

Table 4: MA 1075 PL2 Connections (Cont'd)

PL1 PIN NO.	SIGNAL DESCRIPTION
28	Local Line Screen
29] Local Line Output] 600 Ω Balanced
30	
31-33	No Connection
34	Z Y X W
35	
36	
37	

INTERNAL CONTROLS

RA 1792 Receiver

Internal Control Switch

23. A miniature 3-pole 2-way DIL switch is fitted to the front panel memory board. For normal receiver operation, ensure that all three switches (S1A,B and C) are all set to the OPEN position.

External Standard Selection Links

24. If the RA 1792 receiver is to be operated using an external frequency standard, check that links LK1 and LK2 on the second local oscillator/BFO synthesizer board (mounted in one of the under-chassis compartments) are correct to suit the intended frequency, as follows:

1 MHz: LK1 and LK2 MADE
5 MHz: LK1 BROKEN, LK2 MADE
10 MHz: LK1 MADE, LK2 BROKEN

Audio Line Output Adjust

25. In standard production receivers not fitted with the optional ISB IF/AF board, only one audio line output (the monitor line) is provided, and the line level is adjusted using R129 on the main IF/AF board. When the ISB IF/AF board is fitted, there are three audio line outputs, all of which carry the same signal except when an ISB mode is selected. In this case the upper sideband is fed to the line 1 output and the lower sideband to the line 2 output. Resistor R129 (on the main IF/AF board) adjusts the level on line 1, and R132 (also on the main IF/AF board) adjusts the level on line 2. The signal at the monitor line output may be switched between ISB/USB and ISB/LSB, and changes over each time the ISB pushbutton is pressed (the selected monitor sideband is then displayed). The audio monitor line level is then also controlled by either R129 or R132, dependant on the sideband being monitored.

MA 1075 Receiver Control Unit

Internal Control Switch

26. Similar to the RA 1792, the front panel memory board fitted to the MA 1075 contains a 3-pole 2-way DIL switch. For normal operation ensure that all three switches (S1A, B and C) are all set to the OPEN position.

Audio Monitor Line Level

27. The level of the audio monitor line output at PL2 pins 29 and 30 is set by R24 on the audio board, over the range +10 dBm to -20 dBm. Note that R24 also affects the audio to line level indicated on the front panel display (AF METERING selected).

TYPICAL EXTENDED CONTROL INSTALLATION (Fig.2.5)

28. In extended control installations the MA 1075 control unit (and hence the operating position) is sited at a distance from the RA 1792 receiver, and hard-wired cables are used to interconnect the two units. The line driver and line receiver devices fitted to both the RA 1792 and the MA 1075 allow the use of either a balanced double-current interchange circuit (CCITT V11 or EIA RS-422) or an unbalanced double-current interchange circuit (CCITT V10 or EIA RS-423). In this example, the connections for a balanced double-current interchange circuit (CCITT V11) are given. Although this type of interchange is primarily intended for use at the higher signalling rates, its use at the relatively low (approximately 6 kHz) internal data rate clock provided by the MA 1075 may be necessary in the following cases:

- (1) Where the interconnecting cable is too long (greater than approximately 15 metres) for proper unbalanced circuit operation (V10 or V28).
- (2) Where extraneous noise sources make wideband circuit operation impossible.
- (3) Where it is necessary to minimise interference with other signals.

Maximum Cable Length

29. The maximum permissible length of the data and clock lines separating the two units is a function of the data signalling rate, and is further influenced by factors such as tolerable signal distortion, ground potential differences and longitudinal noise. At a data signalling rate of approximately 6 k bits/s however, the maximum line length becomes a function of the actual voltage loss incurred by the line, rather than any other consideration. CCITT recommendation V11 assumes a maximum voltage loss between generator and load of 6 dB and based on this figure suggests a maximum twisted - pair line length of 1000 metres. In practice, the operating distance at low signalling rates may be extended to several kilometers, provided twisted - pair cables are used.
30. The above considerations do not apply to the audio monitor lines; the audio monitor output signal level from the RA 1792 may be set in the range -30 dBm to +6 dBm, and ample gain is provided by the MA 1075. Note however, that where the audio monitor signal is conveyed via British Post Office lines, the maximum one minute mean power level permitted is -13 dBm.

TYPICAL REMOTE CONTROL INSTALLATION (Fig. 2.6)

31. The typical remote control installation shown in fig. 2.6 uses a pair of Racal LSI2401 Data Modems which are compatible with the recommendations of CCITT V28 (for unbalanced double-current interchange circuits). The line driver and line receiver devices fitted to the RA 1792 and the MA 1075 may be used in the unbalanced V28 configuration by making no connection to the normally positive output lead of the line driver, and by earthing the normally positive input connection of the line receiver, as shown in figs. 2(a) and 2(b).

