CHAPTER 3

OPERATION

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OPERATION

INTRODUCTION

1   This chapter provides detailed instructions on the operating procedures associated with the RA1792 receiver. Paragraph 4 describes the function of the front panel controls and indicators; and paragraphs 5 to 37 contain detailed procedures for operating the receiver in the different modes.

2   Before attempting to operate the receiver, however, it is important to note that in some operating modes the receiver front panel is effectively independant from the receiver. That is, the receiver may be set to one station and will continue to receive that station even when the receiver front panel controls are set to a different frequency and operating mode. The receiver will not be switched to the 'new station' until the appropriate pushbutton is depressed. Additionally, the entire contents of the memory (100 channels) may be reviewed or modified, if desired, without affecting the receiver operation.

3   A second significant point is that some pushbuttons are used for more than one function. For example, the numeric keys (0 through 9) are used to enter five different levels of data into the receiver, as follows:

Level 1:   Numeric Value of desired operating frequency
Level 2:   Bandwidth and AGC mode selection
Level 3:   Numeric Value of selected channel
Level 4:   Scan Parameters (channels to be scanned and time duration for each channel)
Level 5:   Automatic test mode parameters.

The desired level is selected by depressing one or more of the control pushbuttons.

OPERATING CONTROLS AND INDICATORS

4   The controls and indicators located on the front panel of the RA1792 receiver are shown in Figure 3-1 and listed in Tables 3-1 and 3-2. Figure 3-1 shows all indicators illuminated at the same time. In actual operation, however, only one or two indicators of a particular group would be illuminated at the same time.

TABLE 3-1. FRONT PANEL CONTROLS

Nomenclature	Function
SUPPLY	Rocker switch used to supply operating voltage to receiver.
TUNE	Pushbutton used to select tune mode. In this mode the tuning knob is used to select the operating frequency of the receiver.
BFO	Pushbutton used to enable BFO tuning mode. In this mode the tuning knob is used to vary the BFO frequency.
REM (Remote)	Pushbutton used to place the receiver under the control of a remote device.
Tuning Knob	Rotary knob used to select receiver operating frequency, BFO frequency, or channels (00 to 99). In the frequency mode the tuning control provides a continuously variable rate of change according to the speed at which it is turned. For example, if the knob is turned slowly, the receiver frequency may be easily tuned in 10 Hz increments. If the knob is turned rapidly (or spun) the rate of change per revolution will be much higher.
0 to 9, BW1 to BW5, MAN, SHORT, MED, LONG, AUX. (Numeric Keypad)	These ten pushbuttons are used along with other pushbuttons to enter the desired information into the receiver. When the FREQ pushbutton is depressed, the numeric value of the desired operating frequency may be entered. After the frequency has been selected the bandwidth may be selected (BW1 to BW5) and the AGC mode (MAN, SHORT, MED, LONG). The AUX pushbutton is used to recall a particular preset operating mode. The numeric keys are also used to select channels, change the time duration during a scan operation, and to enter test numbers during an automatic test operation.
STORE	This pushbutton is used to load all operating parameters into a specific memory location.
ENTER	This pushbutton is used to set the receiver to the operating parameters shown on the front panel when coming from the front panel monitor mode; and it is also used after the FREQ pushbutton has been activated, to enter the new frequency displayed.
FREQ (Frequency)	This pushbutton is used to enable the numeric keys to enter a specific operating frequency, in conjunction with the ENTER pushbutton.
CHAN (Channel)	This pushbutton is used to set the receiver to the channel mode.
RCL (Recall)	This pushbutton is used to set the receiver to the previous frequency and operating mode, before the ENTER pushbutton is depressed.
SCAN	This pushbutton is used to set or remove a scan flag from a particular channel. It is also used to set the receiver to the scan mode.

TABLE 3-1.FRONT PANEL CONTROLS (Cont.)

