(24)

If a USB board is to be fitted, continue at instruction 25, otherwise re-assemble the recorder as described in instructions 16 to 18 inclusive.

EXISTING USB BOARD REPLACEMENT

(25)

If a USB board is already fitted, follow the removal procedure given in steps 19 and 20. If this is a new option, continue at instruction 26.

Take the new board, and push it onto the serial communications board, plastic, stand-off pillars (p).

Secure the USB connectors using screws 'g'. Re-fit the USB loom, and press the associated grommet (e) into the appropriate slot in the circuit board retainer.

Re-assemble the recorder as described in instructions 16 to 18 inclusive.

NEW USB OPTION

(26)

Access the top of the card cage, as described in instruction 19.

Peel off and discard the self-adhesive label covering the USB apertures.

Push the two plastic stand off pillars (p) into the apertures in the battery board

Ensuring correct orientation, push-fit the USB board onto the battery board stand-offs.

Secure the USB connectors using screws 'g'. Fit the USB loom to connector d, and press the associated grommet (e) into the appropriate slot in the circuit board retainer.

Re-assemble the recorder as described in instructions 16 to 18 inclusive.
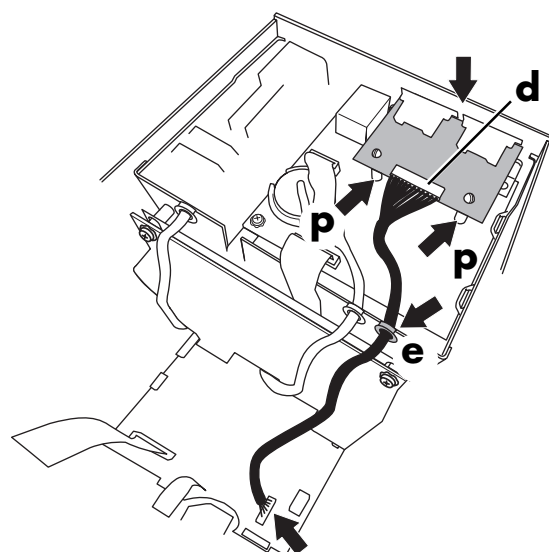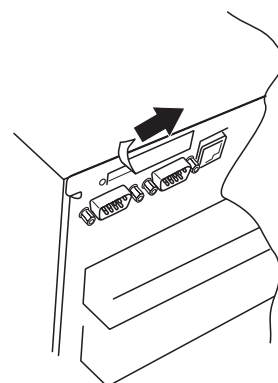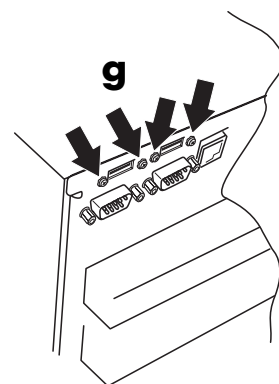
Circuit board retrofit instructions
100mm paperless graphics recorders

INTRODUCTION

These instructions are intended to help service engineers and others to add or replace 100 mm recorder circuit boards. The instructions apply to the power supply unit, input boards and option boards, including serial communications and USB options. For all other replacement retrofit instructions, including the main micro board and the display inverter board, see HA028909U100.

WARNING!
Isolate the recorder from all hazardous voltage sources, both supply and signal. Allow the recorder to cool for at least 10 minutes after powering off .

CAUTION
These procedures involve the handling of components which are sensitive to static electrical discharge. All relevant personnel must be aware of static handling procedures.

OPTION BOARD LOCATION RULES

1 If Relay boards are fitted, they must be located in the lowest numbered slots. Where more than one type of relay board is fitted, then change-over types must be fitted first, followed by normally-closed, followed by normally-open.

2 If Event Input boards are fitted, they must be fitted in the lowest numbered slots available after all relay boards have been fitted.

3 If Analogue output boards are fitted they must be fitted in the lowest numbered slots available after all relay and event input boards have been fitted.

Example:

If a normally-open relay board, two analogue output boards, and a normally-closed relay board are fitted, the normally-closed relay board must be fitted in slot 1, the normally-open relay board in slot 2, and the analogue output cards in slots 3 and 4.

FLEXI CABLE LENGTHS

For boards in vertically adjacent slots, a 50 mm length is used.
For boards separated by a single empty slot, a 75 mm length is used.
For boards separated by two empty slots, a 125 mm length is used.
From input board 1 to the micro board a 180 mm length is used
From any option board directly to the micro board, a 180 mm length is used.
From input board 3 to the micro board, a 270mm length is used.
From input board 3 to option board 2, a 180mm length is used.
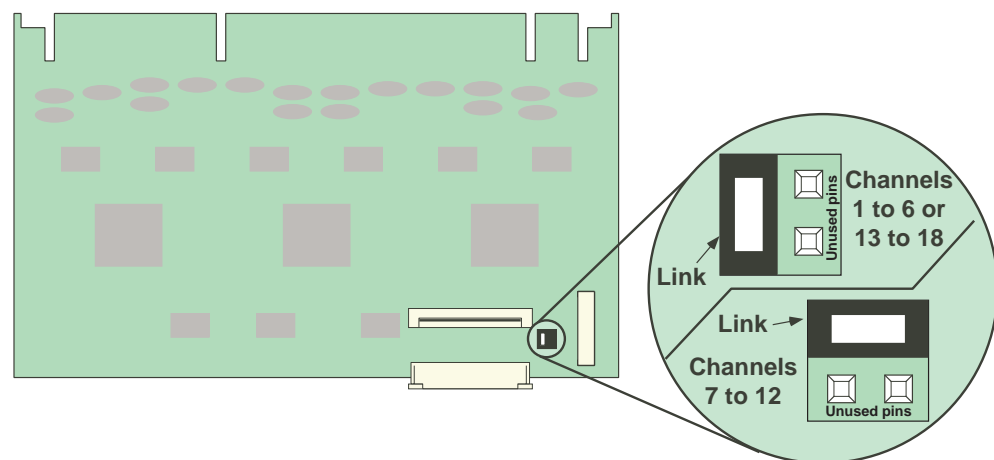
RELAY / EVENT INPUT BOARD SWITCH SETTINGS

Before fitting relay or event input boards, the two elements of the switch located near the front edge of the board must be set to define board number. The figure below, and the accompanying tables give details. (The figure shows a relay board - the event input board is similar.)
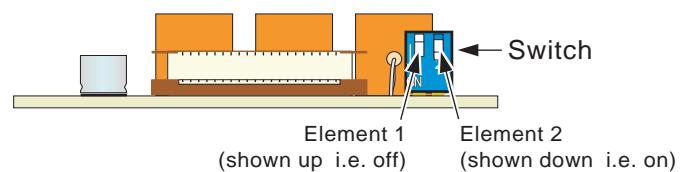
| Relay board No	Switch element	
	1	2
1	Up	Up
2	Up	Up
3	Down	Up
4	Down	Up

Event input board number	Switch element	
	1	2
First	Up	Up
Second	Down	Up
Third	Up	Down
Fourth	Down	Down

Switch

Element 1
(shown up i.e. off)

Element 2
(shown down i.e. on)

INPUT BOARD LINK SETTINGS

Channels
1 to 6 or
13 to 18

Unused pins

Link

Link

Channels
7 to 12

Unused pins

ANALOGUE OUTPUT BOARD LINK SETTINGS

Before fitting an analogue output board, it is necessary to set the board address, according to which output board it is. The address is set by positioning links as shown below.


