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1 INTRODUCTION

The Pluto 6 Controller board is the next generation controller in the Pluto family of products. It builds on the proven reliability and technical excellence of Pluto 5 and provides improved performance and flexibility.

Further information can be found in the PLUTO 6 SOFTWARE HELP FILE (Heber Part no. 80-17314).

Queries that are not covered by this manual should be sent by email to support@heber.co.uk

2 DIFFERENCES FROM PLUTO 5

The Pluto 6 Controller board is an upgrade to the standard Pluto 5 board to meet the new demands of the gaming market. The following is a list of performance upgrades and additional functionality:

- **Processor**; the Motorola 68304 processor upgraded to the Motorola ColdFire® MCF5206e running at 40Mhz.
- **Programme Memory**; on-board EPROM's have been replaced by a Compact Flash card shown in figure 1.
- **Audio**; the OKI sound system has been replaced with a flexible software driven audio system. This provides flexibility of audio format and the number of implemented audio channels.
- **Power Off Switch Monitoring**; standard monitoring of up to 4 switch inputs while power is removed from the board.
- **Real Time Clock**; now a standard function.
- **Hi²/ccTalk**; a dual interface has been added as standard.
- **RS485**; a low cost RS485 option has been added for multi-player style machines.
- **Stake/Prize keys**; dedicated inputs have been added for the stake and prize keys.

![Figure 1 - Compact Flash Card](image)
3 SPECIFICATION

The Pluto 6 Controller specification is shown in table 1. A mechanical layout is shown in figure 2 and a photo is shown in figure 3.

This specification may be subject to change without notification.

<table>
<thead>
<tr>
<th>FEATURE</th>
<th>Pluto 6 Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Processor</td>
<td>Motorola ColdFire® MCF5206e @ 40MHz.</td>
</tr>
<tr>
<td>Flash</td>
<td>Boot flash socket capable of accepting up to 512Kbyte.</td>
</tr>
<tr>
<td>RAM</td>
<td>256K bytes (128Kx16), battery backed static RAM with Battery Fail Monitor</td>
</tr>
<tr>
<td></td>
<td>2Mbytes EDO DRAM</td>
</tr>
<tr>
<td>Program Memory Options</td>
<td>1 off Compact Flash (CF) Slot.</td>
</tr>
<tr>
<td></td>
<td>1 off IDE port for Hard Disk or CD-ROM</td>
</tr>
<tr>
<td></td>
<td>EPROM/FLASH Card in DIN41612 socket.</td>
</tr>
<tr>
<td>Software Security</td>
<td>Multi Level Software protection mechanisms</td>
</tr>
<tr>
<td>Sound</td>
<td>Stereo Codec with software multichannel mixing.</td>
</tr>
<tr>
<td>Audio Amplifier</td>
<td>5W + 5W, Software controlled volume</td>
</tr>
<tr>
<td>Real Time Clock</td>
<td>Yes</td>
</tr>
<tr>
<td>Lamp Multiplex</td>
<td>256 Lamps, 12V/1.2W, 48V supply</td>
</tr>
<tr>
<td>LED Multiplex</td>
<td>32 digits, 7 Segment LED (256 segments)</td>
</tr>
<tr>
<td>Multiplex Features</td>
<td>Current sensing to allow test for both “Bulb Present” and “Bulb Short”</td>
</tr>
<tr>
<td></td>
<td>May be expanded externally by up to 512 Lamps or 512 LED Segments</td>
</tr>
<tr>
<td></td>
<td>Fully independent setting of each Lamp/LED to 1 of 8 brightness levels.</td>
</tr>
<tr>
<td>Outputs</td>
<td>64 off 250mA Open Drain Outputs (TPIC6259).</td>
</tr>
<tr>
<td>Inputs</td>
<td>32 off Inputs +5V CMOS thresholds with +5V pull-ups.</td>
</tr>
<tr>
<td>Low Power Outputs</td>
<td>6 off 100mA Open Drain outputs with +5V pull-ups</td>
</tr>
<tr>
<td>Input / Output Expansion</td>
<td>Input / Output Bus Expansion Connector</td>
</tr>
<tr>
<td>I²C</td>
<td>External I²C bus connector</td>
</tr>
<tr>
<td>Security</td>
<td>Current Sensed Meter Supply</td>
</tr>
<tr>
<td>DIL Switches</td>
<td>2 off 8 way DIL Switches</td>
</tr>
<tr>
<td>Serial Ports</td>
<td>4 off RS232 Levels (including one configured as BACTA Dataport).</td>
</tr>
<tr>
<td></td>
<td>1 off TTL level.</td>
</tr>
<tr>
<td></td>
<td>1 off RS485 level.</td>
</tr>
<tr>
<td></td>
<td>2 off Hi²/ccTalk levels.</td>
</tr>
<tr>
<td></td>
<td>4 UARTs on standard Pluto 6.</td>
</tr>
<tr>
<td></td>
<td>Socket for optional DUART to provide a total of 6 UARTs.</td>
</tr>
<tr>
<td></td>
<td>All routing between UARTs and Serial Ports under software control.</td>
</tr>
<tr>
<td>Percentage/Prize Keys</td>
<td>Dedicated connectors</td>
</tr>
<tr>
<td>Power-Down Security Monitoring</td>
<td>Up to 4 switch inputs</td>
</tr>
<tr>
<td>Video Expansion</td>
<td>Optional Single or Dual Video expansion via 2 168pin DIMM sockets.</td>
</tr>
</tbody>
</table>
3.1 Video Add-on Capabilities

Video performance can be added to Pluto 6 with the Calypso 32 video expansion card.

Pluto 6 boards with the PCB part number: 56-16310 can be used with a single Calypso 32 card.
Pluto 6 boards with the PCB part number: 56-17800 can be used with one or two Calypso 32 cards.
When two Calypso 32 cards are used, Pluto 6 provides dual video.