Nomenclature	Function
ISB, LSB, USB	These three pushbuttons are used to set the receiver to operate in the sideband mode. The ISB pushbutton will cause the receiver to switch between the LSB and USB mode each time the pushbutton is depressed. The LSB and USB pushbuttons are used to set the receiver to the lower or upper sideband operating mode.
AM	This pushbutton is used to set the receiver to the AM mode.
CW	This pushbutton is used to set the receiver to the CW mode. The BFO frequency is variable only when the receiver is set to this mode.
FM	This pushbutton is used to set the receiver to the FM operating mode.
IF GAIN	This control is used to manually set the IF gain level when the Manual AGC operating mode is selected. This control may also be used in conjunction with the Short, Medium, and Long AGC operating modes to set the receiver agc threshold.
VOLUME	This control is used to adjust the amplitude of the audio signal applied to the front panel loudspeaker and phones jack.
METER	This rocker switch is used to set the front panel meter to display either the AF audio level or the RF signal level.
L/S	This rocker switch is used to enable or disable the front panel loudspeaker.

TABLE 3-2.FRONT PANEL INDICATORS

Nomenclature	Function
CHANNEL 88	Indicates the receiver is set to the channel mode. The two digits below the channel indicator represent the channel designation (00 to 99).
⚠	Indicates that the receiver is operating independent of the front panel.
SCAN	Indicates that the receiver is set to the scan mode (if the ⚠ is not illuminated) or that the channel currently shown has a scan flag set (if the ⚠ is illuminated).
FREQUENCY, kHz 28 888.88	Indicates the frequency, in kHz, that the receiver is set to.

TABLE 3-2. FRONT PANEL INDICATORS (Cont.)

Nomenclature	Function
REMOTE	Indicates that the receiver is set to the remote control mode.
TUNE	Indicates that the receiver is set to the tune mode (front panel tuning knob is used to select the desired frequency).
BFO + 8.00 kHz	Indicates the BFO frequency.
AF - dBm RF - dB μV	Front panel digital meter indicates the audio level in dBm or the RF level in dB μV. The METER switch is used to select the meter function.
BW 6.0 kHz	Indicates the IF bandwidth selected.
AUX	Indicates that the preset auxiliary receiver detection mode has been selected.
MAN, SHORT, MED, LONG	Indicates the selected AGC mode. When two indicators are displayed (MAN, SHORT) it indicates that the receiver is set to operate with a variable agc threshold.
ISB, LSB, USB, AM, CW, FM	Indicates the receiver operating mode.

OPERATING PROCEDURES

5   The following paragraphs 6 to 37 describe the different operating modes associated with the receiver. It is recommended that all procedures associated with operating the receiver be reviewed in their entirety before attempting to operate the receiver.

Frequency Selection

6   The receiver frequency may be set either with the tuning knob or with the numeric keypad. To use the tuning knob, depress the TUNE pushbutton and spin the tuning knob in either direction to increase or decrease the frequency. Note that in this mode the receiver is under the direct control of the front panel. To disable the tuning mode, or lock the receiver to the selected frequency, the TUNE pushbutton is depressed a second time. To select a frequency using the numeric keypad, depress the FREQ pushbutton and enter the tens MHz digit (0, 1, 2 or 3). If a 3 is entered, the receiver will block any additional digits since the maximum receiver frequency is 30 MHz. If a 0, 1 or 2 is entered the digit indicator will move to the right as each digit is entered. In this mode, the front panel is operated independantly from the receiver. To set the receiver to the selected frequency depress the ENTER pushbutton.

Mode Selection

7   The receiver operating mode, FM, CW, AM, or sideband, is selected by depressing the appropriate pushbutton. The corresponding indicator will be illuminated in the display. In the FM, CW, and AM modes, the bandwidth and AGC operating mode may also be selected (see paragraphs 9 to 11). In the sideband mode the AGC mode may be selected as described in paragraphs 10 and 11. A BFO frequency may be used when the receiver is operated in the CW mode. This procedure is described in paragraph 12.

8   The bandwidth and AGC operating parameters may be preset, for each mode so that the receiver will automatically return to the selected parameters each time the mode is selected. Additionally, when using the AUX mode, the mode, bandwidth, AGC, and BFO parameters may be preset so that the receiver will return to these parameters each time the AUX mode is selected. Refer to paragraph 36 for detailed procedures on presetting these parameters. The ISB pushbutton can be used only when the receiver is equipped with the ISB option.