O/p board 1

O/p board 2
Unused pins
Link

O/p board 3
Unused pins

O/p board 4
Link

Link Link
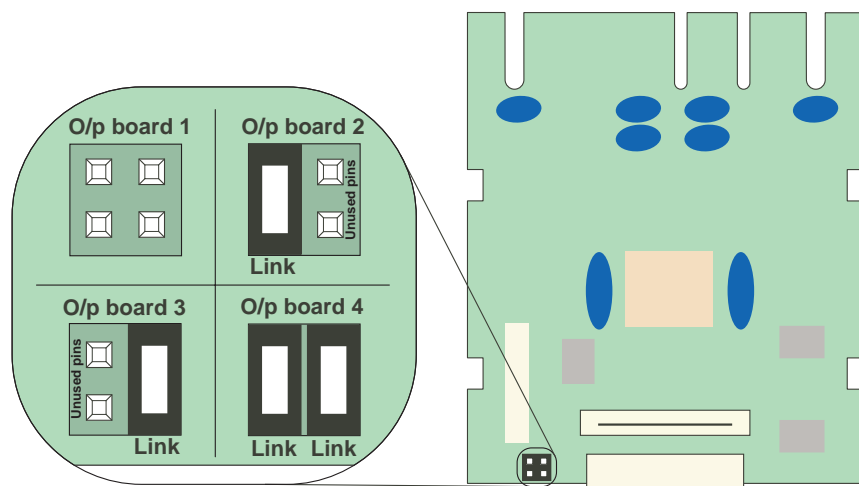
SERIAL COMMUNICATIONS BOARD REPLACEMENT

21

Remove the card cage from the chassis, by removing the two countersunk pozidriv screws (h), and lifting the card cage away whilst disconnecting all the relevant leads as they become available.
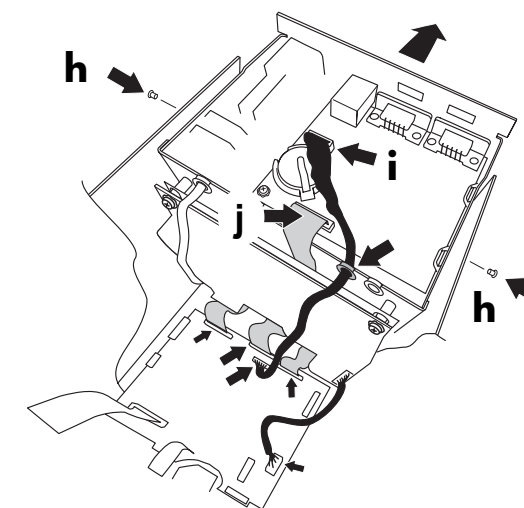
Disconnect the battery lead (i) and lift the harness and grommet out of the slot in the card retainer. If a serial comms flexi (j) is fitted, remove this from its connector.
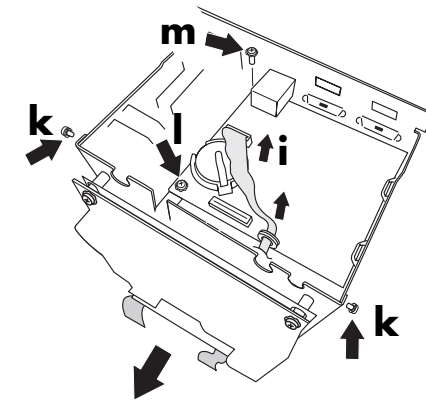

Remove the two Torx-headed screws (k) and the pozidriv screw (l) that secure power supply unit and circuit board retainer to the card cage. Carefully lift the power supply etc. away from the card cage, taking care not to damage the flexi cables.

Remove screw 'm'. The existing card can now be slid out of the card cage. Remove the battery.

If this is the first time the serial comms option has been fitted, lever out the two blanking panels, filling the 9-way D-type apertures, in the same way as is described for 22-way connectors on page 3.

22

If a USB option board is to be fitted, insert the two plastic stand-off pillars into the replacement serial communications board. Take the replacement comms board and slide it into the card cage, securing it with the hex jacking screws (n) and shake-proof washers provided, and with screw 'm' previously removed.
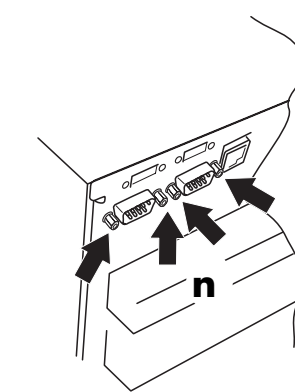

23

Re-secure the power supply/circuit board retainer assembly to the card cage, using screws 'k' and 'l' previously removed. To ensure EMC compliance, the flexicable must emerge from the correct slots in the card retainer, as shown.

If not already in place, take the flexicable supplied with the serial comms board, and with the blue-ended side towards the power supply unit, slide the flexi down between the insulating sheet and the circuit board retainer. Insert the top end of the flexi into connector 'j'.

Fit either a new battery or the battery previously removed. Re-fit the battery loom to its connector (i) on the serial comms board.
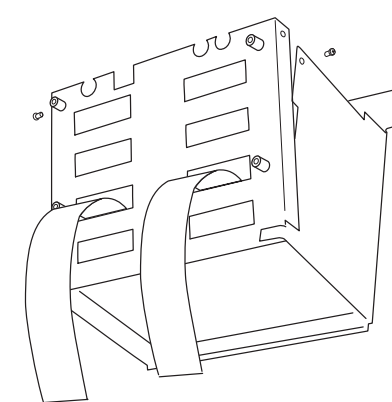
SERIAL COMMUNICATIONS AND USB OPTIONS

This section shows how to retrofit the serial communications and USB option boards. If the boards are being replaced, rather than fitted for the first time, then the user should ignore the irrelevant instructions.

> Note: The serial communications option board replaces the battery/Ethernet board, which is always fitted.

(19)

With the recorder isolated and removed from the panel, remove the top plate, by removing the four Torx-headed screws 'A' and the pan-head pozidriv screw 'B', and then lifting the cover up and out from under the gasket (C).

This reveals the top of the card cage.
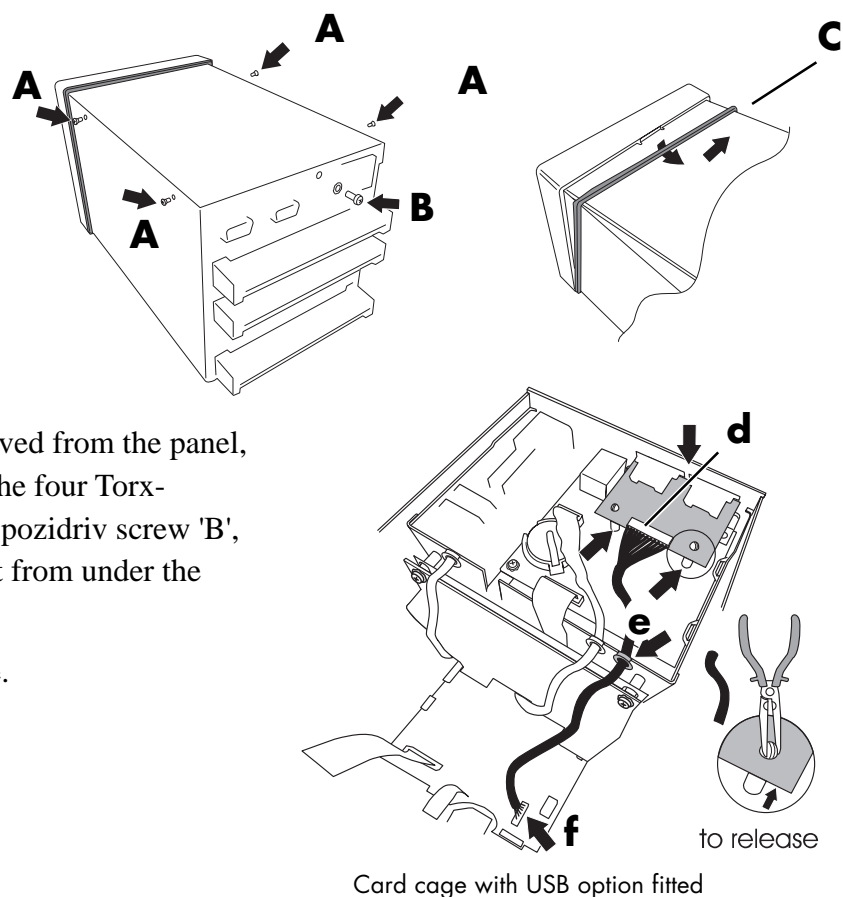
Card cage with USB option fitted