The Calypso 32 card is designed around the Fujitsu Cremson graphics processor and has 32Mbytes of video memory. For more information see the PLUTO 6 CALYPSO 32 VIDEO CARD USER MANUAL (Heber Part no. 80-16538).

3.2 Identifying the Version of your Pluto 6 Board

Pluto 6 boards with a single VGA connector (labelled P24 on the PCB) can only be used with a single Calypso 32 card. These boards can be identified by the part number: 56-16310-I (where I is the Issue Number).

Pluto 6 boards with two VGA connectors (labelled P24 and P25 on the PCB) can be used with a single Calypso 32 card or two Calypso 32 cards. These boards can be identified by the part number: 56-17800-I (where I is the Issue Number).

The PCB part number and issue number are printed on the back of a Pluto 6 board.

3.3 Mechanical Construction

Pluto 6 is manufactured as a multilayer PCB assembly of dimensions 206mm x 282mm (8.1” x 11.1”).

3.4 Power Supply Requirements

Pluto 6 requires the following power supplies and signals (applied to connector P18):

- +12V. Also provides supply for LED drive, audio amplifier, current sensing +12V output and distributed to various I/O connectors.
- +5V. Internally regulated to provide +3.3V supplies for CPU and FPGA.
- +48V. This is the Multiplexed lamp supply.
- -12V. Used for the RS232 transmitters and distributed to the Dataport connector, P24.
- Power fail signal, active low input connected to pin 10.

Customers with applications where a +48V supply is required may wish to look at the Sanken SP5077W. Customers with applications that do not require a +48V supply may wish to look at PC ATX power supplies. When using this type of supply customers should always check the minimum loading requirements.

3.5 Input / Output connectors

3.5.1 Schedule of Connector Types

The Pluto 6 Controller uses five different families of connectors:

- AMP MTA-100, 2.54mm single in-line headers with friction lock and bump polarisation.
- AMP MTA-156, 3.96mm single in-line headers with friction lock and bump polarisation.
- AMP LOW PROFILE BOX HEADER, 2.54mm dual row headers with bump polarisation.
- 25 way “D” Type header.
- 15 way hi density “D” type header (only used when Calypso 32 is fitted).
### 3.5.2 Summary of Connectors

**Table 2 - Summary of Connectors**

<table>
<thead>
<tr>
<th>IDENT</th>
<th>CONNECTOR TYPE</th>
<th>LABEL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>168w DIMM Connector</td>
<td>EXP 1</td>
<td>Video Expansion Daughter Board</td>
</tr>
<tr>
<td>P2</td>
<td>168w DIMM Connector</td>
<td>EXP 0</td>
<td>Video Expansion Daughter Board</td>
</tr>
<tr>
<td>P3</td>
<td>96w DIN41612</td>
<td>Memory Expansion</td>
<td>Memory Daughter Board</td>
</tr>
<tr>
<td>P4</td>
<td>26w 0.1” Low Profile Box Header</td>
<td>BDM</td>
<td>ColdFire® Debug Connector</td>
</tr>
<tr>
<td>P5</td>
<td>40w 0.1” Low Profile Box Header</td>
<td>IDE</td>
<td>IDE</td>
</tr>
<tr>
<td>P6</td>
<td>50w Compact Flash</td>
<td>CF</td>
<td>Compact Flash Socket</td>
</tr>
<tr>
<td>P7</td>
<td>14w 0.1” Low Profile Box Header</td>
<td>%AGE/ STAKE</td>
<td>Percentage/Stake Keys</td>
</tr>
<tr>
<td>P8</td>
<td>10w 0.1” Low Profile Box Header</td>
<td>SECURITY</td>
<td>Power-down Switch Monitor x 4</td>
</tr>
<tr>
<td>P9</td>
<td>18w AMP MTA-100 Header</td>
<td>LAMP SINKS</td>
<td>Multiplex Lamp Column Sinks</td>
</tr>
<tr>
<td>P10</td>
<td>34w 0.1” Low Profile Box Header</td>
<td>LEDs</td>
<td>Multiplex LEDs</td>
</tr>
<tr>
<td>P11</td>
<td>17w AMP MTA-100 Header</td>
<td>LAMP SRC</td>
<td>Multiplex Lamp Row Sources</td>
</tr>
<tr>
<td>P12</td>
<td>50w 0.1” Low Profile Box Header</td>
<td>REELS</td>
<td>Reels (24 OP / 6 IP)</td>
</tr>
<tr>
<td>P13</td>
<td>34w 0.1” Low Profile Header</td>
<td>I/O 2</td>
<td>I/O 2 (16 OP / 14 IP)</td>
</tr>
<tr>
<td>P14</td>
<td>40w 0.1” Low Profile Header</td>
<td>I/O 1</td>
<td>I/O 1 (24 OP / 12 IP)</td>
</tr>
<tr>
<td>P15</td>
<td>9w AMP MTA-100 Header</td>
<td>AUX Ops</td>
<td>Low Power Outputs (x6)</td>
</tr>
<tr>
<td>P16</td>
<td>8w AMP MTA-100 Header</td>
<td>MPX EXP</td>
<td>Multiplex Expansion</td>
</tr>
<tr>
<td>P17</td>
<td>26w 0.1” Low Profile Box Header</td>
<td>I/O EXP BUS</td>
<td>I/O Expansion Bus</td>
</tr>
<tr>
<td>P18</td>
<td>11w AMP MTA-156 Header</td>
<td>POWER</td>
<td>Power In</td>
</tr>
<tr>
<td>P19</td>
<td>6w AMP MTA-100 Header</td>
<td>LS</td>
<td>Loudspeakers</td>
</tr>
<tr>
<td>P20</td>
<td>20w 0.1” Low Profile Box Header</td>
<td>HI²/ccTalk</td>
<td>HI²/ccTalk CH1 &amp; CH2</td>
</tr>
<tr>
<td>P21</td>
<td>16w 0.1” Low Profile Box Header</td>
<td>RS232 A/C/D</td>
<td>RS232 Serial Ports A, C &amp; D</td>
</tr>
<tr>
<td>P22</td>
<td>25w D Socket</td>
<td>DATAPORT</td>
<td>RS232 Serial Port B (Dataport)</td>
</tr>
<tr>
<td>P23</td>
<td>12w AMP MTA-100 Header</td>
<td>TTL/RS485</td>
<td>TTL Serial/RS485 Serial</td>
</tr>
<tr>
<td>P24</td>
<td>15w Sub-miniature D Socket</td>
<td>VIDEO EXP 0</td>
<td>VGA Video Out</td>
</tr>
<tr>
<td>P25</td>
<td>15w Sub-miniature D Socket</td>
<td>VIDEO EXP 1</td>
<td>VGA Video Out</td>
</tr>
<tr>
<td>P26</td>
<td>7w AMP MTA-100 Header</td>
<td>Reserved for future expansion.</td>
<td></td>
</tr>
<tr>
<td>P27</td>
<td>5w AMP MTA-100 Header</td>
<td>I²C</td>
<td>I²C Bus</td>
</tr>
</tbody>
</table>
3.5.3 **P1 and P2 - Expansion Connectors EXP 0 and EXP 1**