Bandwidth Selection

9   A total of 5 different IF bandwidths may be selected when the receiver is operated in the FM, CW, or AM modes. The desired bandwidth is selected by depressing the appropriate pushbutton (BW1 to BW5). The display will indicate the bandwidth in kHz.

AGC Selection

10   The receiver may be set to operate with a Short, Medium or Long agc time constant by pressing the appropriate pushbutton (SHORT, MED, or LONG). If MAN is pressed the receiver operates with a variable agc threshold, adjusted with the IF GAIN control and the agc time constant indicated. To disable the agc, after pressing MAN. the time constant previously selected may be cancelled by pressing the appropriate button (SHORT, MED. or LONG). The IF GAIN control now acts to set the receiver gain.

11   To return to agc operation, pressing MAN. disables the IF GAIN control and selects SHORT agc.

BFO Tuning

12   In the CW mode, the internal beat frequency oscillator is enabled. The frequency range of the oscillator is ± 8 kHz in 10 Hz increments. When the BFO pushbutton is depressed the tuning knob may be used to select the desired BFO signal. The BFO pushbutton must be depressed a second time to disable the tuning knob from the BFO tuning mode.

Channel Loading

13   Each of the 100 channels in the receiver may be preset to a particular frequency and operating mode. The following procedure details the steps required to load each of the channels.

14   Depress the FREQ pushbutton. The frequency indicator will be illuminated and the display set to all zeros.

15   Enter the desired frequency using the numeric keypad.

16   Select the desired mode, bandwidth, AGC, and BFO parameters. Verify the selected parameters by observing the display.

17   Press and hold the STORE pushbutton. Enter the desired channel number with the numeric keypad (10s digit first followed by 1s digit).

18   Release the STORE pushbutton. This will cause the frequency and mode data shown on the front panel to be written into the indicated channel.

19   At any time while operating the receiver, the current operating parameters may be stored using the procedure in paragraphs 17 and 18.

Memory Check

20   The contents of memory may be verified or checked at any time simply by depressing the CHAN pushbutton and turning the main tuning knob to select the desired memory channel. This procedure will not affect the operation of the receiver.

Memory Transfer

21   The contents of one memory location may be transferred to another memory location by depressing the CHAN pushbutton and using the main tuning knob to locate the channel to be transferred. Depress and hold the STORE pushbutton and use the numeric keypad to select the new memory location. The information shown on the front panel will be written into the new memory location when the STORE pushbutton is released.

Manual Scan Operation

22   After the operating data has been entered into the channels, the channels may be manually scanned by depressing the CHAN and ENTER pushbuttons. By turning the main tuning knob, the receiver will be set to the operating parameters contained in each channel.

Automatic Scan Operation

23   For automatic scan operation, the 100 channels in the receiver are divided into 10 groups of 10 channels each (channels 00 to 09, 10 to 19 etc.). The receiver will automatically scan each channel in a selected group that has asserted its scan flag. The following procedure details the steps necessary to initiate the automatic scan sequence.

24   Review the channels to be scanned by depressing the CHAN pushbutton and using the main tuning knob to check the operating parameters on each channel.

25   The receiver will scan only the channels where the scan flag is asserted; as indicated by the SCAN display just below the channel number.

26   The scan flag is asserted or deleted by depressing the SCAN pushbutton.

27   After all channels have been checked, use the numeric keypad to enter any channel number of the group to be scanned (00, 10, 20 etc.).

28   Press the ENTER pushbutton. This will set the receiver to the selected channel.

29   Press the SCAN pushbutton to initiate the automatic scan sequence. The receiver will scan each channel in the selected group with the scan flag asserted. The time duration that the receiver spends on each channel may be varied from approximately 100 milliseconds to 10 seconds. The desired time interval is selected during the scan operation, with the numeric keys. Depressing 0 will result in a 100 millisecond scan, 1 will result in a somewhat longer scan, and so on. Depressing 9 will result in the maximum scan interval, or 10 seconds.