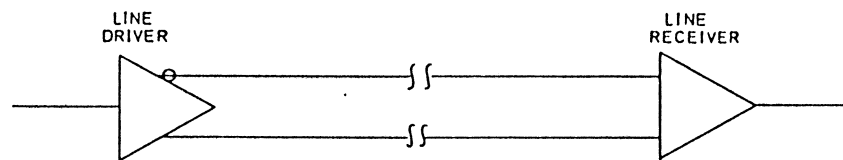


Fig. 2(a) Balanced Interchange

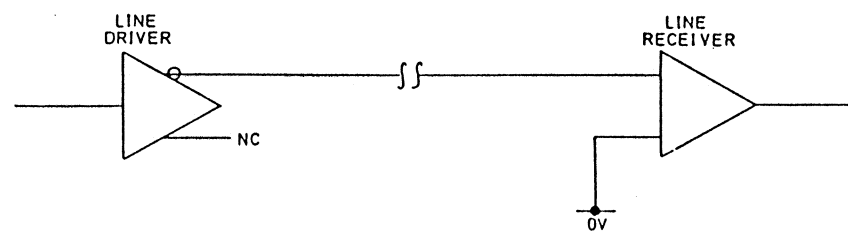
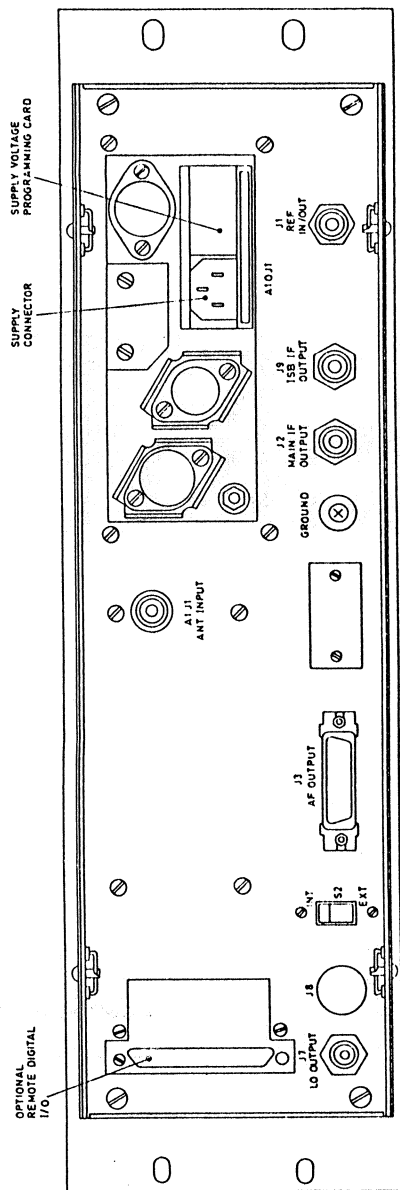
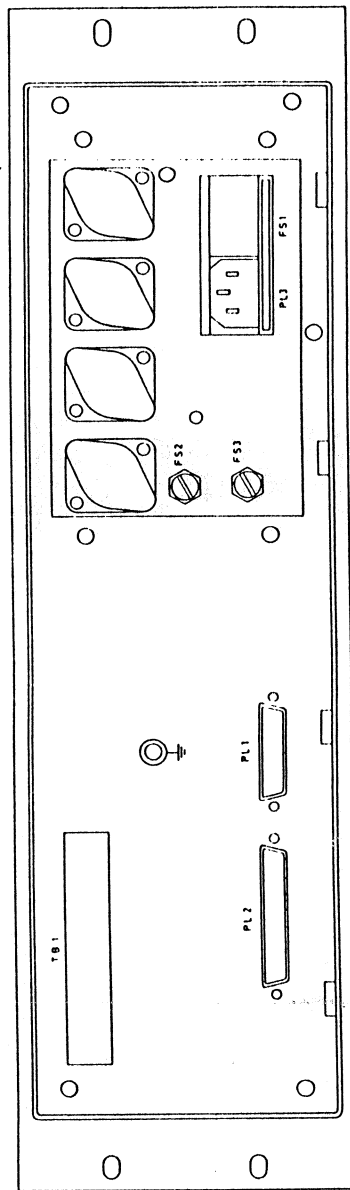