Reference: P1 and P2  
Type: 168 Way DIMM Connector  
Description: Expansion Connectors EXP 0 and EXP 1

Designed for use with the Calypso 32 video add-on card.

3.5.4 **P3 - Memory Expansion Connector EXP3**

Reference: P3  
Type: 96 Way DIN41612 (3 rows x 32 pins)  
Description: Memory Expansion Connector. Designed for use with Pluto 6 EPROM card.

---

**3.5.4.1 P3A**

<table>
<thead>
<tr>
<th>A1</th>
<th>Address bus 0</th>
</tr>
</thead>
<tbody>
<tr>
<td>A2</td>
<td>Address bus 2</td>
</tr>
<tr>
<td>A3</td>
<td>Address bus 4</td>
</tr>
<tr>
<td>A4</td>
<td>Address bus 6</td>
</tr>
<tr>
<td>A5</td>
<td>Address bus 8</td>
</tr>
<tr>
<td>A6</td>
<td>Address bus 10</td>
</tr>
<tr>
<td>A7</td>
<td>Address bus 12</td>
</tr>
<tr>
<td>A8</td>
<td>Address bus 14</td>
</tr>
<tr>
<td>A9</td>
<td>Address bus 16</td>
</tr>
<tr>
<td>A10</td>
<td>Address bus 18</td>
</tr>
<tr>
<td>A11</td>
<td>Address bus 20</td>
</tr>
<tr>
<td>A12</td>
<td>Address bus 22</td>
</tr>
<tr>
<td>A13</td>
<td>Address bus 24</td>
</tr>
<tr>
<td>A14</td>
<td>Chip select 1 Upper Byte -</td>
</tr>
<tr>
<td>A15</td>
<td>Chip select 1 Lower Byte -</td>
</tr>
<tr>
<td>A16</td>
<td>RAM Expansion Output Enable</td>
</tr>
<tr>
<td>A17</td>
<td>RAM Expansion Write Enable</td>
</tr>
<tr>
<td>A18</td>
<td>RAM Expansion Chip Select 0</td>
</tr>
<tr>
<td>A19</td>
<td>Read/Write Signal</td>
</tr>
<tr>
<td>A20</td>
<td>Expansion Detect</td>
</tr>
<tr>
<td>A21</td>
<td>Ground</td>
</tr>
<tr>
<td>A22</td>
<td>Ground</td>
</tr>
<tr>
<td>A23</td>
<td>Ground</td>
</tr>
<tr>
<td>A24</td>
<td>Ground</td>
</tr>
<tr>
<td>A25</td>
<td>Ground</td>
</tr>
<tr>
<td>A26</td>
<td>Ground</td>
</tr>
<tr>
<td>A27</td>
<td>Ground</td>
</tr>
<tr>
<td>A28</td>
<td>Ground</td>
</tr>
<tr>
<td>A29</td>
<td>Ground</td>
</tr>
<tr>
<td>A30</td>
<td>Ground</td>
</tr>
<tr>
<td>A31</td>
<td>Ground</td>
</tr>
<tr>
<td>A32</td>
<td>Battery Feed Output (from Pluto 6 board)</td>
</tr>
</tbody>
</table>
3.5.4.2 P3B

There are no connections to pins B1 to B32 (middle row of connector P3).

3.5.4.3 P3C

| C1  | Address bus 1 |
| C2  | Address bus 3 |
| C3  | Address bus 5 |
| C4  | Address bus 7 |
| C5  | Address bus 9 |
| C6  | Address bus 11 |
| C7  | Address bus 13 |
| C8  | Address bus 15 |
| C9  | Address bus 17 |
| C10 | Address bus 19 |
| C11 | Address bus 21 |
| C12 | Address bus 23 |
| C13 | +5V Output   |
| C14 | Data bus 16  |
| C15 | Data bus 17  |
| C16 | Data bus 18  |
| C17 | Data bus 19  |
| C18 | Data bus 20  |
| C19 | Data bus 21  |
| C20 | Data bus 22  |
| C21 | Data bus 23  |
| C22 | Data bus 24  |
| C23 | Data bus 25  |
| C24 | Data bus 26  |
| C25 | Data bus 27  |
| C26 | Data bus 28  |
| C27 | Data bus 29  |
| C28 | Data bus 30  |
| C29 | Data bus 31  |
| C30 | +3.3V Output |
| C31 | Ground       |
| C32 | Battery Voltage Signal |

3.5.5 P4 - BDM

Reference: P4
Type: 26 Way Low Profile
Description: Background Debug Mode Connector

Requests for details of this connector should be sent by email to: support@heber.co.uk

3.5.6 P5 - IDE

Reference: P5
Type: 40 Way Low Profile
Description: IDE Connector

Designed for use with a CD-ROM or Hard Disk.