30   The automatic scan sequence may be stopped by depressing the SCAN pushbutton. Depressing the SCAN pushbutton a second time will initiate the automatic scan operation again.

31 ·   A SCAN INHIBIT input is provided on the rear panel of the receiver (J3, pin 23). The scan sequence may be stopped at any time by earthing this input. Removing the earth will cause the scan sequence to re-start providing SCAN is still selected on the front panel.

Recall Operation

32   The recall operation is used to reset the display to the operating mode of the receiver. For example, the receiver may continue to receive one station while the front panel portion of the receiver is used to check memory status, update the memory etc. Depressing the RCL pushbutton will cause the front panel to display the operating parameters of the station being received.

Preset Mode Parameters

33   To preset the mode parameters the dil switch S1a on the A9A2 board must be set to the 'closed' position. Refer to Figure 3-2 for the position of this switch. To preset the AUX mode, first select the desired mode, bandwidth, agc time constant and bfo offset (e.g. CW, 1 kHz, medium, +1.5 kHz). Depress the AUX button to store these parameters as the AUX mode.

To preset the sideband modes select ISB LSB, ISB USB, LSB, USB in turn together with the desired agc time constant. Different time constants may be selected for the two sidebands on ISB, if desired.
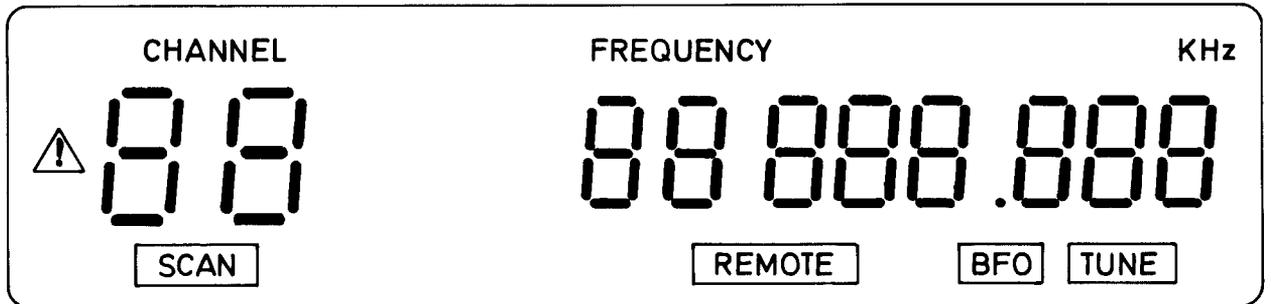
To preset the other modes select AM, FM, CW in turn together with the desired agc time constant, bandwidth and bfo offset (for CW only).