Fig. 2(b) Unbalanced Interchange

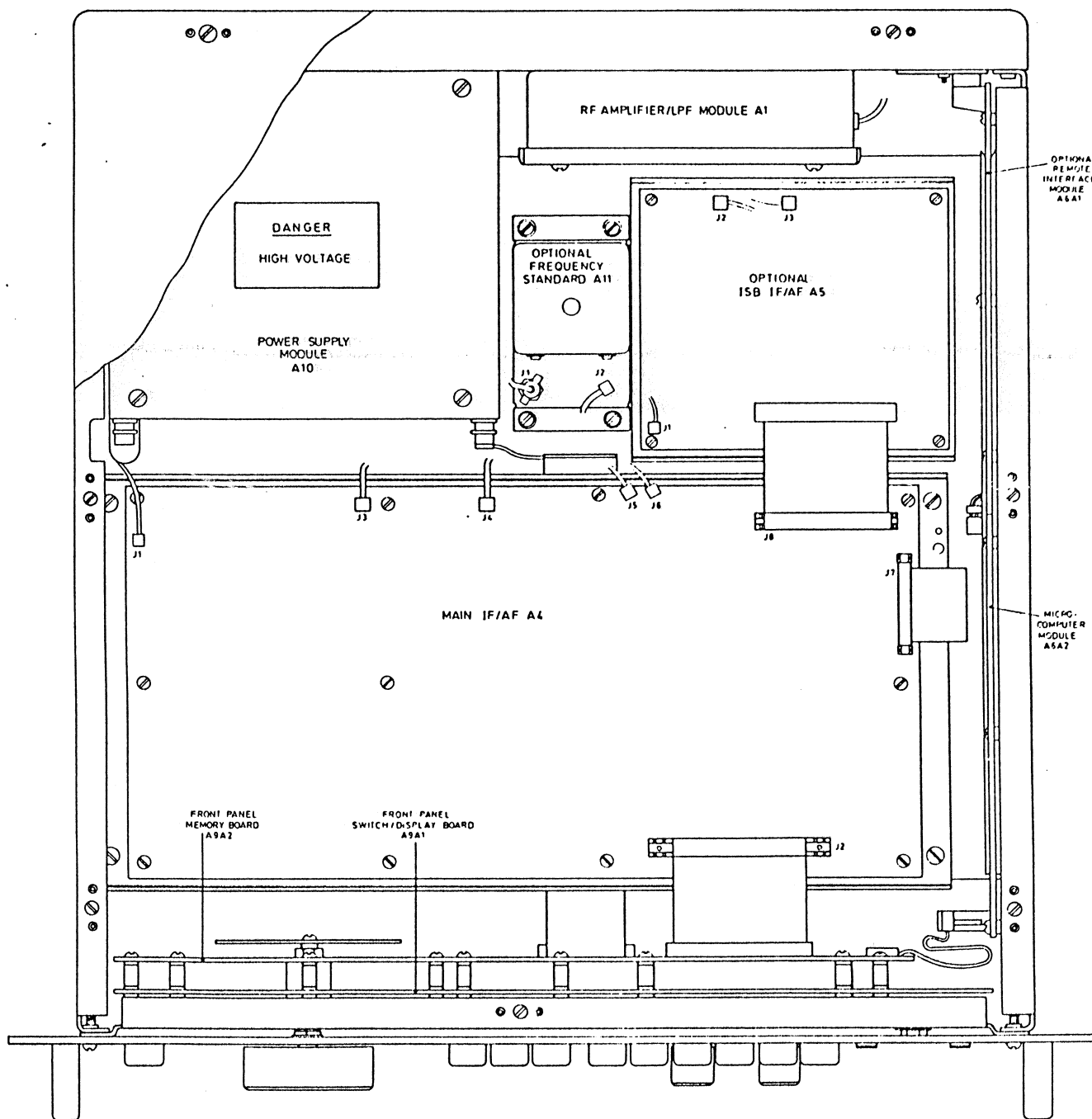


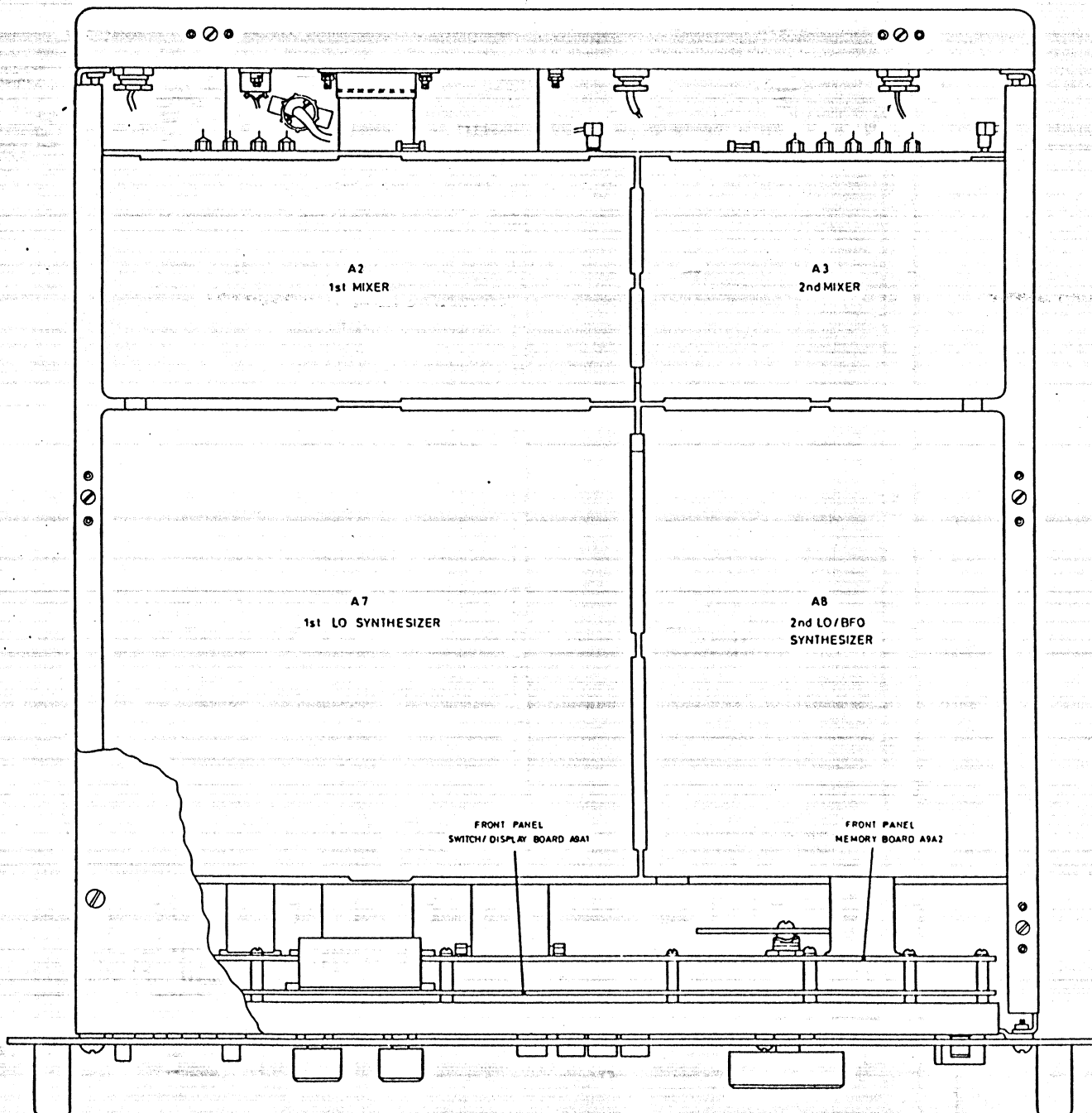
RA 1792



MA 1075

Rear Panel Views: RA 1792 & MA 1075 Fig 2.1

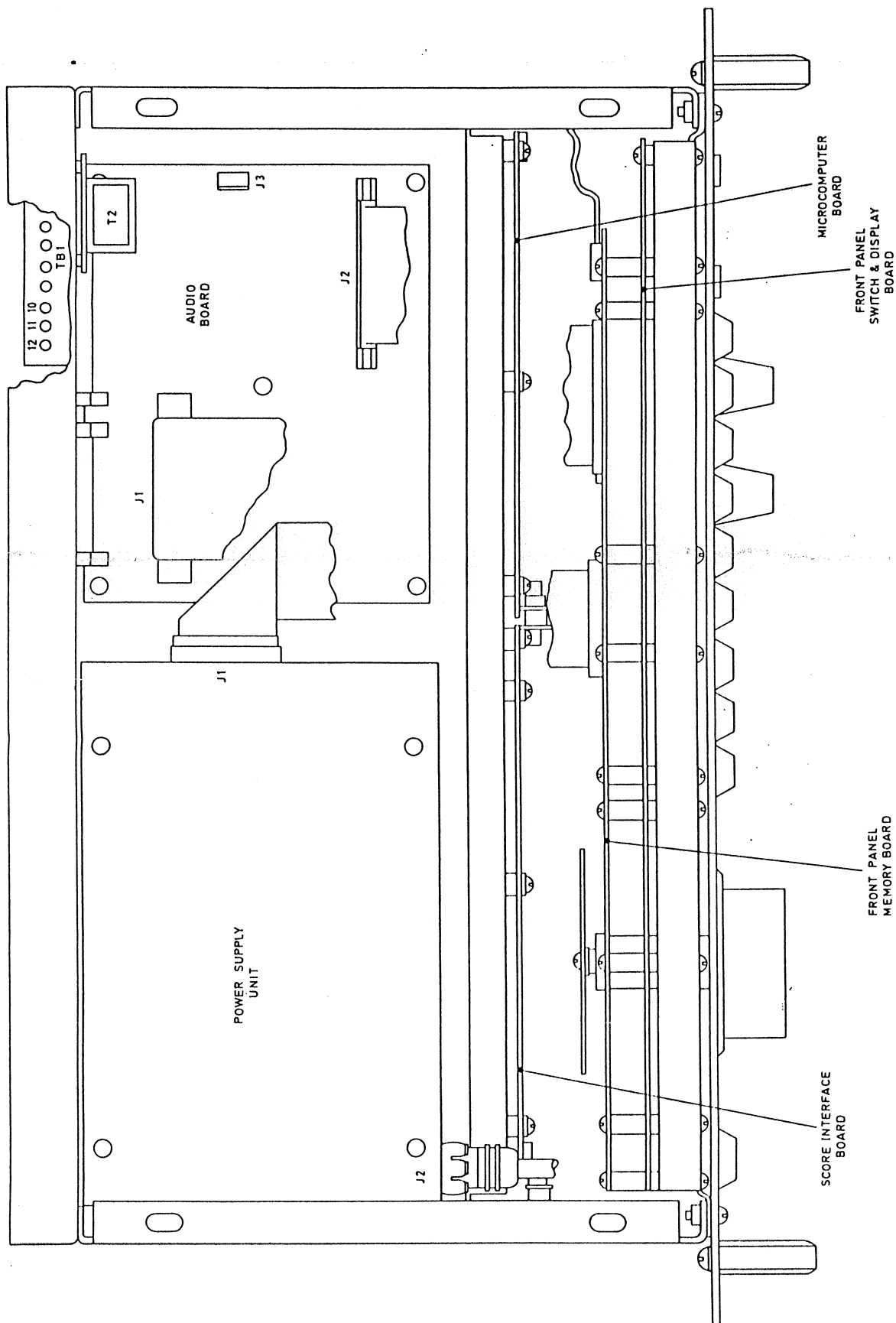


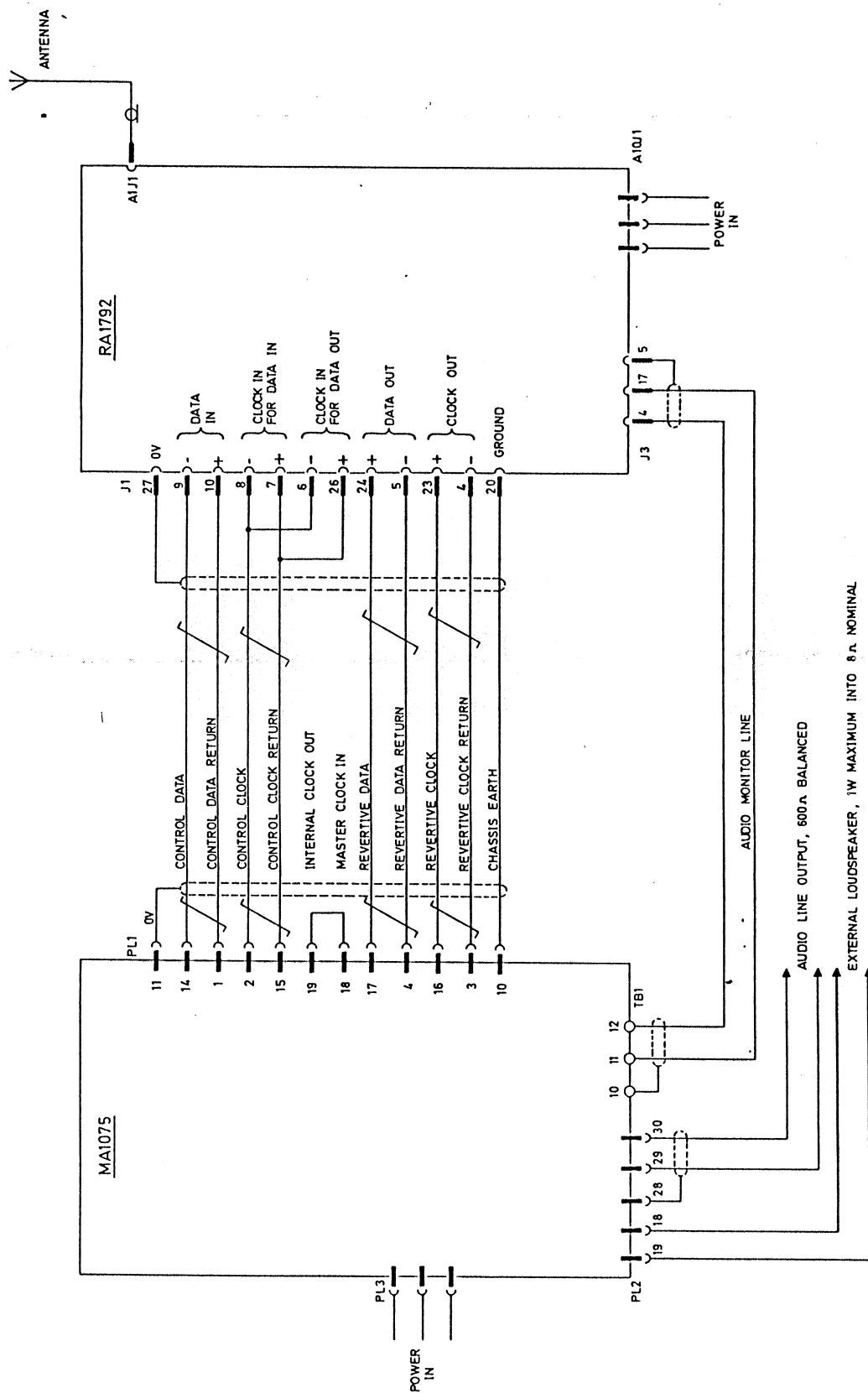


RACAL
UR7192

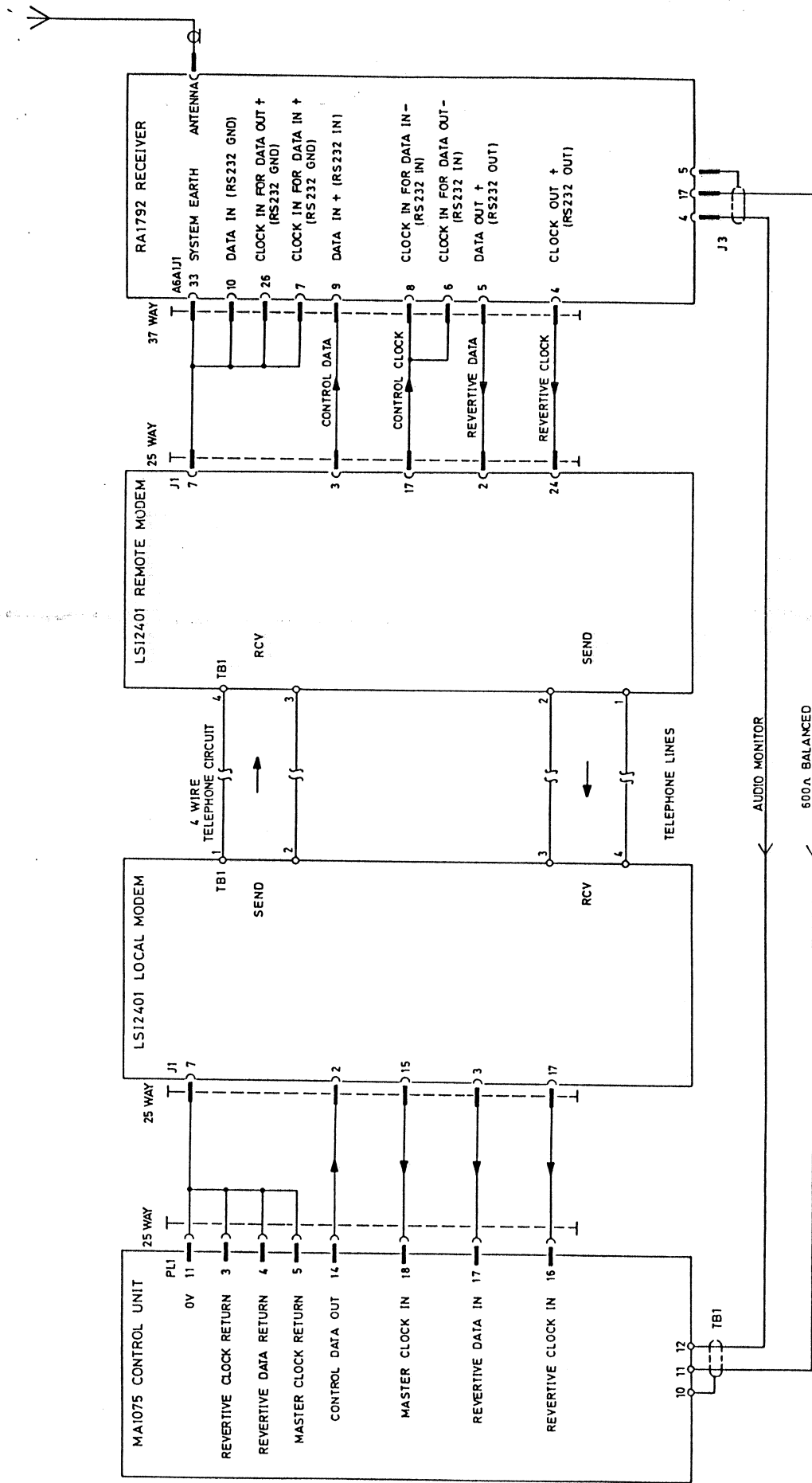
Bottom View RA.1792 Receiver

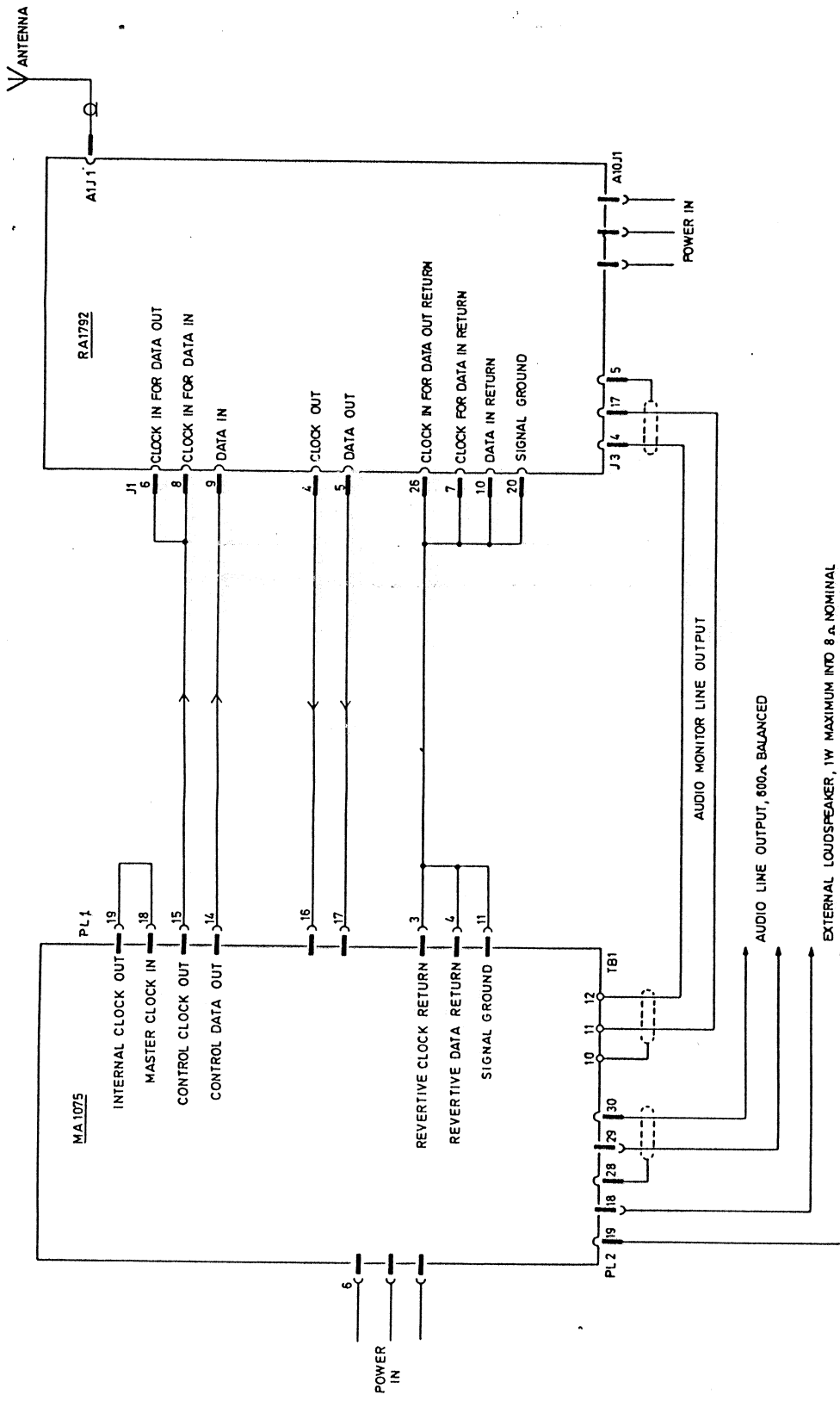
Fig.2.3





Interconnection Diagram : Typical
Extended Control Installation Fig.2-5





Interconnection Diagram:
Unbalanced System

CHAPTER 3

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OPERATING PROCEDURES

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3.1 Operating Controls and Indicators



CHAPTER 3

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OPERATING PROCEDURES

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INTRODUCTION

1. This chapter provides detailed operating procedures for the RA 1792 and the MA 1075. Apart from the action of the REMOTE pushbutton, the operating procedures are generally the same for both units.
