

6 TRANSMITTER POWER SUPPLY AND SERIAL COMMUNICATIONS

The transmitter power supply (if fitted) is located on stand-off pillars, above the serial comms board (if fitted) or directly to the recorder case. Once fitted, the connections to the main board (serial communications) or to the supply voltage connector (transmitter power supply) must be made. See figures 4.2a, 4.3a or 4.4, as appropriate, for details.

6.1 TRANSMITTER POWER SUPPLY: OUTPUT POLARITY AND FUSING

Figure 6.1 shows the location and polarity of the four PSU outputs.

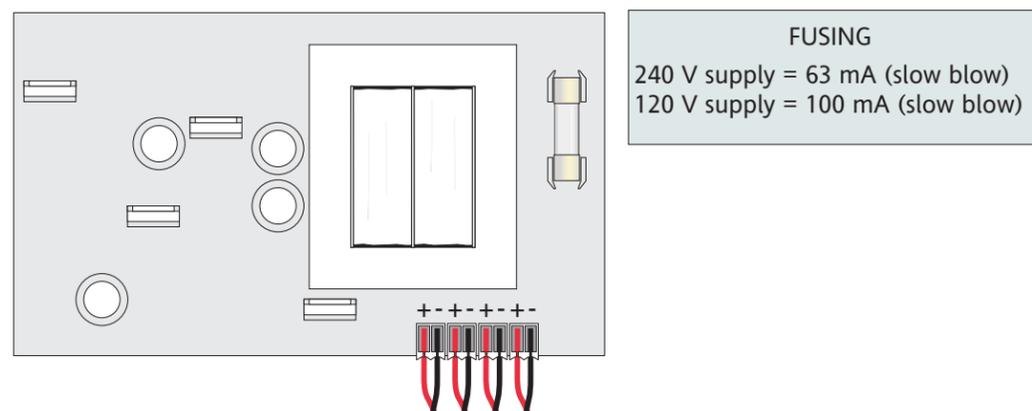


Figure 6.1 Transmitter power supply outputs

6.2 COMMUNICATIONS WIRING

Note: The serial communications board has not been approved for use in CE compliant equipment.

Figure 6.2, below shows the connector pinout. Refer to the communications manual for wiring recommendations, regarding biasing and termination.

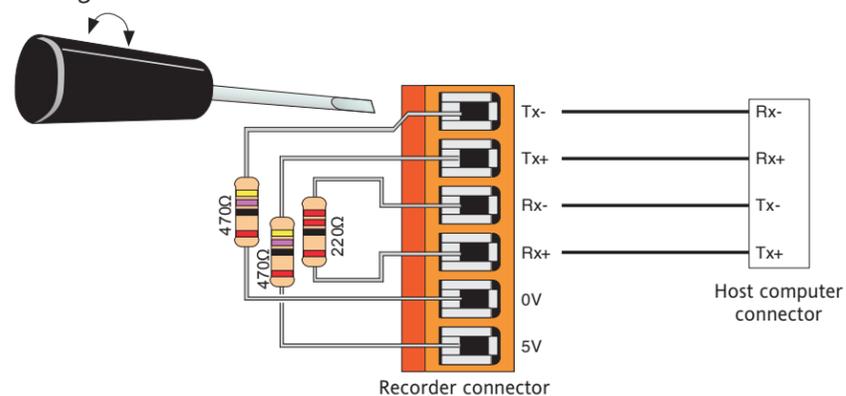


Figure 6.2 Communications connector pinout

Upgrade/Retrofit instructions Continuous-trace, circular-chart recorder

1 INTRODUCTION

This document is intended as an aid to those who are required to upgrade the recorder software, or who wish to add or replace circuit boards.

1.1 CE COMPLIANCE

The hardware configuration of the recorder depends on whether it is certified as being CE compliant or not. The easiest way of telling is to open the door of the recorder (figure 1.1a) and to look for the CE label, which may be in one of two places according to recorder version. Figure 1.1b shows the CE mark located on the outside of the right hand side wall of the platen, close to the serial number label, (which also includes (CE) as a part of the serial number). Figure 1.1c shows the CE mark located near the top right-hand corner of the platen. The three figures are not to the same scale as one another.

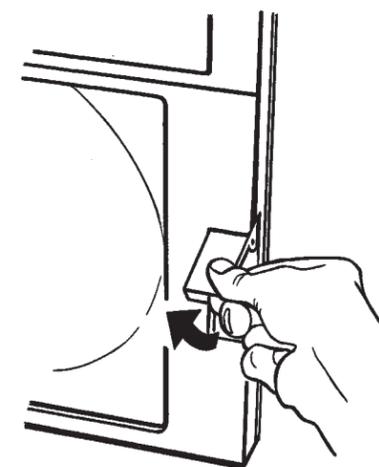


Figure 1.1a
Unlatching the recorder door

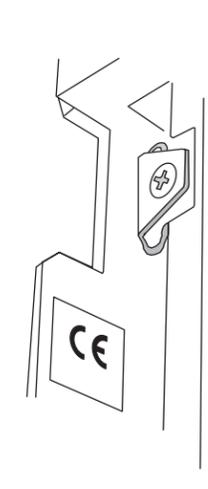


Figure 1.1b
CE Mark on platen wall

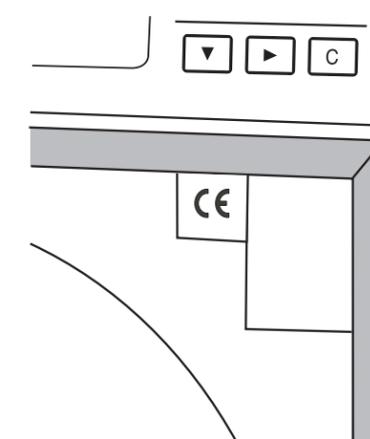


Figure 1.1c
CE Mark in platen top right corner

1.2 SAFETY PRECAUTIONS

WARNING

Before opening the platen, isolate the recorder from all hazardous voltages, both supply and I/O

WARNING

If this procedure is being carried out with the recorder on a horizontal 'bench' or work top, it is recommended that when the platen is open, a piece of masking tape or similar be used to secure the platen to the door in order to prevent the platen from closing, inadvertently, onto the user's hands. This precaution is not necessary for recorders mounted on a vertical wall, panel or pipe.

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2 CIRCUIT BOARD LOCATION



CAUTION

All circuit boards contain components which are sensitive to static electrical discharge. All relevant personnel must be aware of proper static handling procedures.

2.1 INTRODUCTION

Figure 2.1a shows the platen securing screw location. When this, captive, screw is undone, the platen can be opened to reveal the circuit boards (figure 2.1b). Figures 2.1a and b are not to the same scale.

