C1300
Advanced circular chart recorders
Fitting additional pens

1 Introduction
This publication details the fitting of additional pens to the C1300 Advanced Circular Chart Recorder. The work must be carried out by a trained technician. Refer to the User Guide (Part No. IM/C1300) for full operating and programming information following upgrades.

2 Pen Upgrade Kit Identification
Refer to Table 2.1 and Figs. 2.1 to 2.3 for the contents of pen upgrade kits.

<table>
<thead>
<tr>
<th>Kit Number</th>
<th>Purpose</th>
<th>Part No. Taylor Type Chart (1XXX)</th>
<th>Part No. Kent Type Chart (1XXX)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kit 1</td>
<td>Pen 2 upgrade</td>
<td>C1900/1720</td>
<td>C1900/1724</td>
</tr>
<tr>
<td>Kit 1A</td>
<td>Pen 4 upgrade</td>
<td>C1900/1721</td>
<td>C1900/1725</td>
</tr>
<tr>
<td>Kit 2</td>
<td>Pen 3 upgrade</td>
<td>C1900/1722</td>
<td>C1900/1726</td>
</tr>
<tr>
<td>Kit 3</td>
<td>True time event marker</td>
<td>C1900/1723</td>
<td>C1900/1727</td>
</tr>
</tbody>
</table>

Table 2.1 Pen Upgrade Kits

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Information. Due to variations in pen geometry and position of chart fixings it is not possible to convert instruments from one chart/pen type to another, i.e. Taylor to Kent type or vice versa. The 5th letter in the instrument code identifies the chart type (see the Ordering Information contained in the Data Sheet, SS/C1300). For example, a Taylor type chart (13XXJ) can be fitted only to instruments with J in the instrument code number.

Similarly, when fitting additional or replacement pens, ensure that the correct pen arm is used. Pen arms used with Taylor type charts (13XXJ) are identified by a hole located near the motor end of the arm. This hole is not visible on pen arms used with Kent type charts (13XXK).

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Fig. 2.1 Pen Upgrade Kit 1 or 1A

Continued...
...2 Pen Upgrade Kit Identification

![Diagram of Pen Upgrade Kit 2]

- **Kit 2**
  - Pen Motor (C1900/0070)
  - Pen 3
  - Terminal Board (C1900/0305)

**Small Parts Pack**
- Screw x2 (B5974)
- Washer x2 (B6421)
- Cable tie x2 (B5634)
- Ribbon Cable (PXR105/0176)
- Label (C1900/0208)
- Snap Rivet x4 (B12282)
- Eprom (C1300/2001)
- Chip Extractor (B11802)
- Pen capsule (blue) (C1900/0120)

**Display Board**
- (C1900/0446)

**Membrane Overlay**
- Light Grey – C1900/1180
- Blue/Grey – C1900/1181

**I/O Module**
- (C1900/0405)

**Label**
- (C1900/0204)

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![Diagram of Pen Upgrade Kit 3]

- **Taylor Type Chart (13XXJ)**
  - Pen Arm (C1900/0078)
- **Kent Type Chart (13XXK)**
  - Pen Arm (C1900/0077)

**Small Parts Pack**
- Screw x2 (B5974)
- Washer x2 (B6421)
- Cable tie x2 (B5634)
- Pen capsule (violet) C1900/0123

**Pen Motor**
- (C1900/0071)
- Pen 4

**Label**
- (C1900/0204)
### 3.1 Fitting the I/O Module – Figs. 3.1 and 3.2

**Warning.** Before making any connections, ensure that the power supply, any high voltage-operated control circuits and high common mode voltages are switched off.

1. Disconnect the recorder’s power supply.
2. Open the door and chart plate.

**Caution.** The recorder is vulnerable to electrostatic damage. Wear an anti-static strap or place the unit on an anti-static workbench.

3. Identify the module position – see Fig. 3.1.

**Notes.**
- Module positions 2 and 3 can also be used for additional I/O modules (module types 1 and 2) for use with math functions.
- The module type is marked on the component side of the PCB.

![Fig. 3.1 Module Positions and Functions](image)

**Note.** If pen 3 is to be installed (Pen Upgrade Kit 2), refer to Section 3.3 to fit the Display Board and Membrane Overlay.

Continued…
d) If necessary, remove and discard appropriate knockout from the recorder’s case.

**Note.** Remove knockouts by striking from the *inside* of the case, taking great care not to damage any internal components. Alternatively, drill out to 0.875 in. (22.2mm) using a suitable drill bit.

e) Carefully clean out hole and ensure all debris is removed from inside the recorder.

f) Route the leads and cables into the case.

**Note.** If NEMA 4X hosedown standard is to be maintained, suitable cable glands *must* be used to prevent water ingress.

g) Fit the I/O module as detailed in Fig. 3.2.

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**Fig. 3.2 Fitting the I/O Module**
3.2 Fitting the Motor and Pen Assembly – Fig. 3.3

**Warning.** Before making any connections, ensure that the power supply, any high voltage-operated control circuits and high common mode voltages are switched off.

a) Disconnect the recorder’s power supply.
b) Open the door and chart plate.