BATTERY/SERIAL COMMS BOARD ACCESS

(20)

If the USB board is fitted, remove it as described below, otherwise continue at instruction 21.

a   Disconnect the cable harness from the USB board connector (d) and lift the harness and grommet (e) out of the card retainer slot.

b   Remove the four securing screws (g) at the rear of the recorder.

c   Taking appropriate static precautions, release the USB board by compressing the split ends of the standoff pillars whilst easing the board off.

This allows access to the Serial communications board.
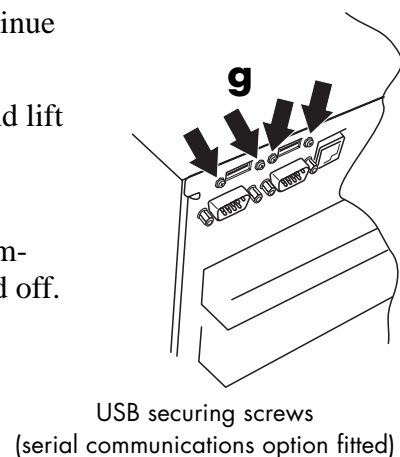
USB securing screws
(serial communications option fitted)

POLARISING PLUGS

In order to avoid accidental insertion of an incorrect board type, it is recommended that a polarising plug be inserted into the board side of the connector in the locations indicated in the table. Failure to do so may damage the recorder. As shown in the figure, the plug is inserted into the connector and the 'handle' is then snapped off.

> Notes:
> 1.   All relay board types have the same polarising key position
> 2.   Input boards do not require polarising plugs.

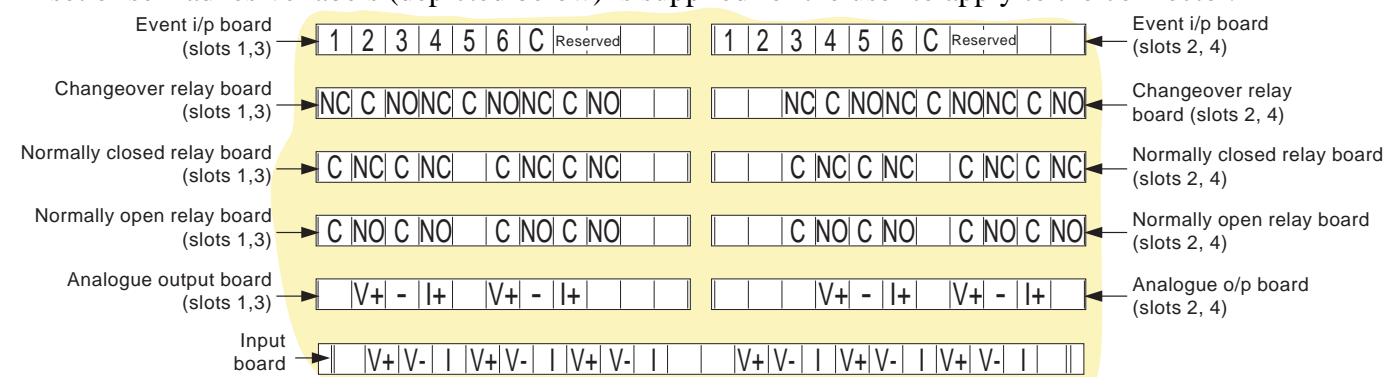| Option board type	Insert plug between contacts:	
	Slots 1,3	Slots 2, 4
Analogue outputs	4 & 5	17 & 18
Event inputs	5 & 6	18 & 19
Relay outputs	6 & 7	19 & 20
Contacts are counted from the left end of the connector, as viewed from the rear of the instrument.		

Insert polarising plug, then snap off 'handle'

Handle — Insert

Snap here
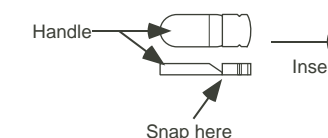
CONNECTOR LABELS

A set of self-adhesive labels (depicted below) is supplied for the user to apply to the connector.

Event i/p board (slots 1,3)
Changeover relay board (slots 1,3)
Normally closed relay board (slots 1,3)
Normally open relay board (slots 1,3)
Analogue output board (slots 1,3)
Input board

Event i/p board (slots 2, 4)
Changeover relay board (slots 2, 4)
Normally closed relay board (slots 2, 4)
Normally open relay board (slots 2, 4)
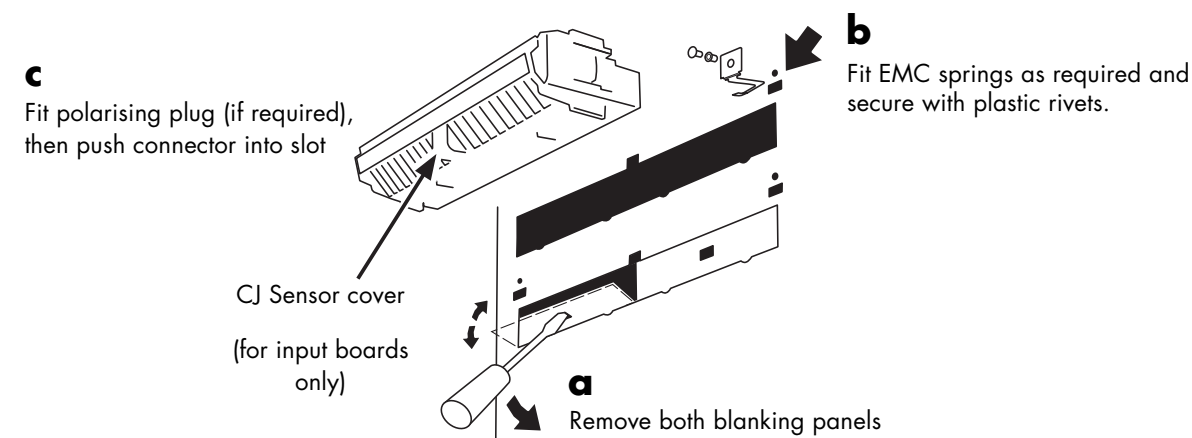Analogue o/p board (slots 2, 4)

CONNECTOR FITTING

EMC springs must be fitted as shown.

Option boards require one EMC spring, fitted at the appropriate end of the connector slot.
Input boards require two EMC springs to be fitted, one at each end of the connector.

c   Fit polarising plug (if required), then push connector into slot

b   Fit EMC springs as required and secure with plastic rivets.