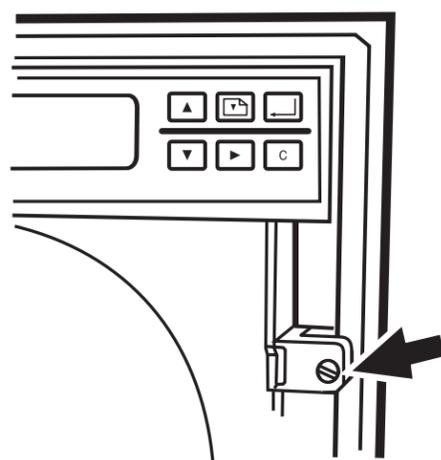


Figure 2.1a Platen release screw

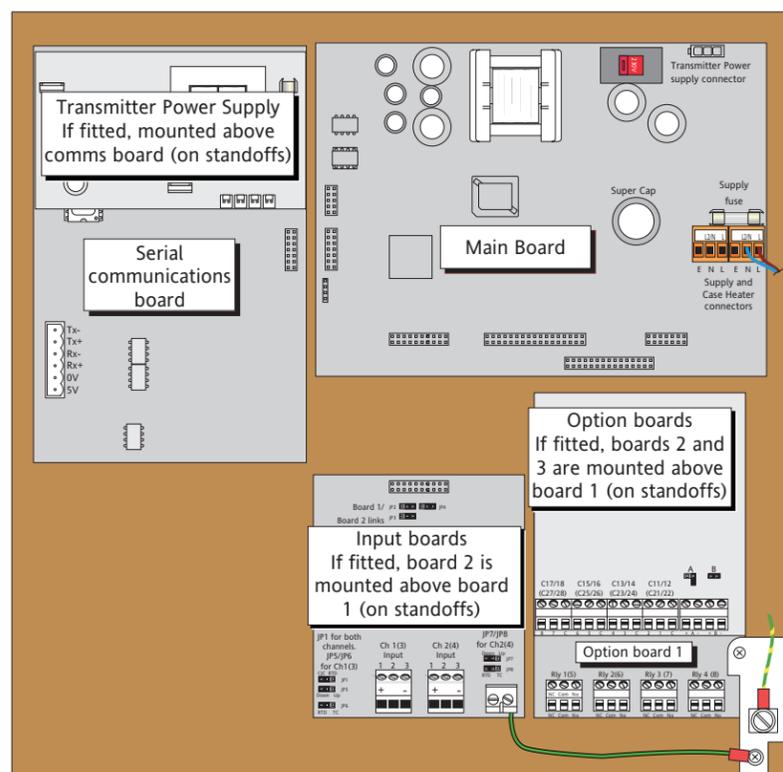


Figure 2.1b Circuit board location (Current version)

5 FITTING CONTROL LOOPS

This may require the fitting of a retransmission or relay output board (described in section 4, above), an update to the software (section 3) and, if this is the first time loops have been fitted to this recorder (i.e. there are no operator keys to the left of the display), the replacement of the display keyboard. This section describes the replacement of the keyboard. Figure 5a, shows the display keyboard for recorders fitted with control loops. Figure 5b, is a view on the rear of the display board (accessible from the rear of the platen) showing all the relevant connectors.

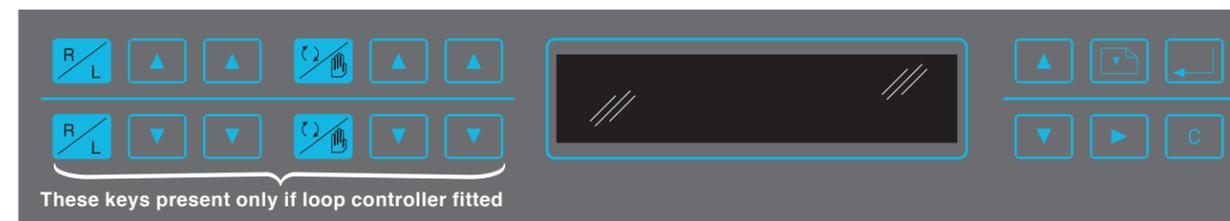


Figure 5a Control loop keyboard

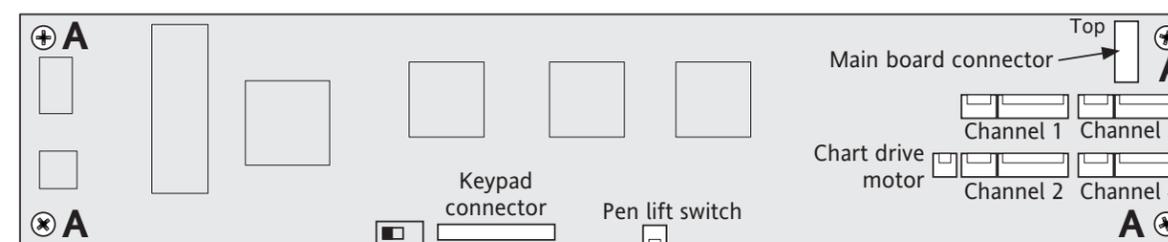


Figure 5b Display board connector locations

5.1 KEYBOARD/DISPLAY BOARD REPLACEMENT PROCEDURE

1. Disconnect all the connectors in the following order:
Main board ribbon cable (note 3).
Channel 1, channel 2, channel 3, channel 4
Chart drive
Pen lift
Keyboard
2. Taking care to retain the associated washers, remove the four screws 'A' which secure the display board. Remove the display board and store it in a static safe area.
3. Carefully remove the keypad from the front face of the platen, and remove any remaining adhesive from the keypad mounting area of the platen, by gentle rubbing.

Caution

It is recommended that solvents are **NOT** used as they may make the adhesive 'stickier' and thus more difficult to remove, and/or, irreversible damage will be caused to the platen material.

4. Remove the protective backing material from the new control keypad, and after ensuring that it is oriented correctly, press the keypad onto the platen, in the same place as the old keyboard was previously located.
5. After ensuring correct orientation, re-fit the display board, using the screws and washers previously removed.
6. Reconnect all the connectors in the reverse order to the disconnection order given in step 1.

Notes:

1. When viewed from the rear of the platen, the channel pen drives are counted from 1 to 4 in a left-right direction. (E.G. Channel one is left-most and channel four (if fitted) is right-most).
2. See the Controller and setpoint generator manual for details of loop control operations.
3. For recorders manufactured before May 2008: if the display board is being replaced, then the existing ribbon cable should also be replaced with the new version (DN204384) supplied with the board.

4.7 RETRANSMISSION/CONTACT INPUT BOARD

Note: This retransmission / contact input board, is occasionally referred-to in this document as the 'Retransmission board' for brevity. The expressions 'Contact input' and 'Event input' are used interchangeably in this and in other documents.

Up to two retransmission boards may be fitted. Each board may contain eight contact input circuits and one or two retransmission outputs, or it may contain only one or two retransmission outputs, or only eight contact inputs according to the variant purchased.

There are two versions of this board, known as 'CE compliant' and 'Original'. Both versions can contain any of the variants described in the previous paragraph. Figure 4.7.2 shows the pinout and link arrangements for the original version. The pinout and Voltage/mA setting links for the CE compliant version are the same as those for the original version, but the board number setting links are not fitted.