**Caution.** The recorder is vulnerable to electrostatic damage. Wear an anti-static strap or place the unit on an anti-static workbench.

Fit the motor and pen assembly as detailed in Fig. 3.3.
3.3 Fitting the Display Board and Membrane Overlay – Figs. 3.4 and 3.5

**Note.** This section is applicable only if installing pen 3 (Pen Upgrade Kit 2).

**Warning.** Before making any connections, ensure that the power supply, any high voltage-operated control circuits and high common mode voltages are switched off.

a) Disconnect the recorder’s power supply.
b) Open the door and chart plate.

**Caution.** The recorder is vulnerable to electrostatic damage. Wear an anti-static strap or place the unit on an anti-static workbench.

c) Fit the display board and membrane overlay as detailed in Fig. 3.4.

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**Fig. 3.4 Fitting the Display Board and Membrane Overlay**

1. Loosen screw
2. Remove screw...
3. ...and slide the display cover away from the door
4. From the inside of the door, push the clear plastic blanking plate outwards to remove the self adhesive blanking plate from the outside of the door. Remove any residual adhesive from the door recess using petroleum ether.
5. Peel the protective paper from the back of the self-adhesive display overlay and, ensuring correct orientation, insert the overlay in the recess in the outside of the door. Press firmly into position.
6. Position the display board over the locating pins adjacent to each of the four rivet holes on the inside of the door.
7. Secure the display board to the door using four snap rivets
8. Link the display boards using the ribbon cable supplied...
9. ...Ensuring ribbon cable positioned as shown
10. Replace the display cover by reversing steps 2 and 3
...3.3 Fitting the Display Board and Membrane Overlay – Figs. 3.4 and 3.5

d) Replace the EPROM as detailed in Fig. 3.5.
e) Close the chart plate and door.
f) Restore the recorder’s power supply.

Fig. 3.5 Replacing the EPROM
3.4 Commissioning

a) Access to the Commissioning Level is prevented by a security link on the recorder’s main board. Set the security link to the OFF position – see Fig. 3.6.

b) Close the chart plate and door.

c) Restore the recorder’s power supply.

3.4.1 Instrument Setup

Instrument Setup

Press the key to open the Main Menu.

Highlight Calibration.

Press and hold the key and press the key to access the Commissioning Level.

Highlight Instrument Setup.

Instrument Type

Select the instrument type required:

C131xx

- chart type
  - C – Chessel Brand charts
  - J – Taylor type charts (13XXJ)
  - K – Kent type charts (13XXK)

- number of pens
  - 1 – One pen (red)
  - 2 – Two pens (red, green)
  - 3 – Three pens (red, green, blue)
  - 4 – Four pens (red, green, blue, black)

Continued on next page.
3.4.1 Instrument Setup

**True Event Pen**

*Note.* For use only when installing Pen Upgrade Kit 3 (True Time Event Marker).

Select **YES** to enable the true time event option.

**Instrument Type Update**

Displayed to indicate that the instrument type has been updated.

**Company Standard**

Select **YES** to reset all configuration parameters to the Company Standard configuration.

*Note.* **YES** is displayed momentarily to indicate that all configuration parameters have been reset to Company Standard. The display then reverts to **NO**.

**Line Rejection**

Set to frequency of local mains power supplies to ensure maximum noise rejection on analog inputs.

**Security Type**

Select type of Configuration Level security required:

- **A** – Security code protected
- **B** – No access

**Totalizer Log Reset**

Select **YES** to reset all totalizer logs.

*Note.* **YES** is displayed momentarily to indicate that all totalizers have been reset to Zero. The display then reverts to **NO**.

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3.4.2 Hardware Calibration

Hardware Calibration
Press the key to open the Main Menu.

Highlight Hardware Calibration.

Select Calibration Function
Select the pen to calibrate.

Set Pen x High
The selected pen moves to its 100% position on the chart. Use the and keys to position the pen on the 100% line on the chart.

Set Pen x Low
The selected pen moves to its 0% position on the chart. Use the and keys to position the pen on the 0% line on the chart.

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Note. This Section is applicable only if Pen Upgrade Kit 2 (Pen 3) has been installed.

Display Setup & Test

Press the key to open the Main Menu.

Highlight Display Setup & Test.

Contrast 1

Set the required screen contrast for display 1.

Contrast 2

Set the required screen contrast for display 2.

Brightness 1

Set the required brightness for display 1.

Brightness 2

Set the required brightness for display 2.

Display Mode

Set the required display mode:

- Normal — White text on blue background
- Inverted — Blue text on white background

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Completion
a) Disconnect the recorder’s power supply.
b) Open the door and chart plate.
c) Set the security link to the ON position – see Fig. 3.6.
d) Write the upgrade kit number on the label supplied with the upgrade kit and attach the label to the recorder – see Fig. 4.1.
e) Close the chart plate and door.
f) Restore the recorder’s power supply.
f) Refer to Section 3 of the User Guide (IM/C1300) and configure the recorder.