2. Before attempting to operate the receiver, it is important to note that when the equipment is operating in  mode ( symbol displayed), the front panel display may not indicate the receiver operating frequency and mode.
3. The entire channel memory content (100 channels) may be reviewed or modified, if desired, without affecting receiver operation.

OPERATING CONTROLS AND INDICATORS

4. The controls and indicators located on the front panels of the two units are shown in fig. 3.1 and are listed in tables 1 and 2. Fig. 3.1 shows all indicators displayed. In normal operation however, all the indicators would not be illuminated at the same time.

Table 1: Front Panel Controls

CONTROL	FUNCTION
POWER	Receiver supply ON/OFF rocker switch
TUNE	Pushbutton used to select TUNE mode, where the tuning knob is used to control the receiver operating frequency. A second press cancels the TUNE mode.
BFO	Pushbutton used to enable the BFO tuning mode. The BFO frequency is set using the tuning knob. A second press cancels the BFO tuning mode.
REM (remote)	In the RA 1792 this pushbutton is used to place the receiver under the control of an associated MA 1075 control unit. In the MA 1075, REMOTE is selected to inhibit the control functions of the associated receiver, and to cause the actual receiver control settings to be displayed on the MA 1075 front panel. To control the receiver, REMOTE is deselected by a second press.
Tuning Knob	Rotary knob used to control the receiver operating frequency, BFO frequency or channel number (00 to 99). In the TUNE mode, the control provides a continuously variable rate of frequency change, proportional to the speed of rotation.

Table 1 (Continued)



CONTROL	FUNCTION
0 to 9, BW1 to BW5, MAN, SHORT, MED, LONG, AUX (Numeric Keypad)	These ten pushbuttons are used, together with other pushbuttons, to enter information into the receiver. When the FREQ pushbutton is depressed, the numeric value of the desired operating frequency may be entered, followed by bandwidth (BW1 to BW5) and AGC (MAN, SHORT, MED, LONG). The AUX pushbutton is used to recall a particular preset operating mode. The numeric pushbuttons are also used for channel selection, to set the SCAN mode dwell time, and to enter test numbers during an automatic test operation.
STORE	This pushbutton is used to load all operating parameters into a specific channel.
ENTER	This pushbutton is used to set the receiver to the operating parameters displayed on the front panel when the receiver is in the  mode ( displayed)
FREQ (frequency)	This pushbutton is used to enable the numeric keypad (pushbuttons 0 to 9) to enter a specific operating frequency. The receiver is set to the new operating frequency when the ENTER button is pressed

Table 1: (Continued)


CONTROL	FUNCTION
CHAN (channel)	This pushbutton is used to set the receiver to the channel mode. The desired channel may be obtained using the tuning knob or by using the numeric pushbuttons and then pressing the ENTER pushbutton.
RCL (recall)	This pushbutton is used to restore the front panel display to the receiver operating parameters.
CHAN SCAN	This pushbutton is used to set the receiver to the Channel Scan mode. It is also used to set or remove a scan flag for a particular channel, when in  mode.
ISB, LSB, USB	These three pushbuttons are for sideband selection. The ISB pushbutton switches the audio monitor between LSB and USB each time the pushbutton is pressed.
AM	Selects the AM mode.
CW	Selects the CW mode. The BFO is switched on and may be adjusted by the tuning control knob.