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3.5.7 **P6 - Compact Flash**

**Reference:** P6  
**Type:** 50 Way Compact Flash Card Connector  
**Description:** Compact Flash Card Connector

Designed for use with Compact Flash cards. Heber supplies Compact Flash cards that have been approved for use with Pluto 6. These are available in 64MB, 128MB and 256MB capacities. For ordering information, see Ordering Compact Flash on page 19. For information on using other types of Compact Flash cards, please email: support@heber.co.uk

**Note:** Heber does not recommend the use of Memorex Compact Flash cards with Pluto 6.

3.5.8 **P7 - PERCENTAGE / STAKE KEYS**

**Reference:** P7  
**Type:** 14 Way Low Profile  
**Description:** Percentage / Stake Key Inputs

![Percentage / Stake Key Inputs Diagram]

3.5.9 **P8 - SECURITY**

**Reference:** P8  
**Type:** 10 Way Low Profile  
**Description:** Power Off Switch Monitoring

![Power Off Switch Monitoring Diagram]

**Note:** Do not ground inputs. These must only be connected to the common strobe.
### 3.5.10 P9 - Multiplexed Lamp Sinks

Reference: P9  
Type: Header 18 Way AMP MTA-100  
Description: Strobed open drain output sinks.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp Column/Sink 0</td>
<td>Lamp Column/Sink 1</td>
<td>Lamp Column/Sink 2</td>
<td>Lamp Column/Sink 3</td>
<td>Lamp Column/Sink 4</td>
<td>Lamp Column/Sink 5</td>
<td>Lamp Column/Sink 6</td>
<td>Lamp Column/Sink 7</td>
<td>No Connection</td>
<td>Polarising Position</td>
<td>Lamp Column/Sink 8</td>
<td>Lamp Column/Sink 9</td>
<td>Lamp Column/Sink 10</td>
<td>Lamp Column/Sink 11</td>
<td>Lamp Column/Sink 12</td>
<td>Lamp Column/Sink 13</td>
<td>Lamp Column/Sink 14</td>
<td>Lamp Column/Sink 15</td>
</tr>
</tbody>
</table>

### 3.5.11 P10 - LED’s

Reference: P10  
Type: 34 Way Low Profile  
Description: Multiplexed 12V current limited LED drives.

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Cathodes, Digit 0 | 1 | 2 | Cathodes, Digit 1 | Cathodes, Digit 2 | 3 | 4 | Cathodes, Digit 3 | Cathodes, Digit 3 | 5 | 6 | Cathodes, Digit 5 | Cathodes, Digit 6 | 7 | 8 | Cathodes, Digit 7 | Cathodes, Digit 8 | 9 | 10 | Cathodes, Digit 9 | Cathodes, Digit 10 | 11 | 12 | Cathodes, Digit 11 | Cathodes, Digit 12 | 13 | 14 | Cathodes, Digit 13 | Cathodes, Digit 14 | 15 | 16 | Cathodes, Digit 15 | Cathodes, Digit 15 |
| Anodes, Segment 0 | 17 | 18 | Anodes, Segment 1 | Anodes, Segment 2 | 19 | 20 | Anodes, Segment 3 | Anodes, Segment 4 | 21 | 22 | Anodes, Segment 5 | Anodes, Segment 6 | 23 | 24 | Anodes, Segment 7 | Anodes, Segment 8 | 25 | 26 | Anodes, Segment 9 | Anodes, Segment 10 | 27 | 28 | Anodes, Segment 11 | Anodes, Segment 12 | 29 | 30 | Anodes, Segment 13 | Anodes, Segment 14 | 31 | 32 | Anodes, Segment 15 | Cathodes, Digit 4 | 33 | 34 | Cathodes, Digit 5 | Cathodes, Digit 5 |
3.5.12 P11 - Multiplexed Lamps Sources

Reference: P11
Type: Header 17W AMP MTA-100
Description: Strobed open collector outputs (source connected to +48V).

|---|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
### 3.5.13 P12 - Reels

**Reference:** P12  
**Type:** 50 Way Low Profile Box Header  
**Description:** Reels - Connector for 6 Stepper Motor Reel Mechanisms