Note Outputs can be set to either 0 to 20mA (0 to 5V) or 4 to 20 mA (1 to 5V) in software configuration (see Installation and Operation manual)

4.7.1 CE compliant boards

This version of board is compatible with the intermediate and current main board design. Each circuit board has two links to define whether the retransmission output is to be Voltage or Current. The relevant positions for these links is shown in figure 4.7.2 below, which also shows the pinout.

The board with the solid ribbon cable connection is defined as board 1; the board with the split ribbon cable connection is defined as board 2.

4.7.2 Original design boards

In addition to the Voltage/current links described in 4.7.1, above, the original Retransmission board (not compatible with the intermediate version of the main board) has three links used to define the board as board 1 or board 2. Figure 4.7.2 shows the location of all the links, and also the pinout, which applies to both versions of the board.

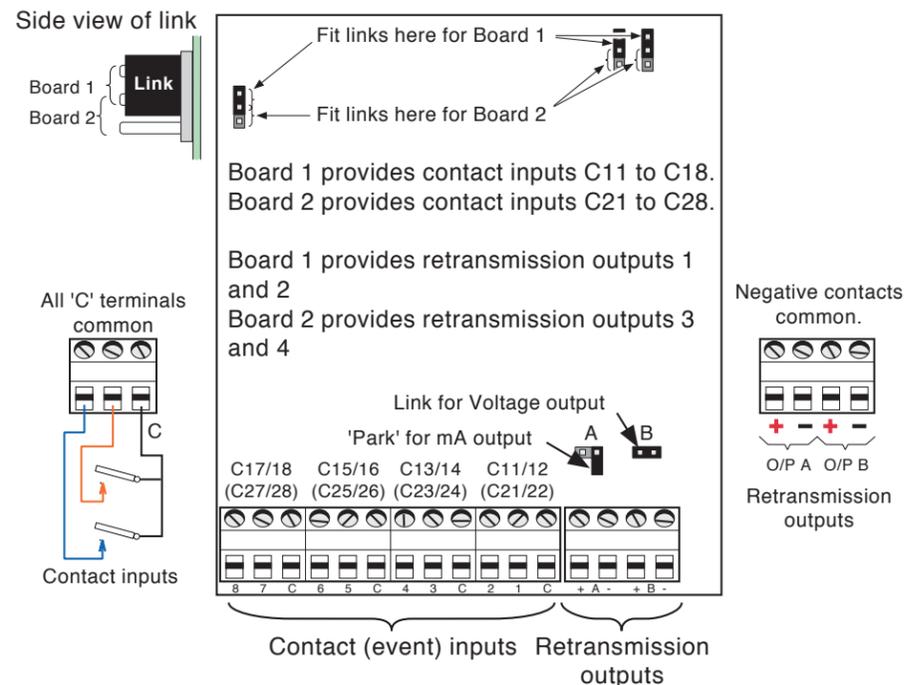


Figure 4.7.2 Retransmission board pinouts and link locations

3 PROM/EEPROM FITTING/REPLACEMENT

3.1 PROM LOCATIONS

There are three versions of the main board, which, for the purposes of this document, will be called 'Original', 'Intermediate' and 'Current'. CE compliant recorders are fitted with the intermediate or current design. Non-compliant recorders may be found with any version. In all cases, the EEPROM location names are the same, but they are in different positions on the board, or are of a different physical shape. Figures 3.1a to 3.1c show the three versions of the main board.

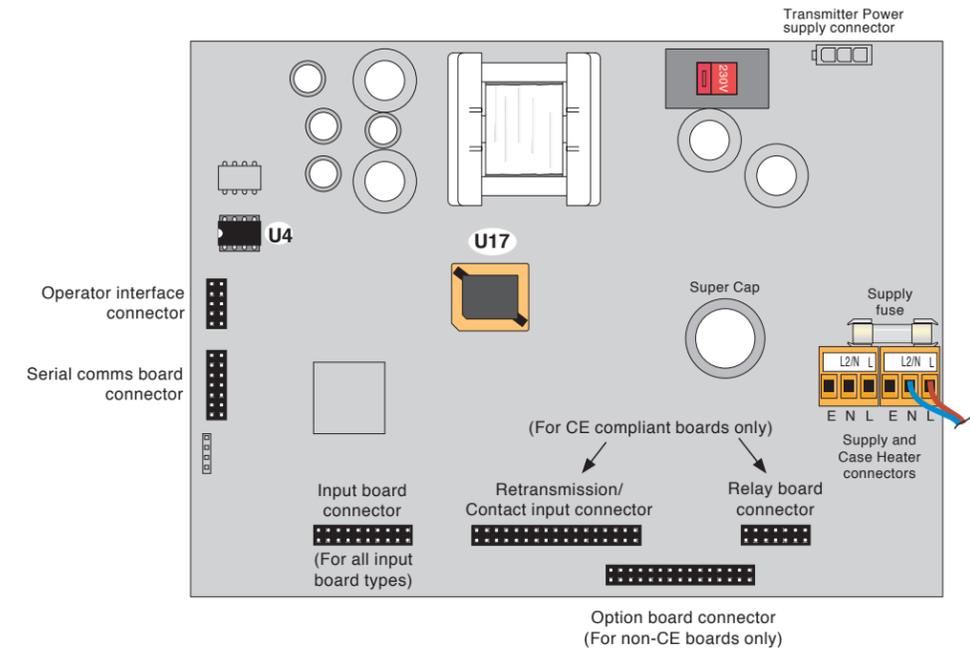


Figure 3.1a Main board PROM locations (Current version)

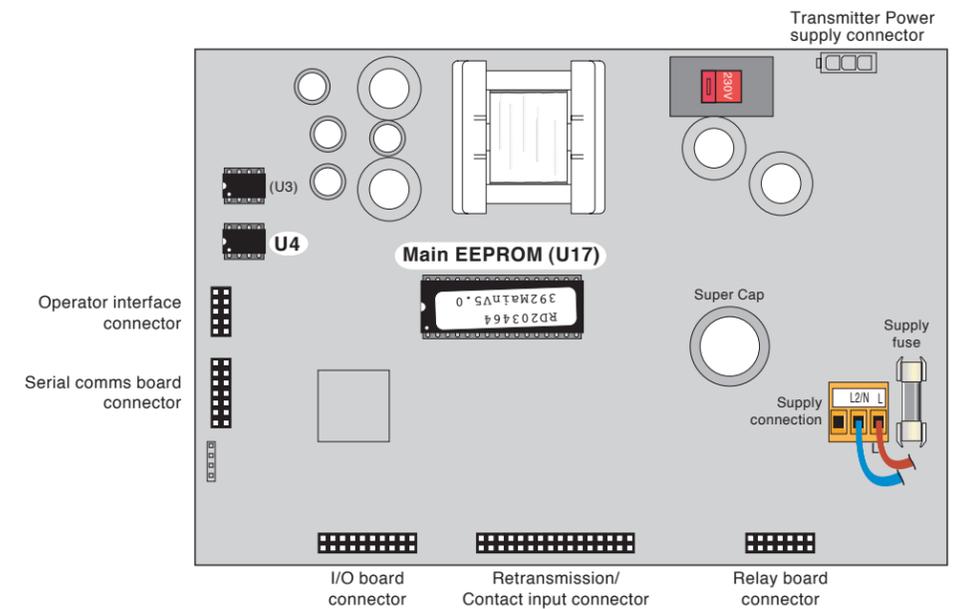


Figure 3.1b Main board PROM locations (Intermediate version)