Table 1: (Continued)

CONTROL	FUNCTION
FM	Selects the FM mode
IF GAIN	This control is used to manually set the receiver IF gain when MAN is selected. This control may also be used when MAN is selected in conjunction with either SHORT, MEDIUM or LONG to set the receiver AGC threshold
VOLUME	Audio output level control for the front panel loudspeaker and phones jack
METER	Sets the front panel meter to display either the audio output level or the RF signal level
L/S	Front panel loudspeaker ON/OFF switch

Table 2: Front Panel Indicators




INDICATOR	FUNCTION
CHANNEL 88	Indicates the receiver is set to the channel mode and gives channel number (00 to 99)
	Indicates that the receiver operating parameters may be different from those displayed
SCAN	Indicates that the receiver is set to the scan mode ( not displayed) or that the channel currently shown has the scan flag set ( displayed)
FREQUENCY, kHz 28 888.88	Indicates the frequency, in kHz, that the receiver is set to
REMOTE	Flashes on and off when receiver is in self test mode (para. 30)
TUNE	Indicates that the receiver is set to the tune mode (frequency is set by front panel tuning control)
BFO \pm 8.00 kHz	Indicates the BFO frequency

Table 2: (Continued)

INDICATOR	FUNCTION
AF - dBm RF - dB μ V	Front panel meter indicates the audio level in dBm or the RF level in dB μ V, as selected by the METER switch
BW 6.0 kHz	Indicates the selected IF bandwidth
AUX	Indicates that the preset auxiliary receiver detection mode has been selected.
MAN, SHORT, MED, LONG	Indicates the selected AGC mode. MAN may be selected in conjunction with SHORT, MED or LONG to set the AGC threshold
ISB, LSB, USB, AM, CW, FM	Indicates the receiver operating mode

OPERATING PROCEDURES

5. The following paragraphs describe the various operating modes of the receiver. It is recommended that all paragraphs are read through before attempting to operate the receiver.


FREQUENCY SELECTION

6. The receiver frequency may be set either with the tuning knob (para.7) or with the 0 to 9 numeric pushbuttons (para.8).

Tuning Knob Frequency Selection

7. (1) Press and release the TUNE pushbutton. Check that TUNE is displayed.
- (2) Rotate the tuning knob in either direction to increase or decrease the receiver frequency.
- (3) Once the desired frequency has been obtained, press and release the TUNE pushbutton again to lock the receiver to the selected frequency and to cancel the TUNE mode.

Numeric Pushbutton Frequency Selection

8. (1) Press and release the FREQ pushbutton. Check that  is displayed denoting that the receiver is operating independent of the front panel.
- (2) Use the numeric pushbuttons to enter the desired frequency, starting with the tens MHz digit. If the first digit entered is numeral 3, then the entry of additional digits is blocked since the maximum receiver frequency is 30 MHz.
- (3) When the correct frequency has been entered and is displayed, press the ENTER pushbutton to set the receiver to the new frequency. Note that leading zeros must be entered whilst trailing zeros need not be

entered. For example, to set the receiver to a frequency of 200.00 kHz, press 0, 0, 2 and then the ENTER pushbutton. For a frequency of 12000.00 kHz, simply press 1, 2 and ENTER. If a mistake is made whilst entering the frequency, press the RCL pushbutton followed by the FREQ pushbutton and start again.

MODE AND BANDWIDTH SELECTION

9. The FM, CW, AM, USB, LSB, and ISB modes are selected by pressing the appropriate pushbutton, and the selected mode is then displayed. The AUX mode is used to select preset MODE and other parameters, as described in para.28. For the FM, CW and AM modes, a bandwidth of 300 Hz, 1 kHz, 3 kHz, 6 kHz or 16 kHz may be selected by pressing BW1, BW2, BW3, BW4 or BW5 respectively (these bandwidth figures are applicable to standard versions of the RA 1792 receiver. Alternative bandwidths are available).

ISB Mode

10. The ISB pushbutton is only operative when the receiver is fitted with the optional ISB IF/AF board. When the ISB pushbutton is pressed, the front panel loudspeaker and PHONES jack are fed from the sideband indicated on the display (either LSB or USB). If the ISB pushbutton is pressed again, the audio monitor circuits are fed from the other sideband.

SSB Modes

11. Bandpass tuning is provided at the RA 1792 only for the LSB and USB single sideband modes, and this may be utilised to minimise the effects of an interfering signal present within the passband. The procedure is as follows.
12.
 - (1) Press and release the LSB or USB pushbutton as required.
 - (2) Select BW1 (300 Hz) or BW2 (1 kHz) as required.
 - (3) Press and release the BFO pushbutton.

- (4) The tuning control may now be adjusted to position the selected passband within the 3 kHz sideband filter passband.
- (5) To cancel the bandpass tuning facility, press the selected sideband pushbutton (LSB or USB) a second time.

Preset Mode Parameters

13. 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 a particular mode is selected. Instructions for presetting these parameters are given in para.28.

AGC SELECTION

14. Receiver gain is controlled by the SHORT, MED and LONG pushbuttons and the MAN pushbutton in conjunction with the manual IF GAIN control. When MAN is not selected, the SHORT, MED and LONG pushbuttons are electronically latched. When MAN is selected, the SHORT MED and LONG pushbuttons are still electronically latched but toggle on and off so that MAN only may be selected, i.e. if MAN and LONG are both selected and LONG is pressed, LONG is switched off and MAN remains. The MAN function also toggles on and off each time the button is pressed. If MAN only is selected and is pressed again, MAN is switched off and SHORT is automatically selected. MAN is selected in conjunction with either SHORT, MED or LONG so that the AGC threshold may be set using the IF GAIN control.