<table>
<thead>
<tr>
<th>Lamp Column 0</th>
<th>1</th>
<th>2</th>
<th>Lamp Column 1</th>
<th>15</th>
<th>16</th>
<th>TPIC6259 Open Drain, Output 0</th>
<th>15</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamp Column 2</td>
<td>3</td>
<td>4</td>
<td>Lamp Column 3</td>
<td>17</td>
<td>18</td>
<td>TPIC6259 Open Drain, Output 2</td>
<td>17</td>
<td>18</td>
</tr>
<tr>
<td>Lamp Column 4</td>
<td>5</td>
<td>6</td>
<td>Lamp Column 5</td>
<td>19</td>
<td>20</td>
<td>TPIC6259 Open Drain, Output 4</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>Lamp Row 0</td>
<td>7</td>
<td>8</td>
<td>Lamp Row 1</td>
<td>21</td>
<td>22</td>
<td>TPIC6259 Open Drain, Output 6</td>
<td>21</td>
<td>22</td>
</tr>
<tr>
<td>Lamp Row 2</td>
<td>9</td>
<td>10</td>
<td>Lamp Row 3</td>
<td>23</td>
<td>24</td>
<td>TPIC6259 Open Drain, Output 8</td>
<td>23</td>
<td>24</td>
</tr>
<tr>
<td>Lamp Row 4</td>
<td>11</td>
<td>12</td>
<td>Lamp Row 5</td>
<td>25</td>
<td>26</td>
<td>TPIC6259 Open Drain, Output 10</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>Ground</td>
<td>13</td>
<td>14</td>
<td>+5V</td>
<td>27</td>
<td>28</td>
<td>TPIC6259 Open Drain, Output 12</td>
<td>27</td>
<td>28</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 0</td>
<td>15</td>
<td>16</td>
<td>TPIC6259 Open Drain, Output 1</td>
<td>29</td>
<td>30</td>
<td>TPIC6259 Open Drain, Output 14</td>
<td>29</td>
<td>30</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 2</td>
<td>17</td>
<td>18</td>
<td>TPIC6259 Open Drain, Output 3</td>
<td>31</td>
<td>32</td>
<td>TPIC6259 Open Drain, Output 16</td>
<td>31</td>
<td>32</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 4</td>
<td>19</td>
<td>20</td>
<td>TPIC6259 Open Drain, Output 5</td>
<td>33</td>
<td>34</td>
<td>TPIC6259 Open Drain, Output 18</td>
<td>33</td>
<td>34</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 6</td>
<td>21</td>
<td>22</td>
<td>TPIC6259 Open Drain, Output 7</td>
<td>35</td>
<td>36</td>
<td>TPIC6259 Open Drain, Output 20</td>
<td>35</td>
<td>36</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 8</td>
<td>23</td>
<td>24</td>
<td>TPIC6259 Open Drain, Output 9</td>
<td>37</td>
<td>38</td>
<td>TPIC6259 Open Drain, Output 22</td>
<td>37</td>
<td>38</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 10</td>
<td>25</td>
<td>26</td>
<td>TPIC6259 Open Drain, Output 11</td>
<td>39</td>
<td>40</td>
<td>Input 0, CMOS Level Pulled-up to +5V</td>
<td>39</td>
<td>40</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 12</td>
<td>27</td>
<td>28</td>
<td>TPIC6259 Open Drain, Output 13</td>
<td>41</td>
<td>42</td>
<td>Input 1, CMOS Level Pulled-up to +5V</td>
<td>41</td>
<td>42</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 14</td>
<td>29</td>
<td>30</td>
<td>TPIC6259 Open Drain, Output 15</td>
<td>43</td>
<td>44</td>
<td>Input 2, CMOS Level Pulled-up to +5V</td>
<td>43</td>
<td>44</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 16</td>
<td>31</td>
<td>32</td>
<td>TPIC6259 Open Drain, Output 17</td>
<td>45</td>
<td>46</td>
<td>Input 3, CMOS Level Pulled-up to +5V</td>
<td>45</td>
<td>46</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 18</td>
<td>33</td>
<td>34</td>
<td>TPIC6259 Open Drain, Output 19</td>
<td>+12V</td>
<td>+12V</td>
<td>Polarising Position</td>
<td>+12V</td>
<td>+12V</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 20</td>
<td>35</td>
<td>36</td>
<td>TPIC6259 Open Drain, Output 21</td>
<td>+12V</td>
<td>+12V</td>
<td>+12V</td>
<td>+12V</td>
<td>+12V</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 22</td>
<td>37</td>
<td>38</td>
<td>TPIC6259 Open Drain, Output 23</td>
<td>+12V</td>
<td>+12V</td>
<td>+12V</td>
<td>+12V</td>
<td>+12V</td>
</tr>
</tbody>
</table>
### 3.5.14 P13 - General I/O 2

**Reference:** P13  
**Type:** 34 Way Low Profile Box Header  
**Description:** General Purpose I/O 2

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>34</th>
<th>33</th>
</tr>
</thead>
<tbody>
<tr>
<td>TPIC6259 Open Drain, Output 48</td>
<td>1</td>
<td>2</td>
<td>TPIC6259 Open Drain, Output 49</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 50</td>
<td>3</td>
<td>4</td>
<td>TPIC6259 Open Drain, Output 51</td>
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<tr>
<td>TPIC6259 Open Drain, Output 52</td>
<td>5</td>
<td>6</td>
<td>TPIC6259 Open Drain, Output 53</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 54</td>
<td>7</td>
<td>8</td>
<td>TPIC6259 Open Drain, Output 55</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 56</td>
<td>9</td>
<td>10</td>
<td>TPIC6259 Open Drain, Output 57</td>
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<tr>
<td>TPIC6259 Open Drain, Output 58</td>
<td>11</td>
<td>12</td>
<td>TPIC6259 Open Drain, Output 59</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 60</td>
<td>13</td>
<td>14</td>
<td>TPIC6259 Open Drain, Output 61</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 62</td>
<td>15</td>
<td>16</td>
<td>TPIC6259 Open Drain, Output 63</td>
</tr>
<tr>
<td><strong>Ground</strong></td>
<td>17</td>
<td>18</td>
<td>Polarising Position</td>
</tr>
<tr>
<td>Input 6, CMOS Level Pulled-up to +5V</td>
<td>19</td>
<td>20</td>
<td>Input 7, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 8, CMOS Level Pulled-up to +5V</td>
<td>21</td>
<td>22</td>
<td>Input 9, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 10, CMOS Level Pulled-up to +5V</td>
<td>23</td>
<td>24</td>
<td>Input 11, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 12, CMOS Level Pulled-up to +5V</td>
<td>25</td>
<td>26</td>
<td>Input 13, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 14, CMOS Level Pulled-up to +5V</td>
<td>27</td>
<td>28</td>
<td>Input 15, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 16, CMOS Level Pulled-up to +5V</td>
<td>29</td>
<td>30</td>
<td>Input 17, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 18, CMOS Level Pulled-up to +5V</td>
<td>31</td>
<td>32</td>
<td>Input 19, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td><strong>+12V</strong></td>
<td>33</td>
<td>34</td>
<td>Current Sensing +12V</td>
</tr>
</tbody>
</table>