3.1 PROM LOCATIONS (Cont.)

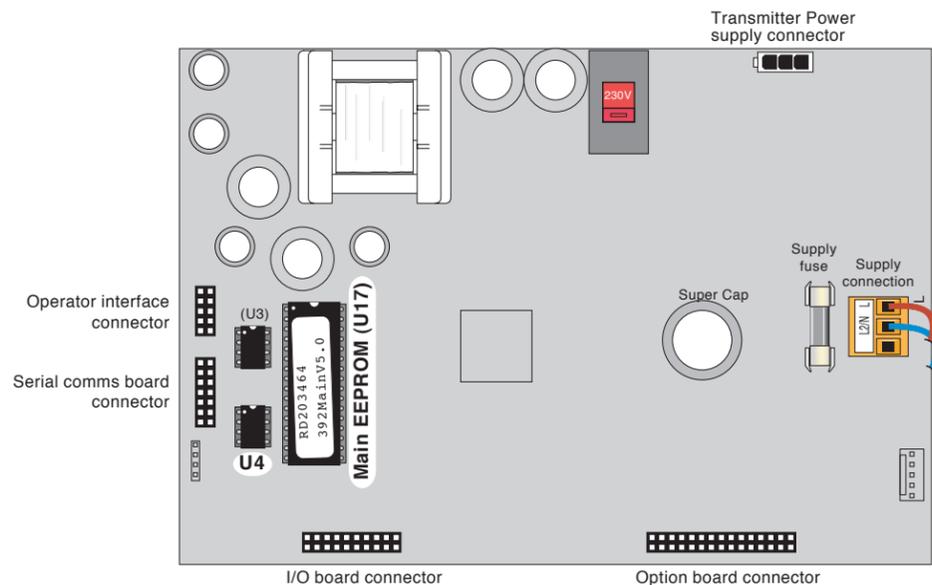


Figure 3.1c Main board PROM locations (Original version)

3.2 SOFTWARE UPGRADE AND FEATURE ADDITION

The following procedures must be carried out only after the recorder has been isolated from all sources of hazardous voltage (both supply and I/O).

3.2.1 Main EEPROM replacement

1. Make a note of the orientation of the IC.
2. Taking the appropriate precautions against static electrical discharge, carefully prise the Main EEPROM (U17) out of its socket.
3. Fit the replacement integrated circuit, ensuring that it is oriented correctly. Orientation is shown in figures 3.1a to 3.1c above.

4.6 RELAY OUTPUT BOARD HARDWARE CONFIGURATION

A maximum of two relay output boards may be fitted, each board containing up to four relays. Board 1 (usually the bottom board) contains relays one to four, and board 2 (mounted above board 1, on stand-off pillars) contains relays five to eight. Relay numbering is left-to-right. If board 1 contains, say, only two relays, the first relay on board 2 is still called 'Relay 5' (not 'Relay 3')

There are two versions of the relay output board, known as 'CE compliant' and 'Original'. Figure 4.6.2 shows the pinout and link location for the original design. The pinout for CE compliant boards is the same, but the link is not fitted.

4.6.1 CE compliant boards

This version of relay output board is compatible with the intermediate and current main board design and has no hardware configuration associated with it.

The board with the 'solid' ribbon cable connection is defined as board 1; the board with the split ribbon cable connection is defined as board 2.

4.6.2 Original design boards

The original Relay output board (not compatible with the intermediate version of the main board) has a link to set the board as board 1 or board 2.

Figure 4.6.2 shows the location of the link, and the relay pinout.

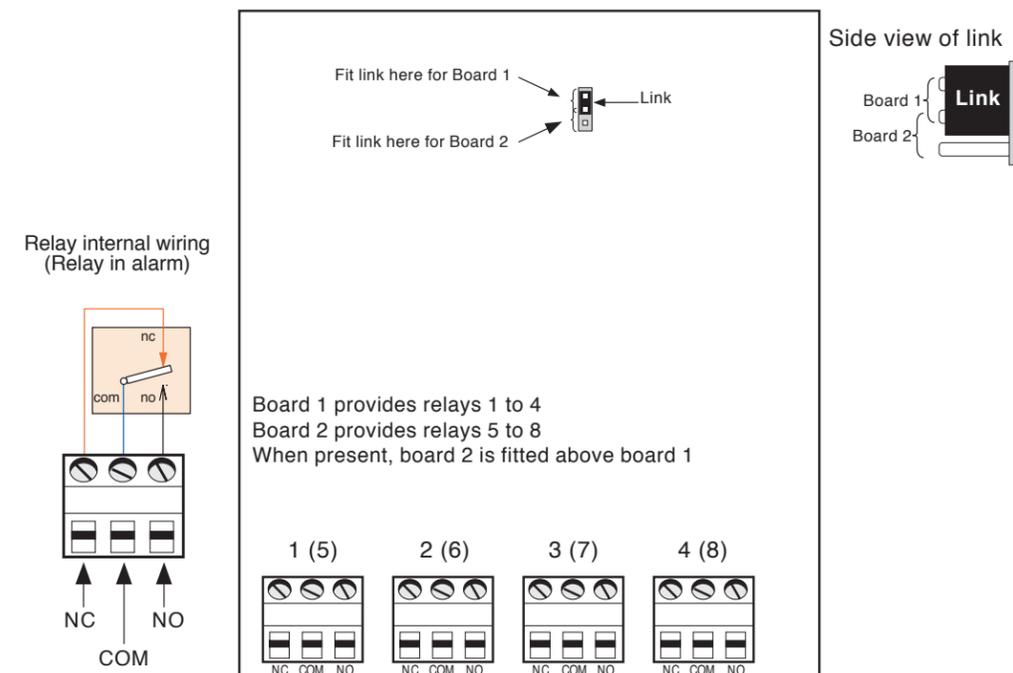


Figure 4.6.2 Relay board pinout and link location

4.5.4 Upscale/Downscale drive

These links define the behaviour of the channel in the case of a broken thermocouple input circuit. Locating the link to 'Upscale' means that if the recorder detects an open circuit, the channel will drive to the full scale position and remain there until the problem is solved. Locating the link to 'Downscale' is similar, but the recorder drives the trace to chart zero instead of full scale.

Note

If the associated TC/RTD link is set to RTD, the upscale/downscale link must be removed. It is recommended that, for safekeeping, the link be 'parked' sideways on the centre pin of the connector.

