ARM 710a Header Card

Reference Guide

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Change Log

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<th>Issue Date</th>
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<th>Change</th>
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<td>A June 97</td>
<td>BJH</td>
<td>First release</td>
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EMC Warning
The ARM range of evaluation and development products has been tested for electromagnetic emissions and is restricted to the following guidelines under the EMC directive.

Restrictions on use
- This product should only be used in designated industrial research and development areas.
- It must not be used within 30 metres of a domestic radio or television receiver.
- Mobile phones must not be used within 10 metres of the product.
- ESD precautions must be taken when handling the product.
- Use with a ‘CE’ approved power supply.
- Modifications to these evaluation cards not approved by ARM may cause harmful interference.
- The card should be powered down when not in use.

This equipment generates electromagnetic interference. If not installed and used as directed it may interfere with radio communications and other electronic equipment. If interference is experienced the user should attempt to correct the interference by one or more of the following actions.

Suggested measures for improvement
- Increase the separation distance between the two items.
- Reorient or relocate either item.
- Connect the equipment to different power circuits.
- Use filtered mains plugs or sockets.
- Ensure attached cables do not lie across the card.
- Fit RFI suppression kit which is obtainable from ARM.
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The ARM710a Header Card is a processor daughter board for the ARM Development Board (HBI-0016B). Used in conjunction with this board, the header card is suitable for code development and evaluation of the ARM710a processor.

The header card provides an interface to the Advanced Microcontroller Bus Architecture (AMBA) Advanced System Bus (ASB).

Using the Angel debug monitor program supplied with the card, you can download and run code with the ARM Software Development Toolkit.

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ATM710a Header Card

1.1 Programmers’ Information

The programmer can consider the header card as an ARM710a processor; this is a general-purpose 32-bit microprocessor with:

- 8Kb cache
- enlarged write buffer
- Memory Management Unit (MMU).

The CPU within a ARM710a is the ARM7.

The ARM710a is software-compatible with the ARM processor family. Please refer to the ARM710a Macrocell Datasheet (ARM DDI 0033) for further information.

1.2 Setting up the System

The header card plugs into the top left-hand corner of the development board, with the copyright notice of the header card to the top, so that the header is flush with the development board.

Note

The ARM710a Header card does not provide EmbeddedICE support. To use the Angel Debug Monitor, a serial/parallel link or ethernet connection to the host debugging system is required.

The host should also be running the ARM debugger (ADW or armsd), which is a program supplied as part of the ARM Software Development Toolkit.

Please refer to the manual Target Development System User Guide (ARM DUI 0061) for information on how to establish a debug link between the board and the host system.
1.3 Configuring the ARM710a Header Card

A socket is provided to allow a standard (DIL14 outline) or small (DIL8 outline) crystal oscillator to plug into the header card. A 32MHz crystal oscillator is fitted as default.

The position of a switch on the card determines the source of clock to be used for clocking the core of the ARM710a. The two positions marked on the silkscreen of the board, are:

**STB MODE** Standard Bus Mode.
Where the core clock is provided by the crystal oscillator, the frequency must be greater or equal to memory interface clock (normally 20 MHz) provided by the motherboard. The memory interface clock frequency is configurable; for details, refer to the *Target Development System User Guide* (ARM DUI 0061).

**FBMODE** Fast Bus Mode.
The core is clocked from the memory interface clock which is provided by the motherboard.

*Note* Please see the release note supplied with the board for details of the maximum frequency of operation.

1.3.1 Links

For normal operation, the surface mount links should not be moved. They are set as follows:

- **LK1** AMBA Bus Master Veneer Configuration link set between A-C
- **LK2** AMBA Bus Master Veneer Configuration link set between B-C
- **LK3** AMBA Bus Master Veneer Configuration link set between A-C
- **LK4** GNT SELECT default link set between A-C
- **LK5** REQARM SELECT default link set between A-C

These links are fitted at factory.

<table>
<thead>
<tr>
<th>Link</th>
<th>Selection</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>LK4</td>
<td>GNT_ARM = S_GNTARM</td>
<td>A - C</td>
</tr>
<tr>
<td></td>
<td>GNT_ARM = GNT001</td>
<td>B - C</td>
</tr>
<tr>
<td>LK5</td>
<td>REQARM = S_REQARM</td>
<td>A - C</td>
</tr>
<tr>
<td></td>
<td>REQARM = REQ001</td>
<td>B - C</td>
</tr>
</tbody>
</table>

*Table 1-1: Links 4 and 5*
1.3.2 Wire link

The wire link (WL1) on the board is provided for current measurement of the core of the processor. The wire link can be removed and allows an external supply to be introduced, and an ammeter to measure the current.
1.4 Circuit Descriptions

The header card consists of:

- the ARM710a processor
- a switch to set the clocking mode
- a crystal oscillator to provide the core clock, when operating in standard mode
- five buffer chips for improved address and control drive
- a MACH complex programmable logic device (CPLD) implementing an AMBA Bus Master veneer

1.4.1 AMBA bus master veneer

In order to turn the ARM710a processor into an AMBA bus master, an AMBA veneer is required. The function is performed by the MACH215 device (U4). Because this is a 5V part, it is necessary to level-shift the outputs so that output high voltages do not damage the processor. The two level converters (U2 and U3) are constructed from "Quickswitch" buffers. These devices have very low propagation delay (less than 250ps) and appear as a 5 ohm resistor when switched on.

The output voltage for an input voltage equal to the supply is approximately 1V below the supply. A resistor/diode network (R20 and D1) is used to provide a supply of 4.3v, so that high inputs are clamped to 3.3v when driven out of the device.

1.4.2 Header connectors

The schematics show four 60-way connectors (SK1-SK4) which are used to attach all the AMBA bus signals from the header card to the development card.

1.4.3 Processor in QFP

The ARM710a processor is supplied in 144-pin PQFP package; a number of inputs are tied to default values through resistors.

A 32MHz crystal oscillator is supplied on the board. Exact maximum frequency varies with 710a processor manufacturer; please see the release note supplied with the product.

1.4.4 Board schematics

The ARM710a header card design comprises the five schematics listed below.

1. Top-level diagram  
2. AMBA bus master veneer  
3. ARM710a processor  
4. AMBA header connectors  
5. Header card outline drawing

These are described in Chapter 2, Board Schematics.
The board design comprises five schematics as listed below.

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2.1 Top-level Drawing

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Board Schematics

2-2
NOTE:
SPLIT VDD POWER INTO VDD AND VDD1

710a processor in QFP package

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