CJ Sensor cover

(for input boards only)

a   Remove both blanking panels

①

With the recorder removed from the panel, remove the top plate, by removing the four Torx-headed screws 'A' and the pan-head pozidriv screw 'B', and then lifting the cover up and out from under the gasket (C).
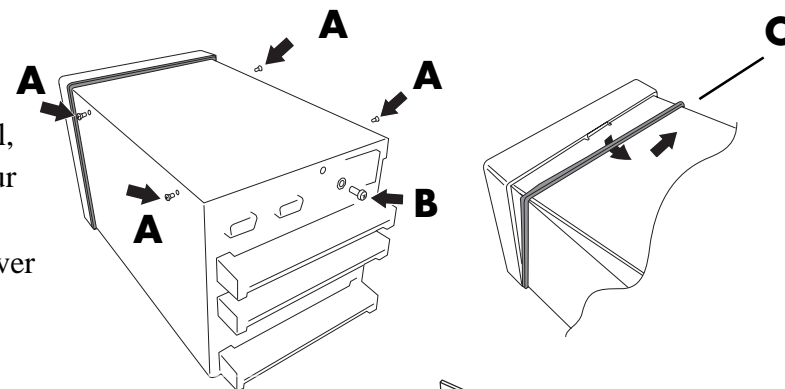
②

Remove screws 'D'. Carefully lift the card cage away from the chassis, disconnecting all harnesses (looms) and ribbon cables as they become accessible.
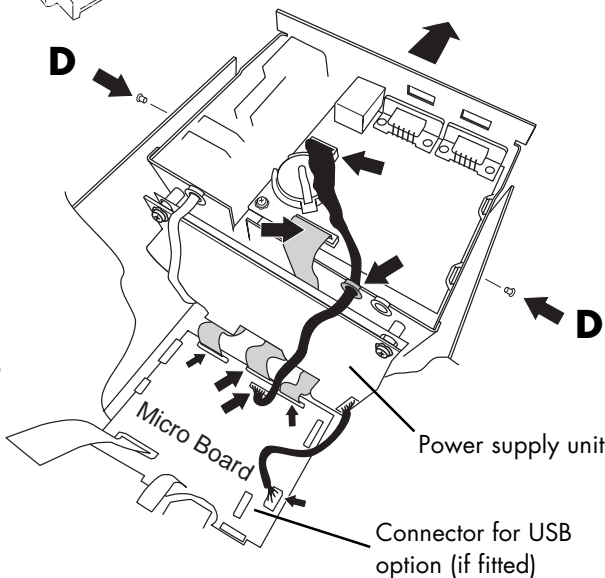
③

If the power supply unit is to be replaced, continue at instruction 4. For i/o boards, continue at instruction 9, or for serial comms or USB options, at instruction 19.

## POWER SUPPLY REPLACEMENT

④

Taking care to avoid any hot components, disconnect the power supply looms.

Remove the PSU from the card cage, by undoing the four screws 'E' and lifting the unit away from the chassis, retaining the insulating 'sheet' for use in re-assembly.

If only the PSU is to be replaced, and if the replacement PSU is of the same type as the existing one (i.e. the supply voltage is not being changed), the new PSU board can now be fitted*, and secured using screws E, previously removed. Reconnect all the connectors previously disconnected and re-assemble the recorder. If input or option boards are also being fitted, continue at instruction 9, and fit the new PSU later, when re-assembling the recorder.