3.2.1 Feature addition

Addition of features may be purely a software upgrade, or it may involve both the adding of an option board, and a software feature upgrade. The following instructions describe the software feature upgrade procedure. The fitting of circuit boards is described in section 4 of this document.

Caution

If fitting more than one retransmission/contact input option board, or more than one relay output board, board one upgrade must always be done first. If the board two upgrade is performed first, then when the board one upgrade is performed, it will delete board two features.

1. If there is an integrated circuit (IC) in U4 position (figures 3.1a to 3.1 c), carefully remove it and place it in a static safe medium, ready for re-use after software upgrade is complete (step 5).
2. After taking into account the caution above (if relevant), insert the 8-pin Integrated Circuit into the U4 socket, ensuring that it is oriented correctly (figure 3.1a to 3.1c)
3. Turn power on.
4. If there are further upgrades to be made, switch power off, replace the IC in U4 with the next one, and re-apply power to the recorder. Repeat for all upgrades.
5. When all upgrades are complete, and if there was an original IC in U4 position, switch the recorder power off, and replace the last-fitted IC with the original IC (removed at step 1).
6. If there was no integrated circuit originally fitted, then the final IC may be left in U4 position.

4 CIRCUIT BOARDS

4.1 INTRODUCTION

The recorder can have the following boards fitted within the case:

1. Main board
2. Up to two input boards.
3. Up to three option boards
4. Serial communications board (not approved for use in CE compliant equipment)
5. Transmitter Power supply board.

The addition of control loops is discussed in section 5

4.1.1 Circuit board fitting

The fitting of circuit boards is generally a matter of fitting any required standoff pillars in the appropriate places, using the fixings supplied, and connecting the ribbon cable from the main board to the newly-fitted board.

The input board needs also to be connected to safety earth (in order to maintain CE compliance). This connection is made at a two-way terminal block located either on the input board (current version boards only) or on the filter board (original version).

The transmitter power supply needs a supply voltage connection instead of a ribbon cable.

4.2 CURRENT MAIN BOARD

The general arrangement of boards is shown in figure 4.2a, below. The figure also shows the ribbon cable arrangement between the main board, and the current versions of input and option board. This version of the main board is backwards compatible with original version I/O boards, using a different connector (J10a) for the option boards.

The physical arrangement of I/O boards is shown in figures 4.2b and 4.2c. When fitted, the Transmitter power supply board is fitted above the Serial communications board, on standoff pillars similar to those depicted in figures 4.2b and 4.2c.

Notes:

1. Relay output and retransmission/contact input boards are defined as board 1 or board 2 by ribbon cable connection. It is therefore essential to make these connections correctly. It is recommended that where there is a mix of option board types, then relay boards are fitted first, with retransmission/contact input boards fitted above.
2. Input boards are separated by insulating standoff pillars, not metal ones as are used elsewhere.

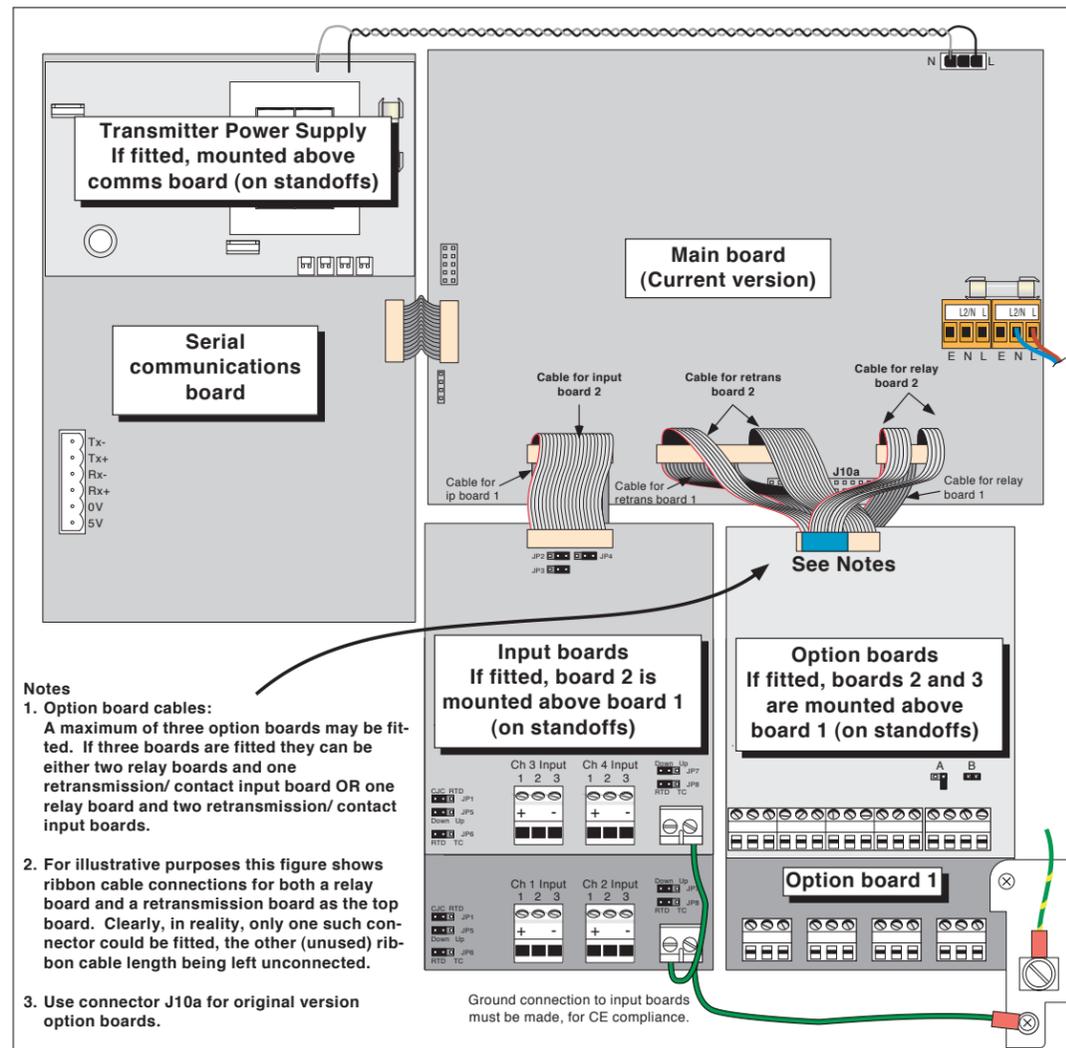


Figure 4.2a General arrangement of circuit boards - current main board, current I/O boards

4.5 INPUT BOARD HARDWARE CONFIGURATION

The input board comes in two versions, the 'Original' and the 'Current'. For some recorders, the Original version was fitted with a filter board, as shown in figure 4.5b, below. The current version (figure 4.5a) does not require this filter board.