BFO TUNING

15. The BFO pushbutton is enabled when the CW mode is selected. When the BFO pushbutton is pressed, the tuning knob may be used to set the BFO frequency in the range plus and minus 8 kHz in 10 Hz increments. If the BFO pushbutton is pressed a second time the BFO frequency is locked and the BFO is electronically isolated from the tuning control.

NOTE: The maximum BFO offset which may be selected at the MA 1075 is restricted to the range plus and minus 7.79 kHz.

CHANNEL SELECTION

16. The receiver may be set to any one of the 100 channels as follows.
17.
 - (1) Press and release the CHAN pushbutton.
 - (2) Then either:
 - (a) Rotate the tuning control until the desired channel is displayed, or
 - (b) Enter the desired channel number (00 to 99) using the numeric pushbuttons (10s digit first)
 - (3) Press and release the ENTER pushbutton.

CHANNEL LOADING

18. Each of the 100 channels may be preset to a particular frequency and operating mode as follows.
19.
 - (1) Press and release the FREQ pushbutton.
 - (2) Enter the desired frequency using the numeric pushbuttons
 - (3) Select the desired mode, bandwidth, AGC and BFO parameters. Verify the selected parameters by observing the display.
 - (4) Press and hold the STORE pushbutton.
 - (5) Enter the desired channel number (10s digit first).
 - (6) Release the STORE pushbutton. The frequency and mode data displayed on the front panel is now stored in the memory location for the selected channel.

NOTE: At any time while operating the receiver, the current operating parameters may be stored using the above procedure.

CHANNEL MEMORY CHECK

20. The contents of the channel memory may be checked at any time simply by pressing the CHAN pushbutton and turning the tuning knob to display the desired channel. This procedure does not affect the operation of the receiver.

CHANNEL MEMORY TRANSFER

21. The contents of one channel memory location may be transferred to a different location as follows.
22. (1) Press and release the CHAN pushbutton.
- (2) Use the tuning control to display the channel to be transferred.
- (3) Depress and hold the STORE pushbutton.
- (4) Use the numeric pushbuttons to enter the new channel number (10s digit first).
- (5) Release the STORE pushbutton.

MANUAL SCAN OPERATION

23. To manually scan the stored channels, proceed as follows.
24. (1) Press and release the CHAN pushbutton.
- (2) Press and release the ENTER pushbutton.
- (3) Rotate the tuning control to set the receiver, in turn, to the displayed channel.

AUTOMATIC SCAN OPERATION

25. For automatic scan operation, the 100 channels are divided into ten groups each of ten channels (00 to 09, 10 to 19 etc.). The receiver will automatically scan a selected group of channels but only those channels within the group that have the scan flag set will be scanned. The scan duration or dwell time may be varied between approximately 100 milliseconds and ten seconds. The procedure is as follows.
26. (1) Press and release the CHAN pushbutton.
- (2) Rotate the tuning control to display the first channel in the decade to be scanned i.e. channel 00 for the decade 00 to 09, channel 10 for the decade 10 to 19, etc.
- (3) Set or delete the scan flag for the displayed channel, as required, by pressing the CHAN SCAN pushbutton. SCAN is displayed when the flag is set.
- (4) Use the tuning knob to display, in turn, the remaining channels of the selected decade, and set or delete the scan flag for each channel, as required.
- (5) When all channels have been checked, use the numeric pushbuttons to enter any channel number of the decade to be scanned.
- (6) Press and release the ENTER pushbutton.
- (7) Press and release the CHAN SCAN pushbutton.
- (8) Set the dwell time using the numeric pushbuttons. If 0 is pressed, a dwell time of approximately 100 milliseconds is selected, 9 selects the maximum dwell time of approximately ten second, and pushbuttons 1 to 8 select intermediate dwell times. Note however, that when automatic scan operation is selected at the MA 1075, the dwell time is also dependent on the SCORE data rate.

- (9) To stop the automatic scan sequence, press and release the CHAN SCAN pushbutton. To restart the scan sequence, press and release the CHAN SCAN pushbutton again.
- (10) A SCAN INHIBIT input is provided on the rear panel of the RA 1792 receiver (J3 pin 23), and also on the MA 1075 (PL2 pin 27). The scan sequence can be stopped at any time by connecting this input to ground. When the ground connection is removed, the scan sequence will restart providing SCAN is still selected at the front panel.

RECALL OPERATION

27. The RCL pushbutton is used to reset the front panel display to the operating parameters of the receiver. For example, the receiver may continue to receive one station while the front panel display is used to check or update the channel memory. Pressing the RCL pushbutton will cause the front panel to display the operating parameters of the station being received.

PRESET MODE PROCEDURE

28. Certain receiver operating parameters may be preset for each mode so that the receiver will automatically return to the selected parameters each time a particular mode is selected. To preset the mode parameters, a board-mounted DIL switch S1a located on the front panel memory board (fig.3.2) must be temporarily set to the CLOSED position. If this switch is permanently left in the CLOSED position, then the preset mode parameter facility is inhibited. The procedure for presetting the mode parameters is as follows.
29.
 - (1) Set switch S1a on the front panel board (RA 1792 or MA 1075, as appropriate) to the CLOSED position (fig.3.2).
 - (2) Press the required mode pushbutton (ISB/LSB, ISB/USB, LSB, AM, CW or FM).

- (3) Select the required AGC pushbutton(s) i.e. LONG, MEDIUM, SHORT and/or MAN. Note that different AGC time constants may be selected for the two ISB sidebands.
- (4) For the AM, CW, FM and AUX modes, select the required IF bandwidth (BW1 to BW5 pushbuttons). Note that the SSB bandpass tuning facility, which uses BW1 or BW2, cannot be preset.
- (5) For the CW mode press the BFO pushbutton and rotate the tuning control for the required BFO offset frequency. Press the BFO pushbutton again to disengage the tuning control.
- (6) Return switch S1a on the front panel memory board to the OPEN position.
- (7) The preset parameters will now be recalled each time a mode is selected, but may be changed by the operator at any time as for normal receiver operation.