If the replacement PSU is of a different type (e.g. low voltage instead of standard), continue at instruction 5.
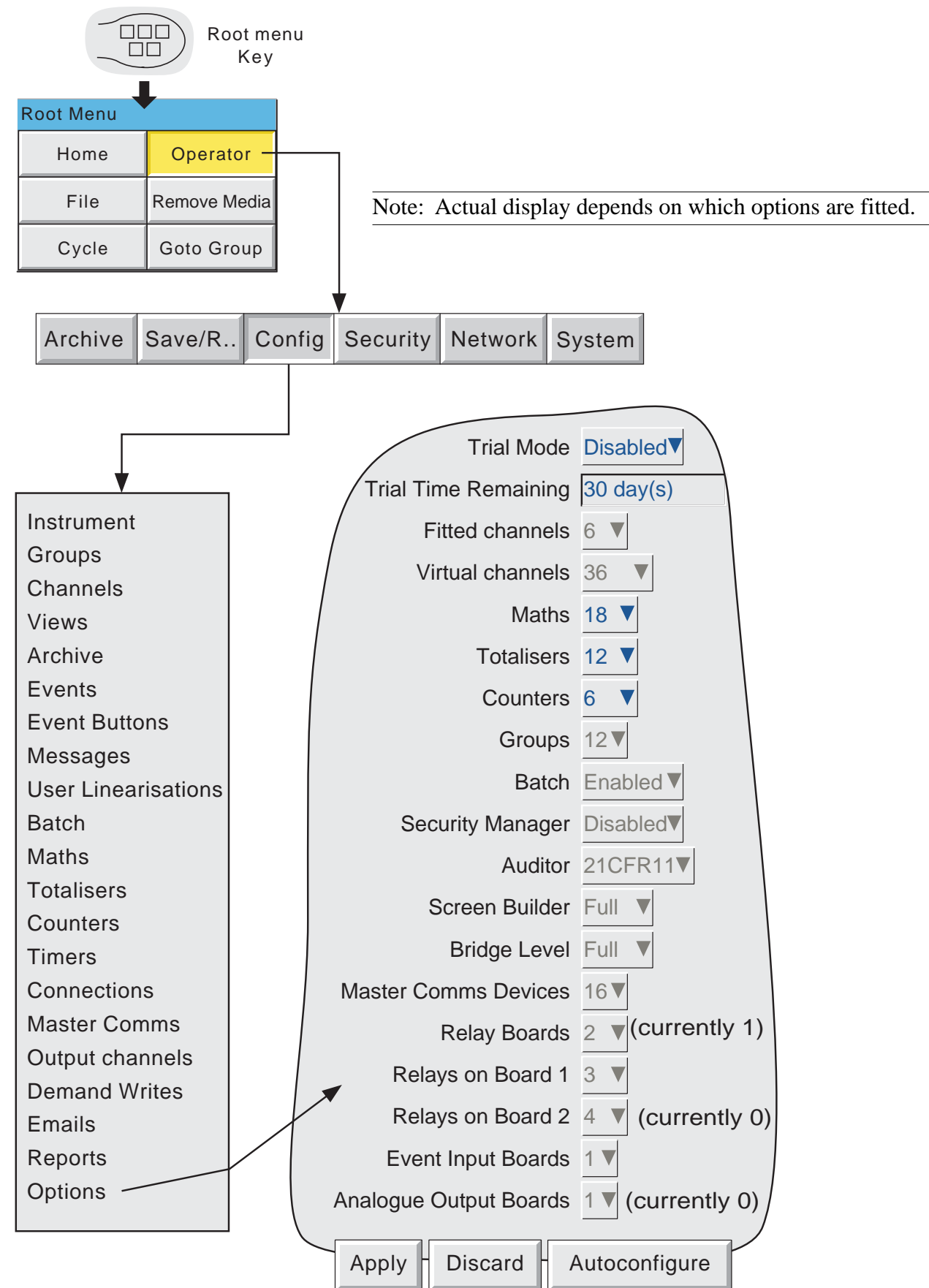
*Note: Ensure that the serial comms flexi (if fitted) runs between the insulating sheet and the card cage.
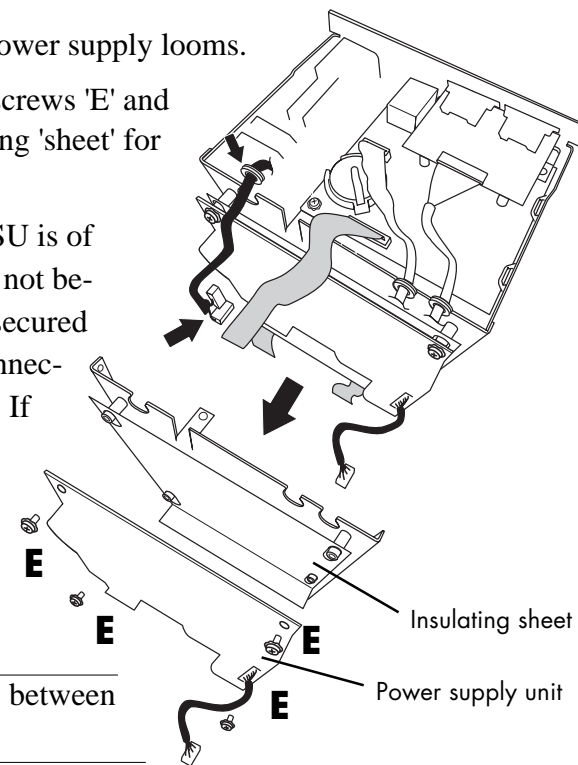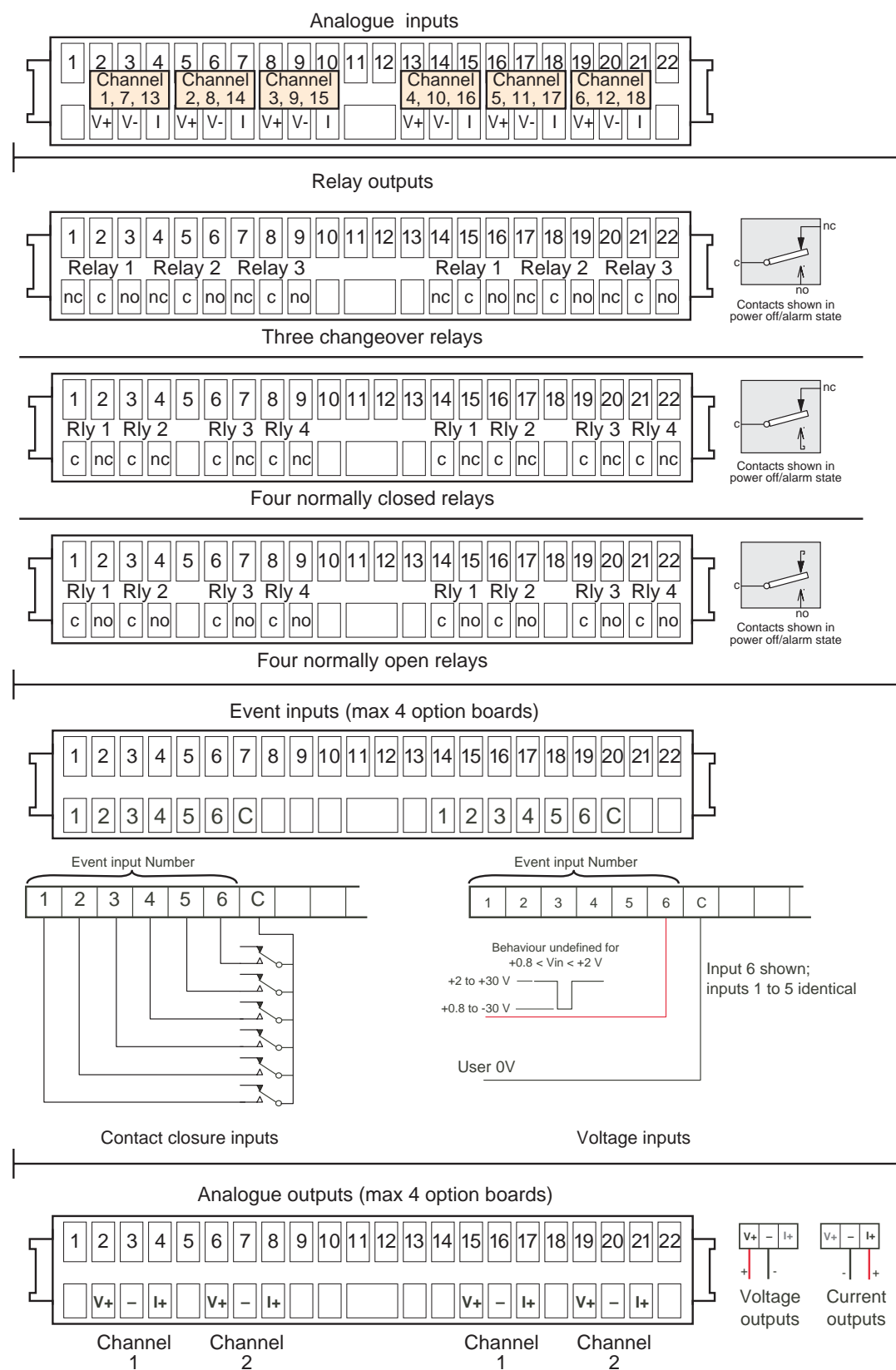
Warning

Ensure that the insulation sheet is not trapped between the Board and any of its standoff pillars.

AUTOCONFIGURE ACCESS

Root menu Key

Note: Actual display depends on which options are fitted.

WIRING DETAILS (CONT.)

Analogue inputs

Relay outputs

Three changeover relays

Contacts shown in power off/alarm state

Four normally closed relays

Contacts shown in power off/alarm state

Four normally open relays

Contacts shown in power off/alarm state

Event inputs (max 4 option boards)

Event input Number

Event input Number

Behaviour undefined for +0.8 < Vin < +2 V

+2 to +30 V

+0.8 to -30 V

Input 6 shown; inputs 1 to 5 identical

User 0V

Contact closure inputs

Voltage inputs

Analogue outputs (max 4 option boards)

Voltage outputs

Current outputs

Channel 1

Channel 2

Channel 1

Channel 2

SUPPLY VOLTAGE CHANGE

Two versions of the power supply unit (PSU) are available, *viz*, Standard and Low Voltage. The standard unit accepts supplies of 85 to 265 Volts, 47 to 63 Hz ac, and 110 to 370Volts dc. The low voltage unit accepts ac supplies of 20 to 42 Volts, 45 to 400 Hz, and dc supplies of 20 to 54 Volts.

When changing PSU versions, the existing supply voltage connector must be replaced with one suited to the supply voltage. This procedure is detailed below, for changing from the standard version to the low voltage version. The description should also be adequate for the situation where it is required, instead, to change from the low voltage version to the standard version.

5

Remove the power cord connector (if fitted) from the rear panel connector. Remove the old PSU as described in instruction 4, above, and fit the replacement PSU physically but without connecting it up.
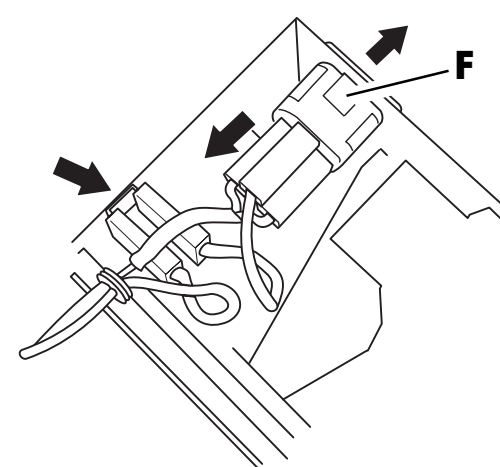
6

Remove the old power harness, by pulling off the three push-on connectors at the rear of the IEC supply voltage connector, and pulling the two push-on safety earth connectors off the 'U' shaped, copper, earth-bonding terminal. Discard the harness

The supply voltage plug can now be removed from the rear panel, by pressing on the two 'clips' or latches, one on top ('F') and two on the underside of the connector.