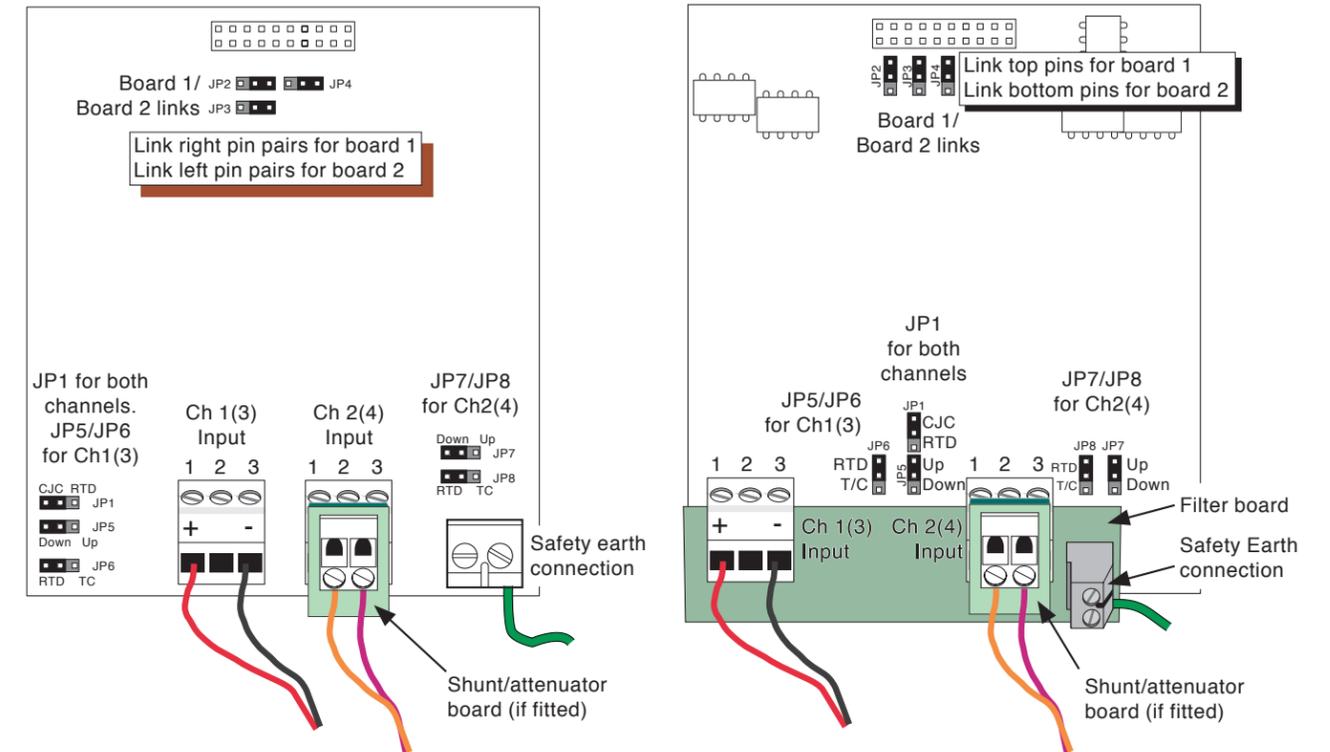


Figure 4.5a Input board (current version) link locations

Figure 4.5b Input board (previous versions) link locations

4.5.1 Board number

This is set by three links near the top end of the circuit board. Board 1 (channels 1 and 2) is the lower of the two cards with Board 2 (channels 3 and 4) (if fitted) set above Board 1 on insulating standoffs.

4.5.2 CJC/RTD

This link must be set to RTD if channel 1 (3) is to be used for RTD input or to CJC for any other input type. This link must be used in a way appropriate to the TC/RTD links described below.

Notes:

1. If the link is set to RTD neither channel can be used for thermocouple inputs.
2. If the link is set to CJC, channel 2 (4) may be used for RTD or T/C etc. inputs, but channel 1 (3) cannot be used for RTD measurements.

4.5.3 TC/RTD

This link must be set for each channel. Channels with this link set to RTD can be used only for RTD inputs. Channels with this link set to TC, are suitable for all other input types. The setting of the CJC/RT (above) link must be appropriate to the setting of this TC/RTD link.

4.4 ORIGINAL MAIN BOARD

As far as the user is concerned, the major difference between the original control board and later versions is that the ribbon cabling to the option boards is different, and that, with the original design, all the option boards have circuit board links to define whether they are 'board 1' or 'board 2'. With other versions, only the input boards need to be defined in this way. Board links are discussed in sections 4.5 to 4.7, below. The original version main board is replaceable by the current version main board, using connector J10A for the option boards.

Input boards may or may not be fitted with filter boards (as shown), according to input board version.