Return the dil switch S1a on the A9A2 board to the 'open' position.
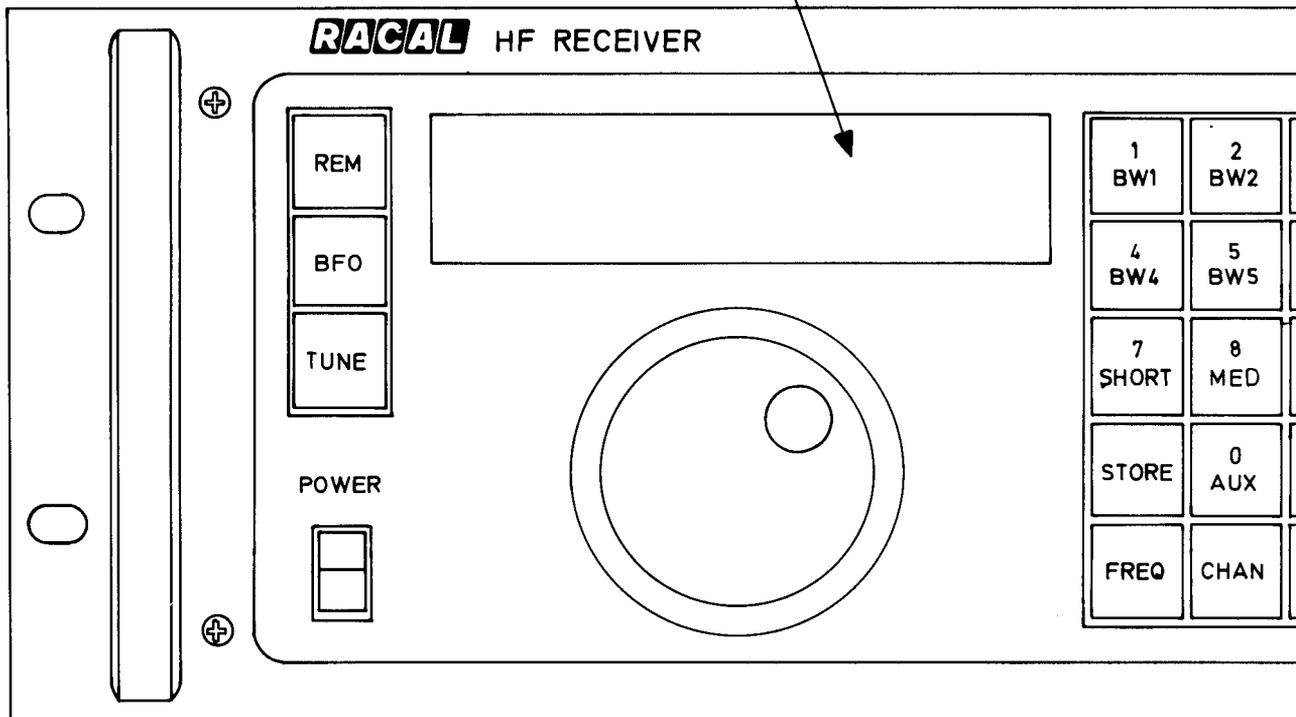
The preset parameter will now be recalled each time a mode is selected but may be changed by the operator using the procedure described in paragraphs 7-12.
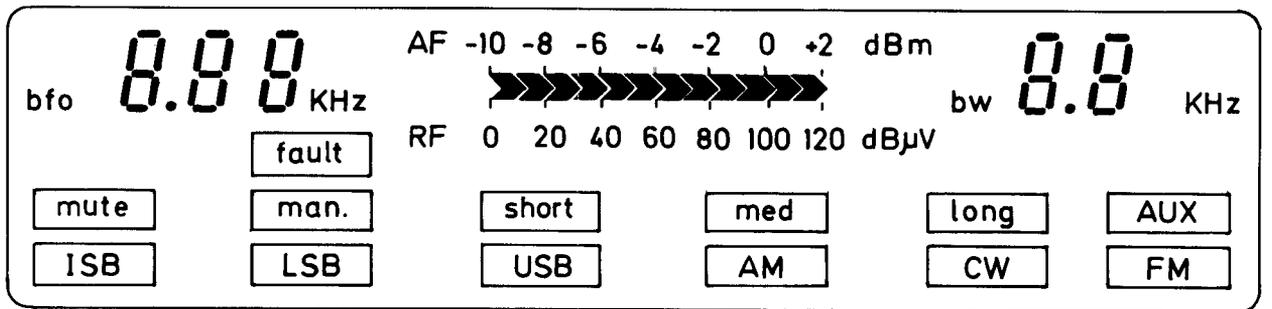
Operation without Preset Mode Parameters

34   If it is required that the agc time constant, bandwidth and bfo offset do not change when a new mode is selected, the receiver may be operated with the dil switch S1a on A9A2 permanently in the 'closed' position. Note, however, that the AUX mode cannot be used in this case.