7

Pass the rectangular connector and associated power leads through the support plate, then through the aperture in the rear panel and finally through the backing plate. Secure the assembly with screws 'G'.

Make the earth connections and connect the supply voltage loom to the new PSU.

Fit the new PSU label

Support plate

Backing plate
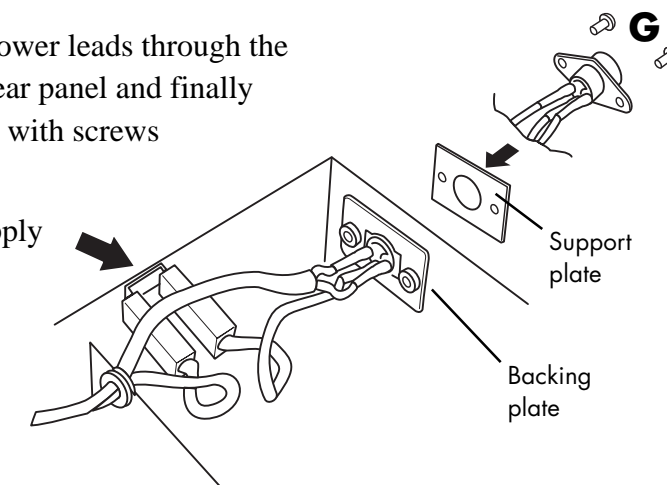
8

If input or option boards are to be replaced, or retro-fitted, please continue at instruction 9.   If not, reassemble the recorder now, ensuring that the insulating sheet is re-installed. See 'Wiring information' on page 10 for dc wiring details.

CIRCUIT BOARD ACCESS

9

Re-assembly detail
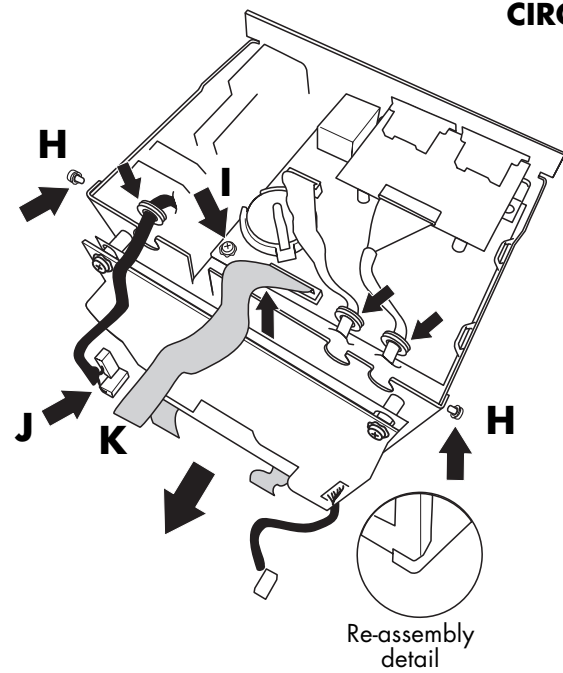
For serial communications and USB options, continue at instruction 19.

Disconnect the PSU connector (J).

If the Serial comms option is fitted, remove the flexi cable (K) from the connector on the Serial comms board. When re-assembling, this flexi is routed between the insulating sheet and the card retainer.

If the USB option is fitted, lift the harness out of the card retainer slot.

Lift the battery and supply voltage harnesses out of their slots in the card retainer.

Remove screws H (Torx) and I. Carefully lift the card retainer up and away from the chassis, ensuring that no damage is caused to the flexi cables.

FITTING FURTHER INPUT BOARDS

10

If necessary, fit extra connectors* and associated EMC springs at the rear of the recorder. Select a label appropriate to the type of new board being added, and apply it to the connector (see page 3).

Continue at instruction 11a, if a further input board is to be fitted, or at instruction 13, if only option boards are being fitted.

*Notes:
1. If required, insert polarising plugs in the appropriate place for the type of board being fitted (see the table on page 3).
2. Input boards require an EMC spring at both ends of the connector. Option boards require one EMC spring each, fitted at the relevant end of the connector.

11a

To fit a second input board, disconnect the flexi cable from the existing input board and the nearest option board (if any).


11b

Set the links for channels 7 to 12 as shown on page 2
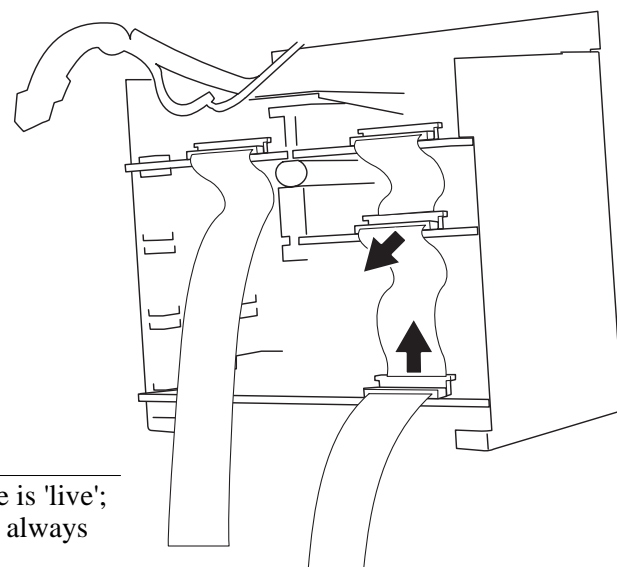
Note: Flexi-cable is not 'double sided'. At the ends, one face is 'live'; the other is insulated. The insulated side of the flexi should always face the latching bar of the connector.

18

Apply power to the recorder. Once initialization is complete it is likely that a request to autoconfigure dialogue page will appear. This is only a reminder - pressing OK does not carry out the Autoconfigure.
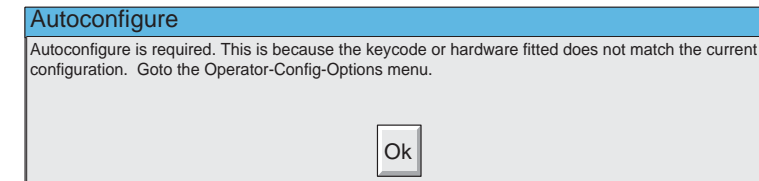

Log in.

Reset the clock as described in 'Clock' in the 'System' section of the user guide.

If necessary (i.e. if a new Serial Communications or other software option has been fitted), enter the option key code as described in 'Upgrade' in the 'System' section of the user guide.