### 3.5.15 P14 - General I/O 1

**Reference:** P14  
**Type:** 40 Way Low Profile Box Header  
**Description:** General Purpose I/O 1

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>39</th>
<th>40</th>
</tr>
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<tbody>
<tr>
<td>TPIC6259 Open Drain, Output 24</td>
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<td>2</td>
<td>TPIC6259 Open Drain, Output 25</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 26</td>
<td>3</td>
<td>4</td>
<td>TPIC6259 Open Drain, Output 27</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 28</td>
<td>5</td>
<td>6</td>
<td>TPIC6259 Open Drain, Output 29</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 30</td>
<td>7</td>
<td>8</td>
<td>TPIC6259 Open Drain, Output 31</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 32</td>
<td>9</td>
<td>10</td>
<td>TPIC6259 Open Drain, Output 33</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 34</td>
<td>11</td>
<td>12</td>
<td>TPIC6259 Open Drain, Output 35</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 36</td>
<td>13</td>
<td>14</td>
<td>TPIC6259 Open Drain, Output 37</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 38</td>
<td>15</td>
<td>16</td>
<td>TPIC6259 Open Drain, Output 39</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 40</td>
<td>17</td>
<td>18</td>
<td>TPIC6259 Open Drain, Output 41</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 42</td>
<td>19</td>
<td>20</td>
<td>TPIC6259 Open Drain, Output 43</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 44</td>
<td>21</td>
<td>22</td>
<td>TPIC6259 Open Drain, Output 45</td>
</tr>
<tr>
<td>TPIC6259 Open Drain, Output 46</td>
<td>23</td>
<td>24</td>
<td>TPIC6259 Open Drain, Output 47</td>
</tr>
<tr>
<td><strong>Ground</strong></td>
<td>25</td>
<td>26</td>
<td>Ground</td>
</tr>
<tr>
<td>Input 20, CMOS Level Pulled-up to +5V</td>
<td>27</td>
<td>28</td>
<td>Input 21, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 22, CMOS Level Pulled-up to +5V</td>
<td>29</td>
<td>30</td>
<td>Input 23, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 24, CMOS Level Pulled-up to +5V</td>
<td>31</td>
<td>32</td>
<td>Input 25, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 26, CMOS Level Pulled-up to +5V</td>
<td>33</td>
<td>34</td>
<td>Input 27, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 28, CMOS Level Pulled-up to +5V</td>
<td>35</td>
<td>36</td>
<td>Input 29, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td>Input 30, CMOS Level Pulled-up to +5V</td>
<td>37</td>
<td>38</td>
<td>Input 31, CMOS Level Pulled-up to +5V</td>
</tr>
<tr>
<td><strong>Polarising Position</strong></td>
<td>39</td>
<td>40</td>
<td><strong>+12V</strong></td>
</tr>
</tbody>
</table>
3.5.16 P15 - Aux Outputs

Reference: P15
Type: Header 9W AMP MTA-100
Description: Aux. Outputs

| 1 | Ground |
| 2 | Open drain output 0, 100mA, 1K pull-up to +5V |
| 3 | Open drain output 1, 100mA, 1K pull-up to +5V |
| 4 | Open drain output 2, 100mA, 1K pull-up to +5V |
| 5 | Open drain output 3, 100mA, 1K pull-up to +5V |
| 6 | Polarising Position |
| 7 | Open drain output 4, 100mA, 1K pull-up to +5V |
| 8 | Open drain output 5, 100mA, 1K pull-up to +5V |
| 9 | +12V |

3.5.17 P16 - Multiplex Expansion

Reference: P16
Type: Header 8W AMP MTA-100
Description: Multiplex Expansion

| 1 | MPX1 Data, +12V CMOS Levels |
| 2 | MPX2 Data, +12V CMOS Levels |
| 3 | MPX Strobe Data, +12V CMOS Levels |
| 4 | Ground |
| 5 | Polarising Position |
| 6 | MPX Clock, +12V CMOS Levels |
| 7 | MPX Strobe, +12V CMOS Levels |
| 8 | MPX Output Enable, +12V CMOS Levels |

3.5.18 P17 - IO Bus Expansion

Reference: P17
Type: 26 Way Low Profile Box Header
Description: 8 Bit IO Bus Expansion

Requests for details of this connector should be sent by email to support@heber.co.uk
3.5.19 P18 - Power

**Reference:** P18

**Type:** Header 11W AMP MTA-156

**Description:** Power

<table>
<thead>
<tr>
<th>1</th>
<th>-12V</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Ground</td>
</tr>
<tr>
<td>3</td>
<td>+12V</td>
</tr>
<tr>
<td>4</td>
<td>Polarising Position</td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>MPX Supply</td>
</tr>
<tr>
<td>7</td>
<td>MPX Return (Ground)</td>
</tr>
<tr>
<td>8</td>
<td>+5V</td>
</tr>
<tr>
<td>9</td>
<td>Ground</td>
</tr>
<tr>
<td>10</td>
<td>Power Fail Active Low</td>
</tr>
<tr>
<td>11</td>
<td>Ground</td>
</tr>
</tbody>
</table>

3.5.20 P19 - Loudspeaker

**Reference:** P19

**Type:** Header 6 AMP MTA-100

**Description:** Loudspeaker

<table>
<thead>
<tr>
<th>1</th>
<th>Loudspeaker 1 Positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Loudspeaker 1 Negative</td>
</tr>
<tr>
<td>3</td>
<td>Polarising Position</td>
</tr>
<tr>
<td>4</td>
<td>No Connection</td>
</tr>
<tr>
<td>5</td>
<td>Loudspeaker 2 Positive</td>
</tr>
<tr>
<td>6</td>
<td>Loudspeaker 2 Negative</td>
</tr>
</tbody>
</table>

