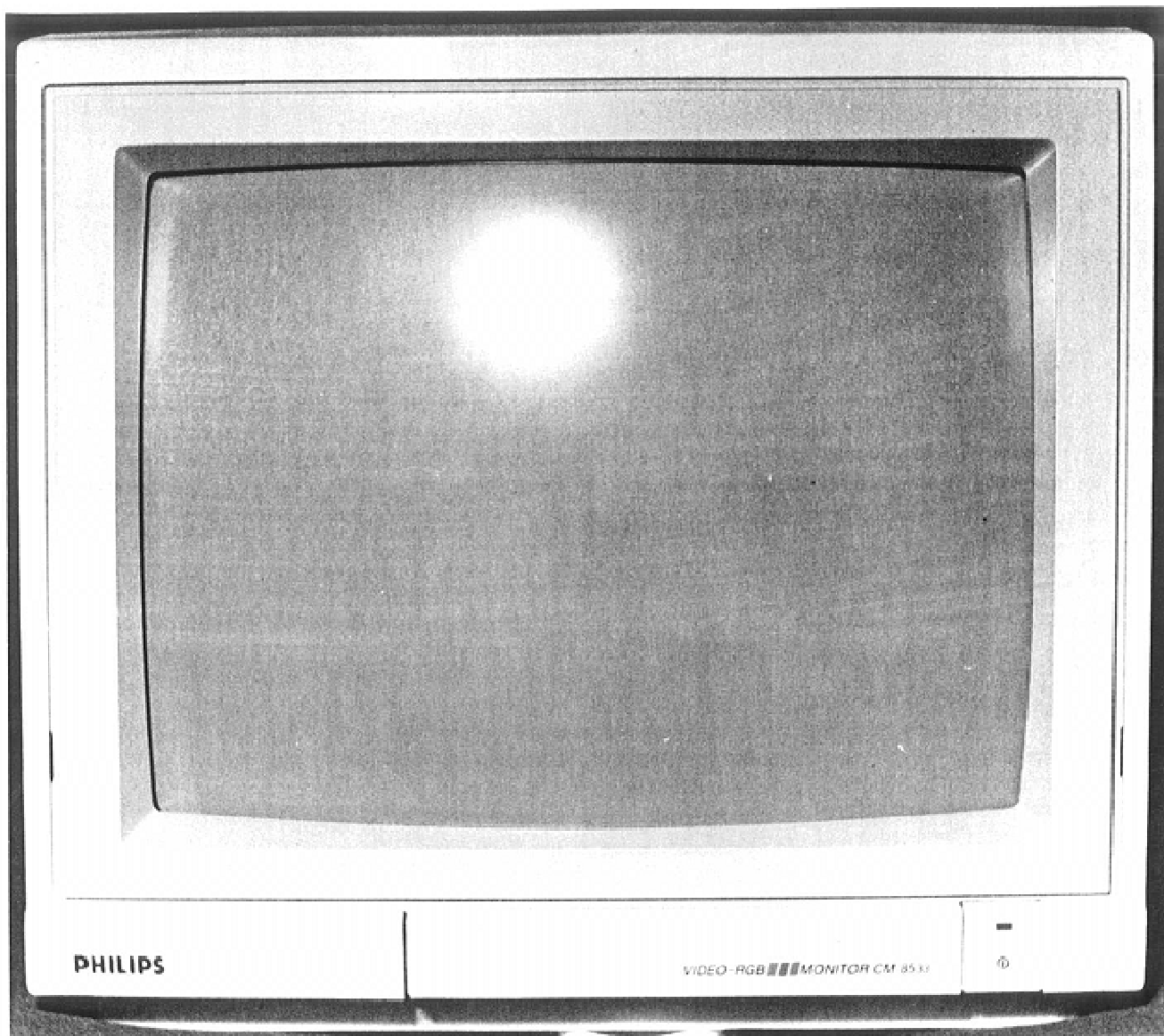


Figure 3 **Operator Display**

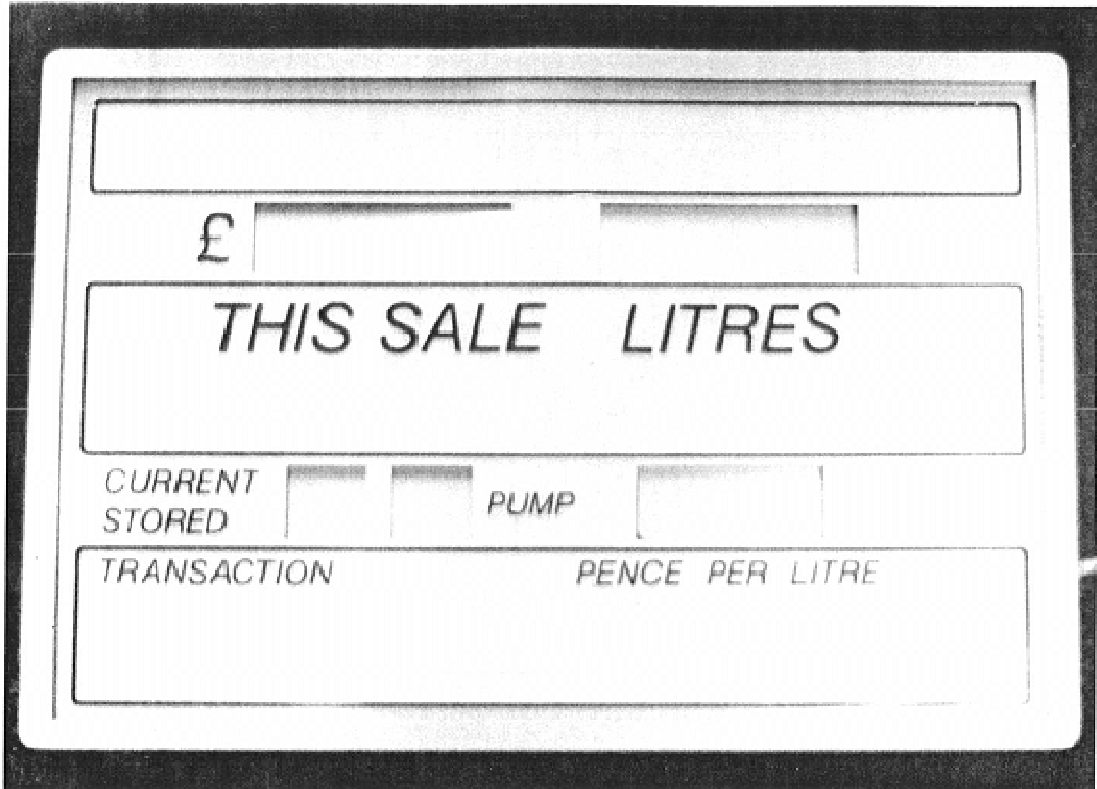


Figure 4 Purchaser Display

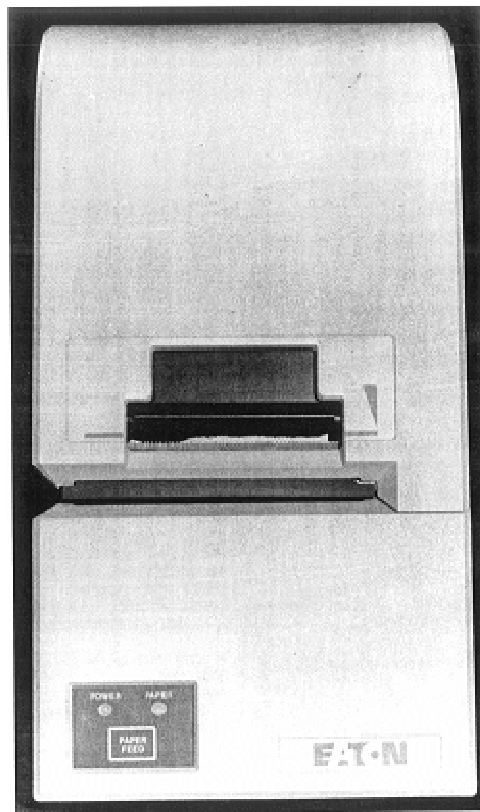


Figure 5 Receipt Printer

DUNCLARE DISPENSERS
BRUNEL ROAD
DUNDEE DD2 4TG
VAT REG NO 123 456 789

CREDIT SLIP, NO... 39
TIME/DATE..... 15:10 MON 25 APR/88
OPERATOR NO... 4 SHIFT NO... 0
PUMP NO.. 3; 2 STAR; PENCE PER LITRE.. 50.0
METHOD OF PAYMENT..... CASH

PAID, INC 15.0% VAT, £ 5.00

TEST RECEIPT ONLY

DUNCLARE DISPENSERS
BRUNEL ROAD
DUNDEE DD2 4TG
VAT REG NO 123 456 789

RECEIPT NO..... 109
TIME/DATE..... 15:12 MON 25 APR/88
OPERATOR NO... 4 SHIFT NO... 0
PUMP NO.. 3; 2 STAR; PENCE PER LITRE.. 50.0
LITRES... 0.05
METHOD OF PAYMENT..... CASH