From the Root key menu select Operator, then 'Config', then 'Options'. Press the Autoconfigure key to complete installation (Back Page).
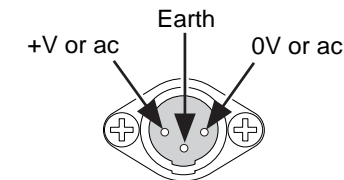
WIRING DETAILS
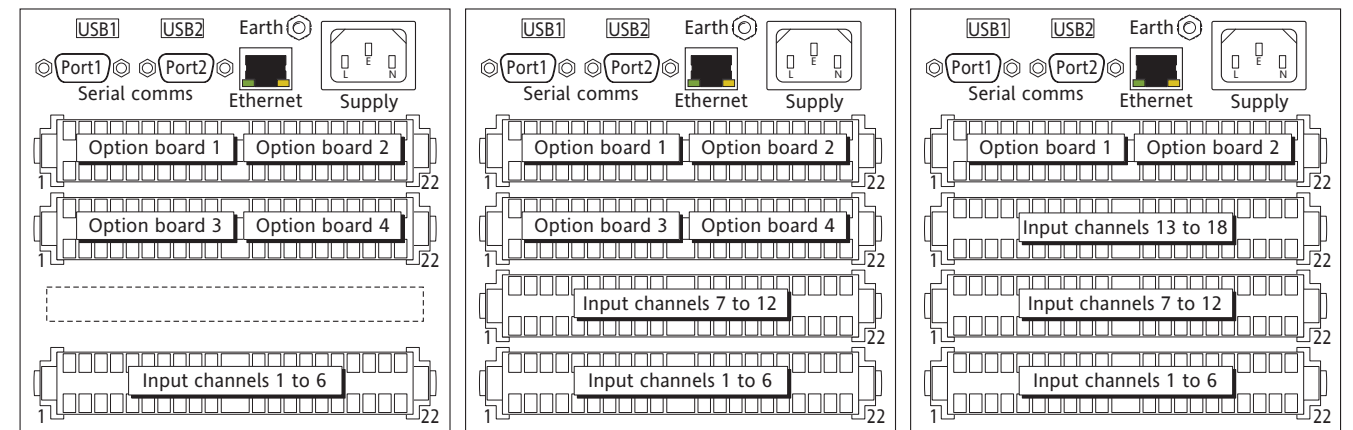
One input board;
up to 4 option boards

Two input boards;
up to 4 option boards
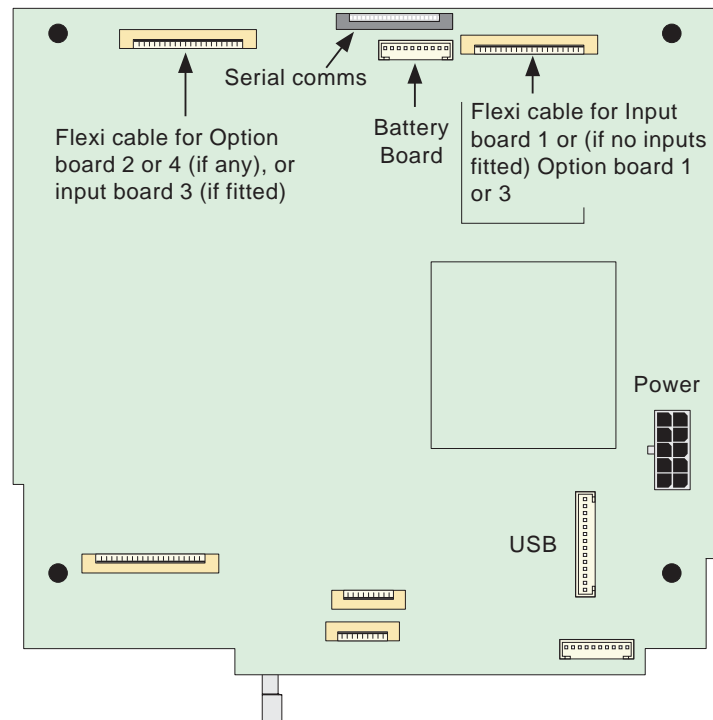
Three input boards;
1 or 2 option boards

DC supply polarity for Low Voltage option

(16)

Carefully re-assemble the recorder, ensuring that both microboard flexi-cables emerge from the correct aperture in the board retainer, as shown opposite, and that the board retainer is correctly located before attempting to secure it. Ensure that all connections to the micro board are secure and that the flexi-cables are securely retained. The figure below shows the relevant connector locations on the micro board.
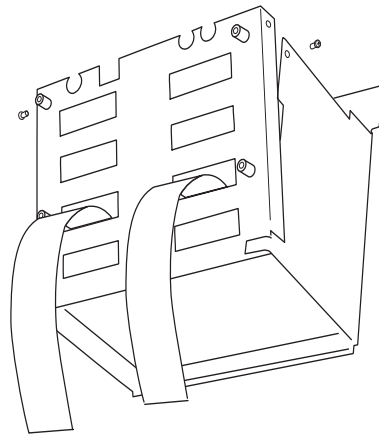
Note: The flexi-cables must be routed as shown in the figure. Otherwise the unit will not be CE compliant when re-assembled.

Flexi cable for Option board 2 or 4 (if any), or input board 3 (if fitted)

Serial comms

Battery Board

Flexi cable for Input board 1 or (if no inputs fitted) Option board 1 or 3

Power

USB

(17)

Wire the new connectors according to the information contained on the following pages.

(11c)

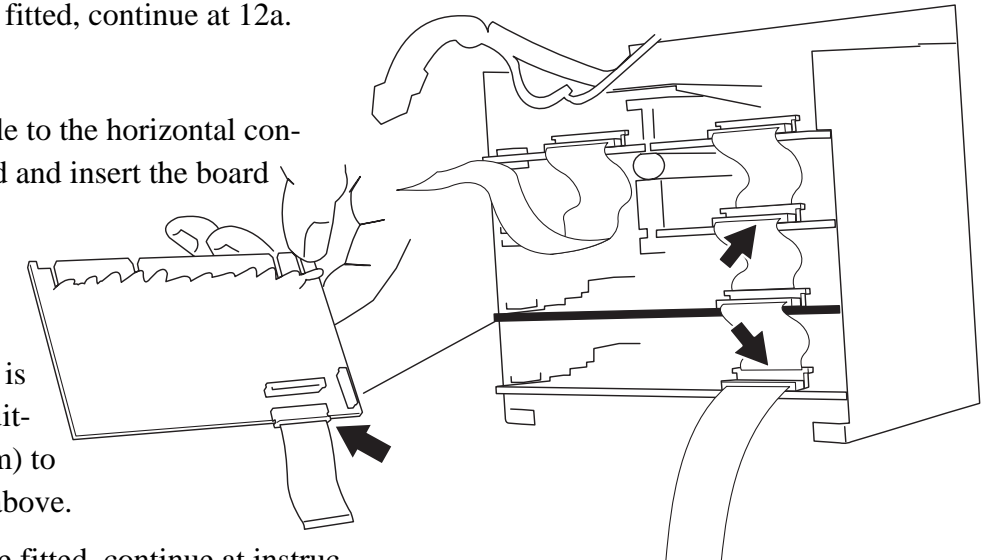If a third input board is to be fitted, continue at 12a.

Otherwise:

Fit a 50 mm length flexi-cable to the horizontal connector of the new input board and insert the board into its slot.

Use the 50 mm flexi to connect to input board 1.

If one or more option boards is fitted, use a flexi-cable of suitable length (50 mm or 75 mm) to connect to the option board above.
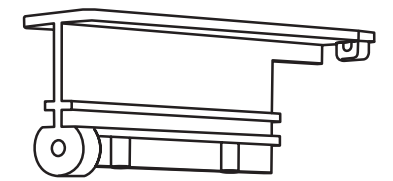

If option boards are also to be fitted, continue at instruction 13. If not, continue at instruction 16.

(12a)

If a third input board is to be fitted, remove all option boards and associated flexi-cables. If a circuit board guide with extension is fitted (as shown in instruction 14), remove the entire circuit board guide (two screws) and replace it with the circuit board guide included as a part of the kit.