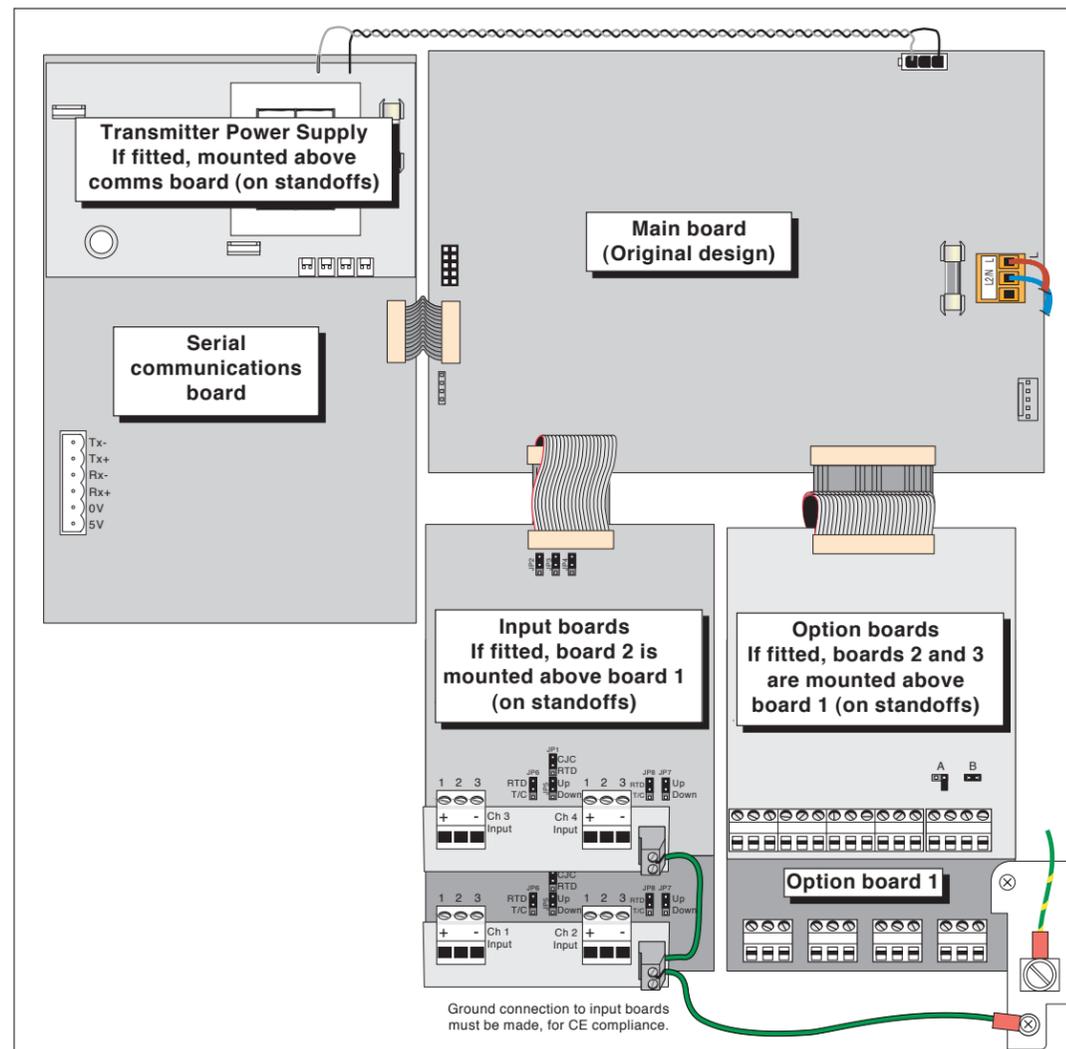


Figure 4.4 General arrangement of circuit boards - original version boards

4.2 CURRENT MAIN BOARD (Cont.)

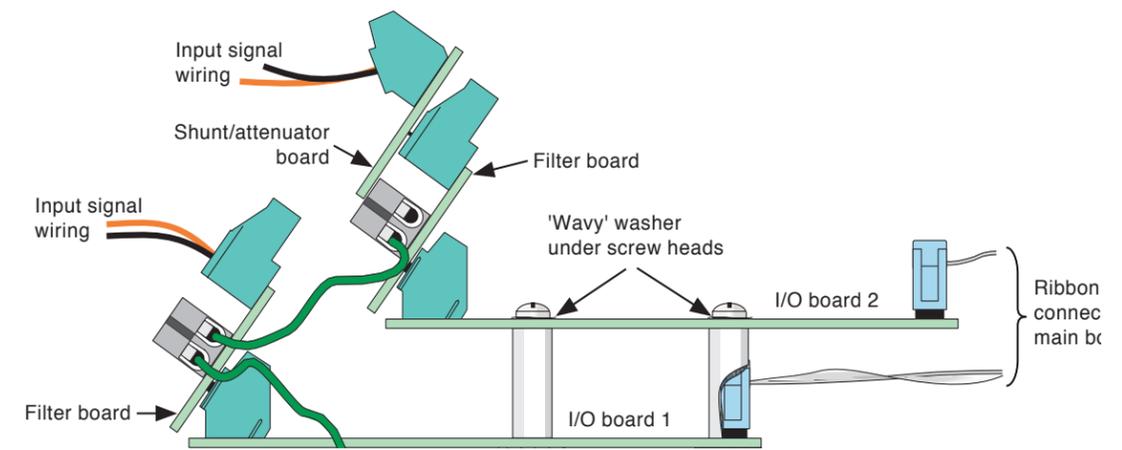


Figure 4.2b Side view of current version input boards

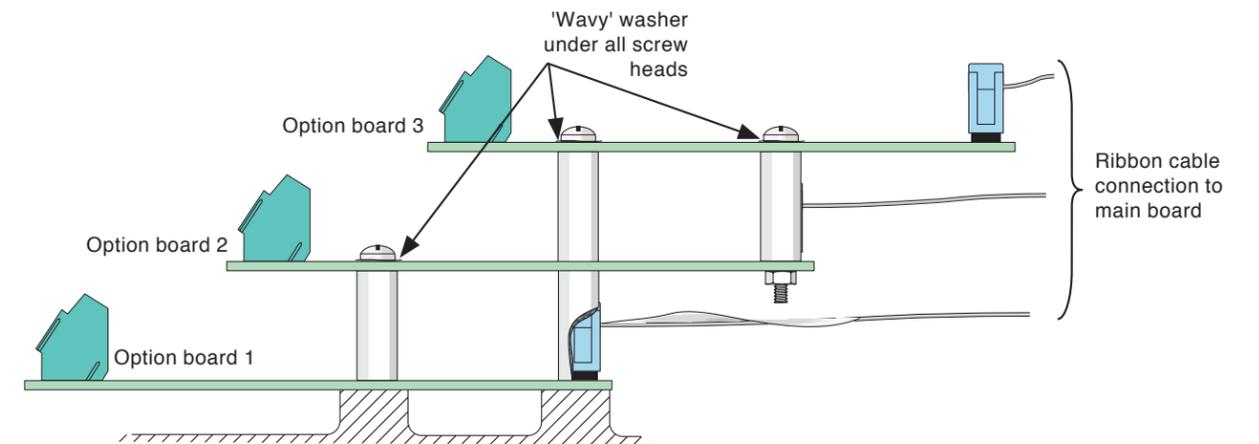


Figure 4.2c Side view of Option boards.

4.3 INTERMEDIATE MAIN BOARD

The general arrangement of boards is shown in figure 4.3a below, which also shows the ribbon cable arrangement for this version of the main board. The I/O board and option board arrangement is depicted in figures 4.3b and 4.3c. When fitted, the transmitter power supply is mounted above the serial communications board on standoffs similar to those shown in figures 4.3b and 4.3c.

Notes:

1. With the intermediate main board, the Relay output and the retransmission/contact input boards are defined as 'Board 1' or 'Board 2' by the ribbon cable connection. It is therefore essential to make this connection in the correct way. It is recommended that if there is a mix of option boards, any relay board(s) are fitted first, with any retransmission board(s) fitted above.
2. Input boards are separated by plastic standoffs, not metal ones as are used elsewhere.
3. The input board requires a 'filter board' to be fitted to its input terminals (figure 4.3b) for CE compliance.