TOTAL, INC 15.0% VAT, £ 0.03
AMOUNT PREPAID..... £ 5.00
REFUND DUE..... £ 4.97

TEST RECEIPT ONLY

DUNCLARE DISPENSERS
BRUNEL ROAD
DUNDEE DD2 4TG
VAT REG NO 123 456 789

RECEIPT NO..... 149
TIME/DATE..... 12:12 THU 28 APR/88
OPERATOR NO... 4 SHIFT NO... 0
PUMP NO.. 3; 2 STAR; PENCE PER LITRE.. 50.0
LITRES... 15.18
METHOD OF PAYMENT..... CASH

TOTAL, INC 15.0% VAT, £ 7.59

TEST RECEIPT ONLY

i) Pre-paid delivery

ii) Post pay delivery

Figure 6 Sample Receipt Tickets

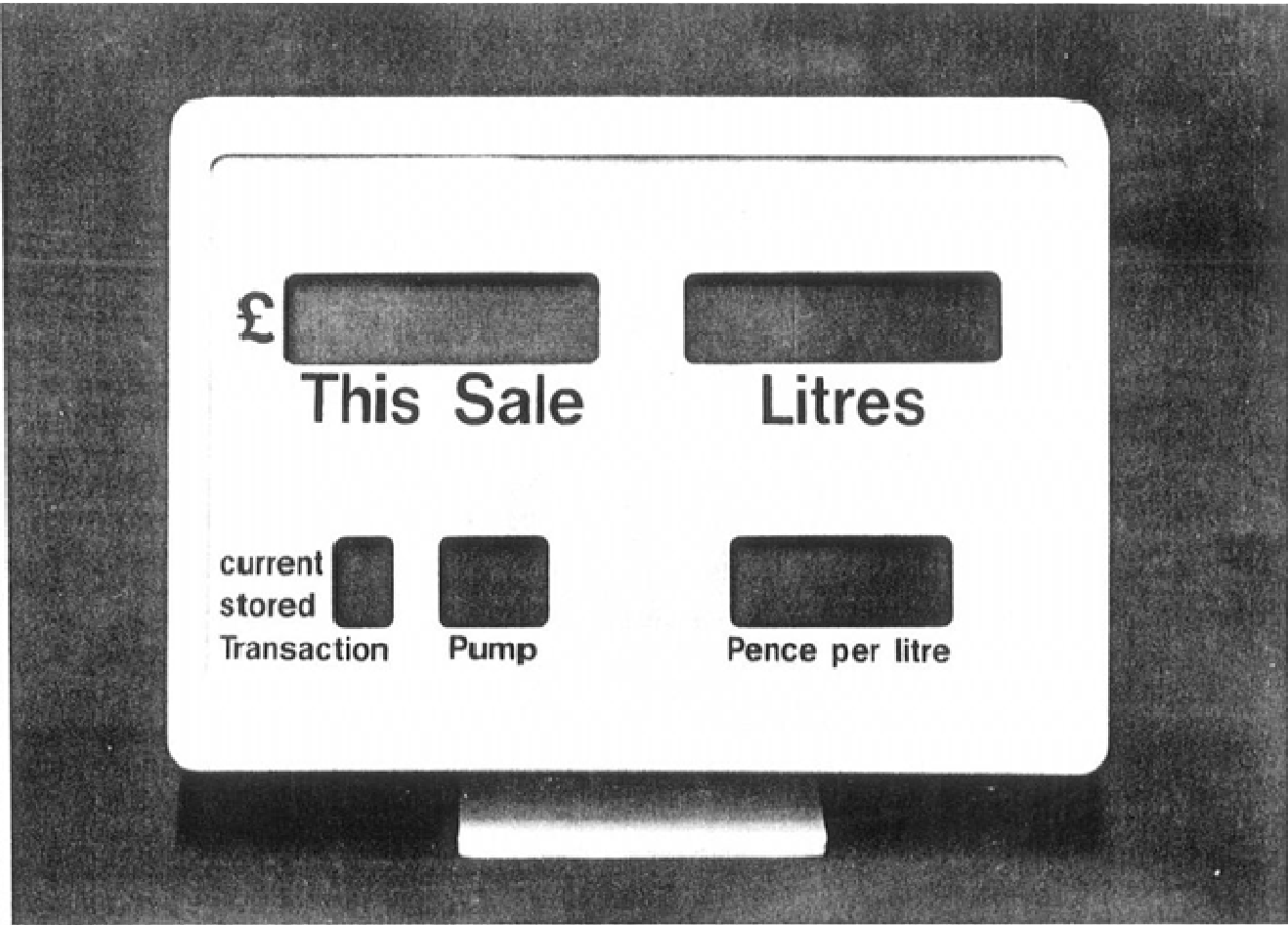


Figure 7 Alternative Purchaser Display

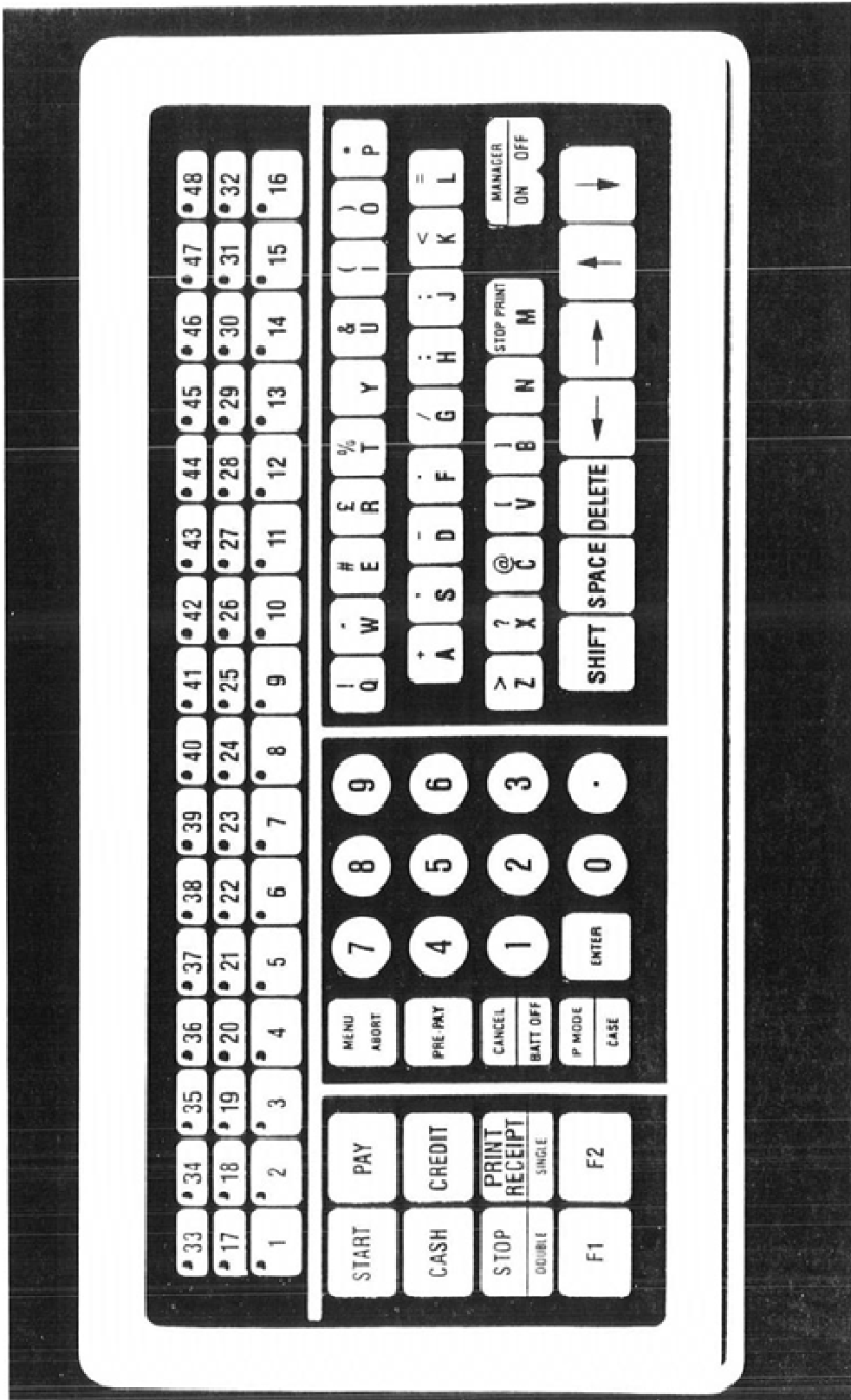


Figure 8 Forelan operator keyboard

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