CHANNEL   FREQUENCY   KHz

⚠ **88**   **88 888.888**

SCAN   REMOTE   BFO TUNE

NOTE: LIQUID
     WITH AL

RACAL HF RECEIVER

REM

BFO

TUNE

POWER

1 BW1	2 BW2
4 BW4	5 BW5
7 SHORT	8 MED
STORE	0 AUX
FREQ	CHAN

RACAL
TH 1496

bfo **8.8.8.** KHz

AF -10 -8 -6 -4 -2 0 +2 dBm

| fault |

RF 0 20 40 60 80 100 120 dBµV

bw **8.8** KHz

| mute | | man. | | short | | med | | long | | AUX |
| ISB | | LSB | | USB | | AM | | CW | | FM |

STAL DISPLAYS SHOWN
EMENTS ENERGISED

RA 1792

| ISB | LSB | USB | AM | CW | FM |

| CHAN SCAN |

IF GAIN   VOLUME   METER   PHONES   L/S
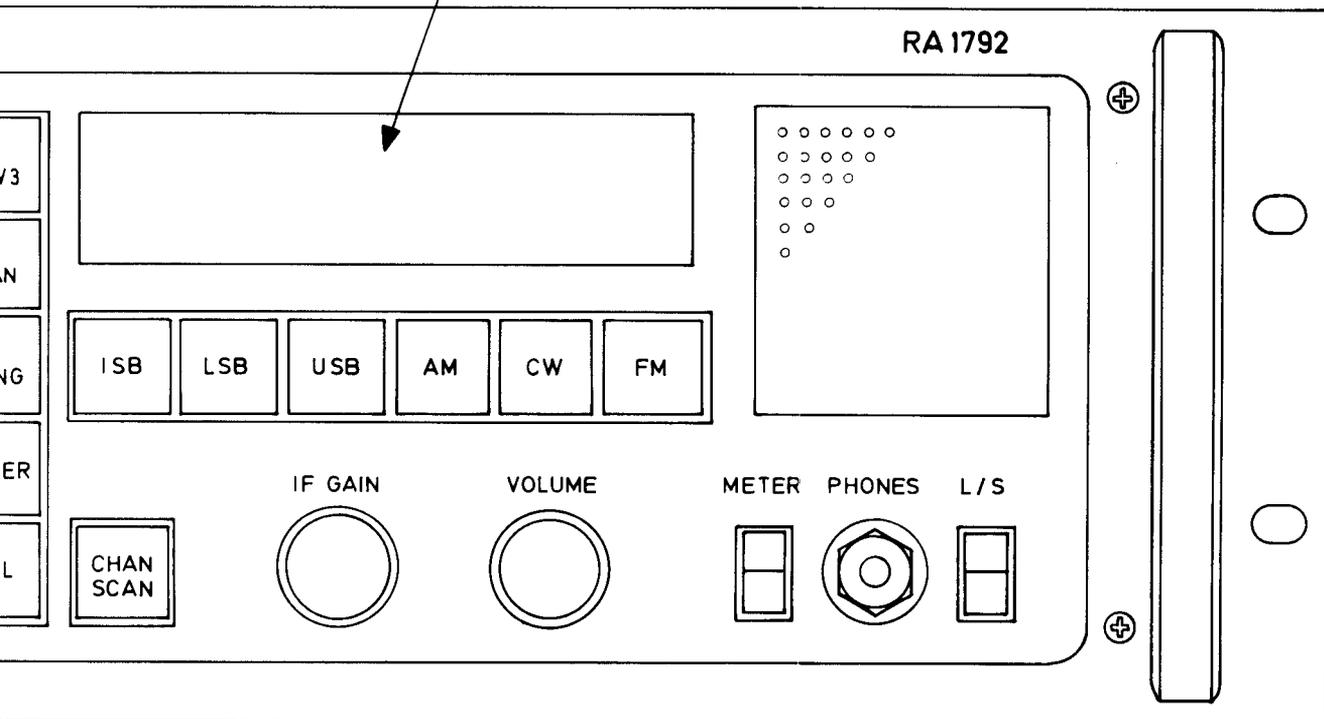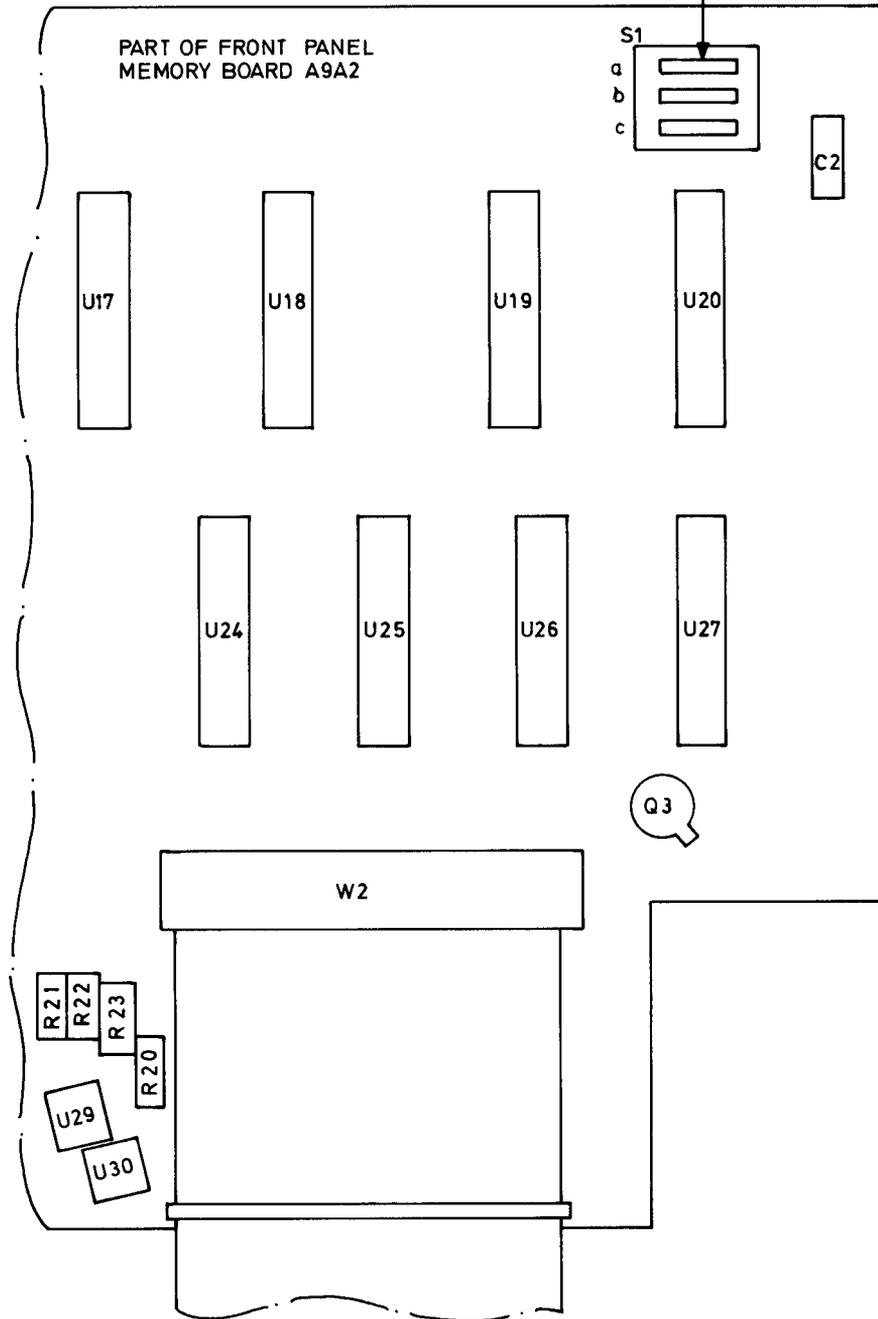
Operating Controls and Indicators

Fig.3.1

CONTROL SWITCH S1

	OPEN	CLOSED
S1a	NORMAL	PRESET MODE
S1b	NORMAL	SELF TEST
S1c	NOT USED	

PART OF FRONT PANEL
MEMORY BOARD A9A2

S1
a
b
c

C2

U17 U18 U19 U20

U24 U25 U26 U27

Q3

W2

R21 R22 R23 R20

U29
U30

Control Switch S1 Location

Fig.3.2