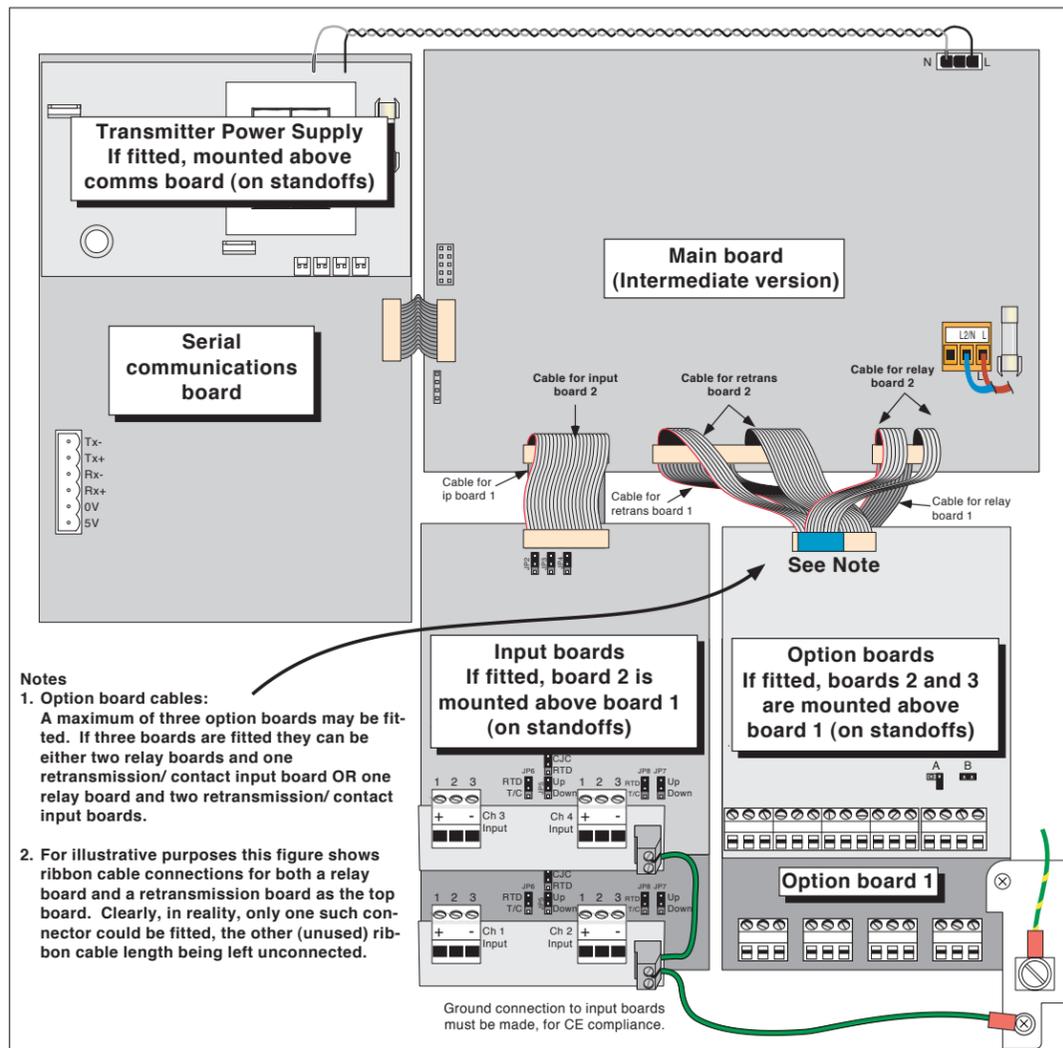


Figure 4.3a General arrangement of circuit boards - intermediate main board

4.3 INTERMEDIATE MAIN BOARD (Cont.)

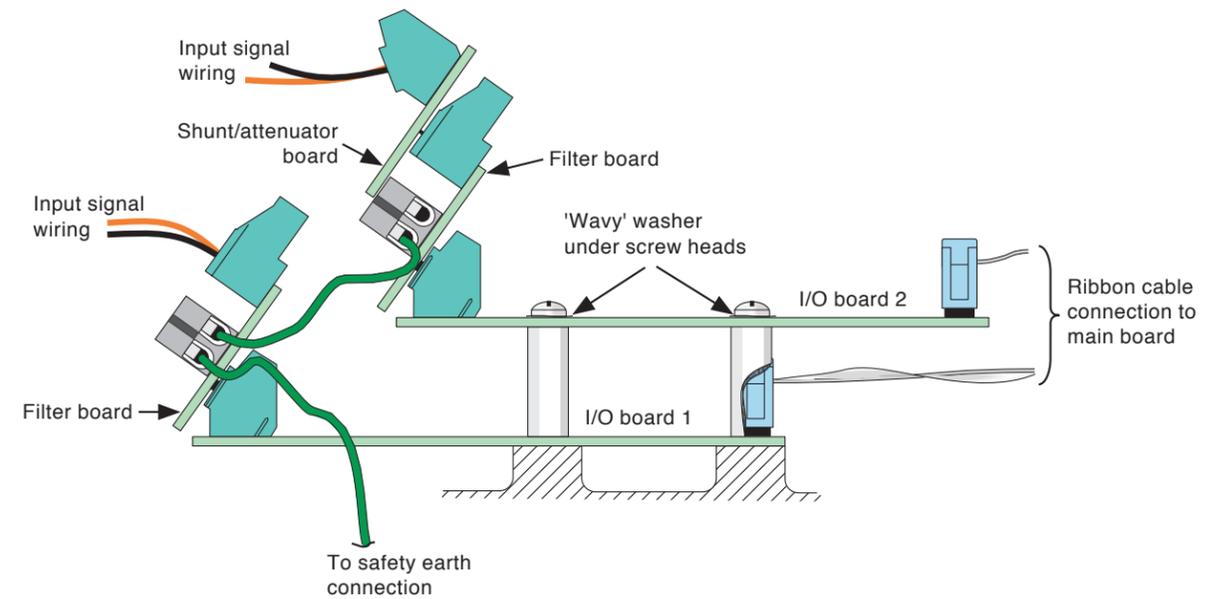


Figure 4.3b Side view of input boards (original version, with filter board)

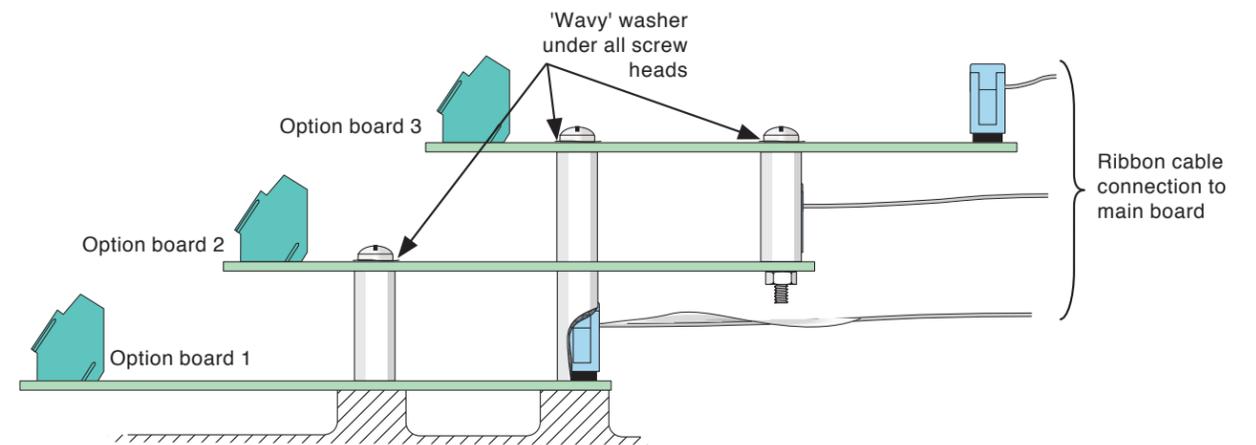


Figure 4.3c Side view of option boards