**Note:** Do not ground loudspeaker outputs. Minimum speaker load is 4Ω.
3.5.21 P20 - ccTalk / HI² Interface

Reference: P20
Type: 20 Way Low Profile Box Header
Description: ccTalk / HI² Interface

| Channel 1 Data | 1 | 2 | Ground |
| Channel 1 Busy | 3 | 4 | Ground |
| Channel 1 Reset | 5 | 6 | Polarising Position |
| +12V | 7 | 8 | * Channel 1 Voltage Select (See Note 1) |
| Ground | 9 | 10 | +12V |
| Channel 2 Data | 11 | 12 | Ground |
| Channel 2 Busy | 13 | 14 | Ground |
| Channel 2 Reset | 15 | 16 | No Connection |
| +12V | 17 | 18 | * Channel 2 Voltage Select (See Note 1) |
| Ground | 19 | 20 | +12V |

- Note 1 - Link to ground for 5V bus operation. Leave open circuit for 12V bus operation.
- Note 2 - To drive the reset signal on Pluto 6, access the signal through Aux6 for ccTalk1 and Aux7 for ccTalk2.

3.5.22 P21 - RS232

Reference: P21
Type: 16 Way Low Profile Box Header
Description: RS232

| TX Data Channel A Output | 3 | 4 | CTS Channel A Input |
| RTS Data Channel A Output | 5 | 6 | Ground |
| TX Data Channel C Output | 7 | 8 | RX Data Channel C Input |
| RTS Data Channel C Output | 9 | 10 | CTS Data Channel C Input |
| Polaring Position | 11 | 12 | Ground |
| TX Data Channel D Output | 13 | 14 | RX Data Channel D Input |
| RTS Data Channel D Output | 15 | 16 | CTS Data Channel D Input |
### 3.5.23 P22 - Dataport (RS232 Channel B)

**Reference:** P22  
**Type:** 25W ‘D’ Socket  
**Description:** BACTA Dataport / RS232 Channel B

<table>
<thead>
<tr>
<th>Port</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-14</td>
<td>No Connection</td>
</tr>
<tr>
<td>2-15</td>
<td>RX Data Channel B Input</td>
</tr>
<tr>
<td>3-16</td>
<td>TX Data Channel B Output</td>
</tr>
<tr>
<td>4-17</td>
<td>CTS Data Channel B Input</td>
</tr>
<tr>
<td>5-18</td>
<td>RTS Data Channel B Output</td>
</tr>
<tr>
<td>6-19</td>
<td>No Connection</td>
</tr>
<tr>
<td>7-19</td>
<td>Ground</td>
</tr>
<tr>
<td>8-20</td>
<td>No Connection</td>
</tr>
<tr>
<td>9-21</td>
<td>No Connection</td>
</tr>
<tr>
<td>10-22</td>
<td>No Connection</td>
</tr>
<tr>
<td>11-23</td>
<td>-12V</td>
</tr>
<tr>
<td>12-24</td>
<td>No Connection</td>
</tr>
<tr>
<td>13-25</td>
<td>No Connection</td>
</tr>
<tr>
<td>14-18</td>
<td>Ground</td>
</tr>
<tr>
<td>15-19</td>
<td>No Connection</td>
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<tr>
<td>16-20</td>
<td>No Connection</td>
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<td>17-21</td>
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<td>18-22</td>
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<td>19-23</td>
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<tr>
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<td>No Connection</td>
</tr>
<tr>
<td>21-25</td>
<td>No Connection</td>
</tr>
</tbody>
</table>

Note: No Connection and Ground connections are indicated explicitly.
**P23 - TTL / RS485**

Reference: P23  
Type: Header 12W AMP MTA-100  
Description: TTL / RS485 Level UART

![Diagram of P23 - TTL / RS485](image)

1. +5V  
2. TTL Level TX Output  
3. TTL Level RX Input  
4. TTL Level RTS Output  
5. TTL Level CTS Input  
6. Ground  
7. RS485 Positive  
8. Polarising Position  
9. RS485 Negative  
10. Ground  
11. Link to Pin 7 for RS485 Termination  
12. Link to Pin 9 for RS485 Termination

**3.5.24 P24 - Video Expansion 0**

Reference: P24  
Type: 15W Hi Density ‘D’ Socket  
Description: Video Output (VGA)

![Diagram of P24 - Video Expansion 0](image)

<table>
<thead>
<tr>
<th>Signal</th>
<th>Pin 1</th>
<th>Pin 2</th>
<th>Pin 3</th>
<th>Pin 4</th>
<th>Pin 5</th>
<th>Pin 6</th>
<th>Pin 7</th>
<th>Pin 8</th>
<th>Pin 9</th>
<th>Pin 10</th>
<th>Pin 11</th>
<th>Pin 12</th>
<th>Pin 13</th>
<th>Pin 14</th>
<th>Pin 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red</td>
<td>1</td>
<td>11</td>
<td>No Connection</td>
<td>6</td>
<td>Ground</td>
<td>10</td>
<td>12</td>
<td>No Connection</td>
<td>8</td>
<td>Ground</td>
<td>9</td>
<td>No Connection</td>
<td>7</td>
<td>No Connection</td>
<td>11</td>
</tr>
<tr>
<td>Green</td>
<td>2</td>
<td>12</td>
<td>No Connection</td>
<td>7</td>
<td>Ground</td>
<td>9</td>
<td>13</td>
<td>Horizontal Sync</td>
<td>6</td>
<td>Ground</td>
<td>5</td>
<td>No Connection</td>
<td>8</td>
<td>Vertical Sync</td>
<td>10</td>
</tr>
<tr>
<td>Blue</td>
<td>3</td>
<td>14</td>
<td>No Connection</td>
<td>13</td>
<td>No Connection</td>
<td>5</td>
<td>15</td>
<td>No Connection</td>
<td>13</td>
<td>No Connection</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These signals are only present if a Calypso 32 Video card is fitted.
3.5.25 P25 - Video Expansion 1

Reference: P25
Type: 15W Hi Density ‘D’ Socket
Description: Video Output (VGA)

![Diagram of 15W Hi Density ‘D’ Socket](image)

<table>
<thead>
<tr>
<th>Red</th>
<th>1</th>
<th>11</th>
<th>No Connection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td>2</td>
<td>12</td>
<td>No Connection</td>
</tr>
<tr>
<td>Ground</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blue</td>
<td>3</td>
<td>13</td>
<td>Horizontal Sync</td>
</tr>
<tr>
<td>Ground</td>
<td>7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No Connection</td>
<td>4</td>
<td>14</td>
<td>Vertical Sync</td>
</tr>
<tr>
<td>Ground</td>
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<td>No Connection</td>
</tr>
<tr>
<td>Ground</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These signals are only present if a Calypso 32 Video card is fitted.