Circuit board guide without extension

Set the links for channels 13 to 18 as shown on page 2

12b

Fit a 270 mm length flexi-cable to the horizontal connector of the new input board. Insert the board into its slot. If option board 1 is to be fitted, insert it into slot 1 and use a 75mm length of flexi-cable to connect it to *INPUT BOARD 2*.
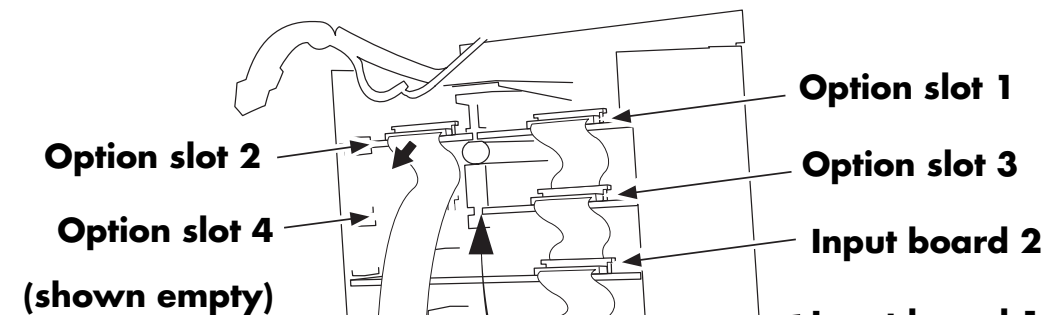
If option board 2 is to be fitted, insert it into its slot, and connect its horizontal connector to the vertical connector of *INPUT BOARD 3*, using a 180mm flexi-cable, folded as shown.

Fold the 270mm flexi-cable as shown, ensuring that it retains its original left-right orientation.

Continue at instruction 16.
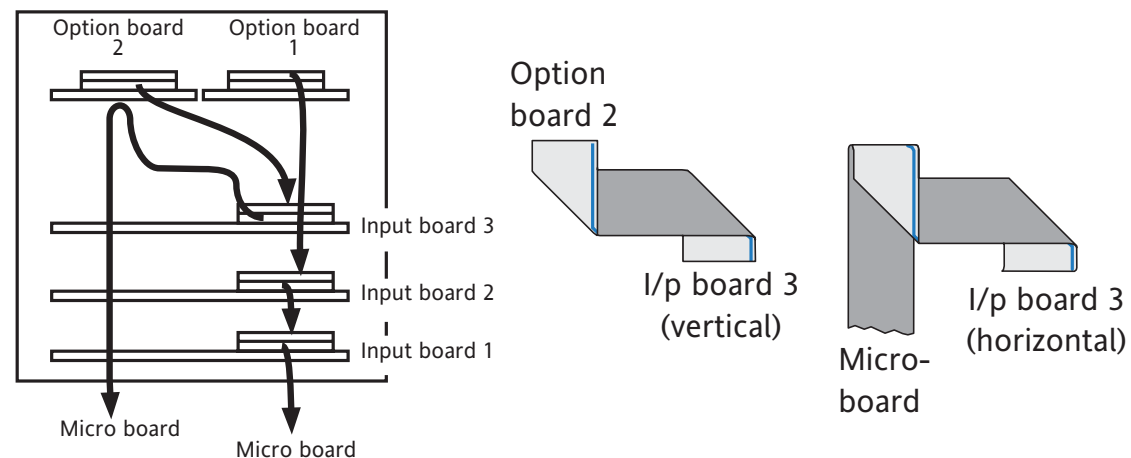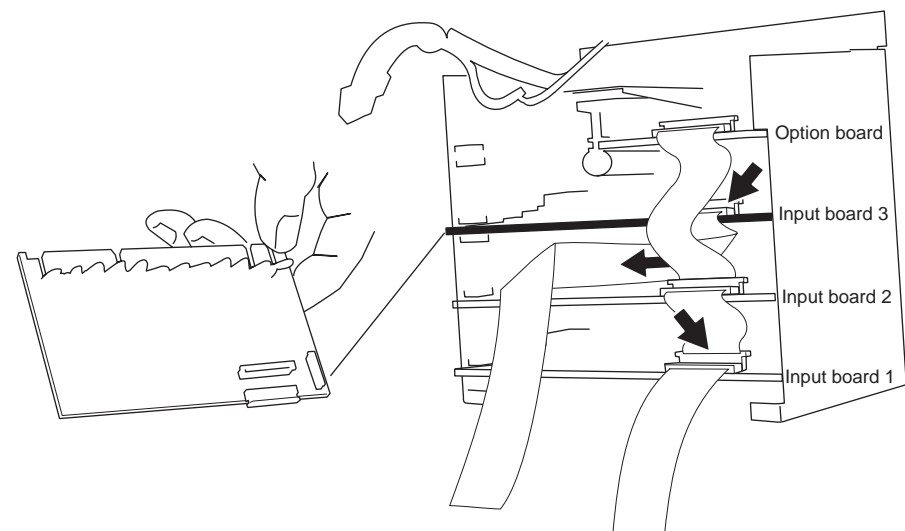
FITTING AN OPTION BOARD

13

Set any relevant switches or links, on the new board(s), as described on page 2. See also the Option Board location rules on page 1.

14

If necessary, add a circuit board guide extension.

15

Option slot 1

If fitting a board into option slot 1, fit the board, and connect it to input (i/p) board 2 (if fitted), using a 75 mm long flexi-cable. If i/p board 2 is not fitted, connect to i/p board 1 (if fitted), using a 125 mm long flexi-cable. If no i/p boards are fitted, connect directly to the microboard using a 180mm flexi-cable.

Option slot 2

If fitting a board to option slot 2, insert a 180 mm long flexi-cable into the horizontal connector and slide the board into its slot. Connect directly to the microboard, or, folded as shown on page 7, to the vertical connector of input board 3 (if fitted).
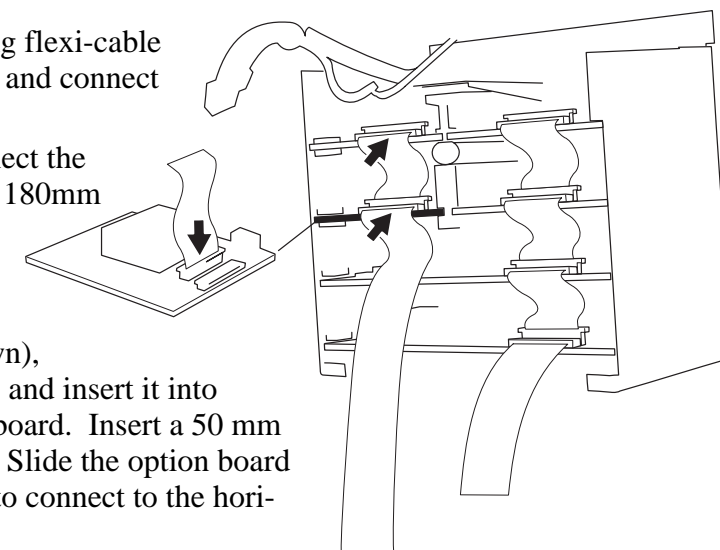
Option slot 3

If fitting a board into option slot 3, remove the flexi-cable between option board 1 and input board 1 (or input board 2, if fitted). Insert a 50 mm long flexi-cable into the vertical connector of the new board. Slide the option board into its slot, and connect it to option board 1 using the 50 mm flexi-cable just fitted.

If input board 2 is fitted, insert a 50 mm long flexi-cable into the option board's horizontal connector and connect the other end to input board 2.

If not, use a 75 mm long flexi-cable to connect the option board to input board 1 (if fitted) or a 180mm long flexi-cable to connect it to the micro board.

Option slot 4

If fitting a board into option slot 4, (as shown), remove the flexi-cable from option board 2, and insert it into the horizontal connector of the new option board. Insert a 50 mm long flexi-cable into the vertical connector. Slide the option board into its slot, and use the 50 mm flexi-cable to connect to the horizontal connector on option board 2.