3.5.26 P26

Reference: P26
Type: Header 7W AMP MTA-100
Description: Reserved for future expansion. This connector does not have any active signal.

3.5.27 P27 - I²C

Reference: P27
Type: Header 5W AMP MTA-100
Description: I²C

![Diagram of I²C connector](image)

1 +3.3V
2 Polarising Position
3 SDA (data input / output)
4 SCL (clock output)
5 Ground

3.5.28 SW3 - Switch

Reference: Switch
Type: Bush button switch
Description: Software configurable general purpose switch, for example, can be configured as reset switch, or service switch.
4 DEVELOPMENT

4.1 Development Kit

The development kit contains all you need to begin your game development. The following is a list of the key items supplied in the development kit:

- Pluto 6 Debug Board.
- Calypso 32 Video Card.
- Pluto 6 Evaluation Board.
- P&E Assembly level debugger.
- Pluto 6 CDROM containing the following key items:
  - Low Level software libraries for driving the Pluto 6 inputs / outputs.
  - A video demonstration programmes using the supplied drivers.
  - A non-video demonstration programme using the supplied drivers.
  - GNU open source ‘C’ compiler.
  - Product user manuals
- PSU

The Pluto 6 Evaluation board supplied in the development kit can be used as a tool to start game development. The evaluation board has indicators and switches on all of the Pluto 6 inputs and outputs. This enables developer to start using the Pluto 6 board and supplied software.

For further information on the drivers and software supplied in the development kit consult the Pluto 6 Software Manual.

4.2 Software Development

A number of options exist for the development and debug of software for use on Pluto 6.

Software is normally generated using a cross-assembler, cross-compiler and linker package. A suitable package is supplied in the Pluto 6 Development kit.

When software has been successfully compiled and linked, it may be tested and debugged using the Background Debug Mode port of the ColdFire® MCF5206e. A suitable debug tool is provided in the development kit. There are, however, plenty of other debug tools available offering different graphical interfaces and electrical interfaces such as USB. They will also offer different functions such as flash programming and ‘C’ source level debugging.

For full details of debugging please consult the development kit software documentation.
5 ORDERING PLUTO 6

5.1 Pluto 6 Family Products

The following table details Pluto 6 products that are available from Heber. To order, please contact Heber, or email: sales@heber.co.uk.

<table>
<thead>
<tr>
<th>HEBER PART No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>01-17802</td>
<td>Pluto 6 Standard Board</td>
</tr>
<tr>
<td>01-17862</td>
<td>Pluto 6 Debug Board</td>
</tr>
<tr>
<td>01-16443</td>
<td>Calypso 32 Video Card</td>
</tr>
<tr>
<td>01-18011</td>
<td>Pluto 6 Development Kit (Dual Video)</td>
</tr>
</tbody>
</table>

5.2 Optional Devices

A number of optional devices are available for the Pluto 6 Debug board. These devices can be ordered separately from Heber. Please contact Heber, or email: sales@heber.co.uk.

<table>
<thead>
<tr>
<th>HEBER PART No.</th>
<th>DESCRIPTION</th>
<th>IDENT on PLUTO 6 DEBUG BOARD</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-82283</td>
<td>Boot Flash U1 512KB Boot Flash Memory</td>
<td>U1</td>
<td>512KB Boot Flash Memory</td>
</tr>
<tr>
<td>20-82208</td>
<td>EEPROM U7 4K or 8K bit EEPROM. Used for permanent non-volatile memory storage.</td>
<td>U7</td>
<td>4K or 8K bit EEPROM.</td>
</tr>
<tr>
<td>20-81693</td>
<td>DUART U56 Dual full-duplex asynchronous receiver/transmitter provides a total of 6 UARTS.</td>
<td>U56</td>
<td>Dual full-duplex asynchronous receiver/transmitter provides a total of 6 UARTS.</td>
</tr>
</tbody>
</table>

5.3 Compact Flash

Heber has approved the following Compact Flash cards and programmer for use with Pluto 6. To order, please contact Heber, or email: sales@heber.co.uk.

<table>
<thead>
<tr>
<th>HEBER PART No.</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>63-82370</td>
<td>64MB Compact Flash card</td>
</tr>
<tr>
<td>63-82658</td>
<td>128MB Compact Flash card</td>
</tr>
<tr>
<td>63-82530</td>
<td>256MB Compact Flash card</td>
</tr>
<tr>
<td>63-82516</td>
<td>Compact Flash Programmer</td>
</tr>
</tbody>
</table>

6 RECOMMENDED FURTHER READING

Software programmers should read the following Motorola publications.

- ColdFire MCF5206e User Manual
- ColdFire MCF5206e Programmers Reference

For further information on the Pluto 6 video add-on card please see the PLUTO 6 CALYPSO 32 VIDEO CARD USER MANUAL (Heber Part no. 80-16538).
7  SUPPORT

To request further documentation, such as circuit schematics that may be needed for approval purposes, please email your requests to support@heber.co.uk. These will be made available directly to the approvals body once a non-disclosure agreement is in place.
Figure 3 - Photograph of Pluto 6

NOTE: This photograph may differ from the stated specification.