

ENGINEERING RELEASED

ATARI 1400XL
HOME COMPUTER

CONFIDENTIAL

PRODUCT SPECIFICATION

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NOTICE

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C061907 - Rev 1A - June 7, 1983

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1.0.0.0 INTRODUCTION

This document details the engineering design and the performance specifications for the ATARI 1400XL Home Computer. It is the major information transfer document, intended for the transfer of product information from the Hardware and Software Development groups to the Manufacturing, Design Assurance, and Applications Software organizations. As such, it covers all aspects of the ATARI 1400XL Home Computer directly, or indirectly by reference to applicable documents.

This product has also been called A1201, the ATARI 1200XLD, and the ATARI 1200XLT Home Computer.

2.0.0.0 REFERENCE DOCUMENTS

2.1.0.0 Uncontrolled Documents

Serial Input/Output Interface User's Handbook, Part 1 and 2.

De Re ATARI

The 6502 Microprocessor Manual

MC68B21 Data Sheets

MTBF Calculations for A800/400, Steve Zyski - HCD QA Document

ATARI 800 Warranty Return Reports, Jim North - HCD QA Document

2.2.0.0 Controlled Documents

ATARI 800 Hardware Manual - C016555

6502 Modified Electrical Specifications - C014806

Environmental Engineering Manual - C061616

General Qualification Specification for Keyboards - C099909

ATARI 1400XL Product Assembly - CA061811-xx

ATARI 1400XL Keyboard - C060046

ATARI 1400XL Console Assembly - CA061788

ATARI 1400XL Top Cover Assembly - CA061789

ATARI 1400XL Bottom Cover Assembly - CA061790

ATARI 1400XL Schematics - C061743

ATARI 1400XL Assembly Tree - C061768

ATARI 1400XL Power Supply Specification - C062039

PIA Specifications - C014795

POKEY Specifications - C012294

GTIA Specifications - C014805

ANTIC Specifications - C012296

ANTIC 'E' Specifications - C061620

FREDDIE Specifications - C061922

Parallel Bus Interface (PBI) Specifications - C061902

Speech Synthesizer Interface Specifications - C062061

Direct Connect Integral Modem Peripheral Interface Specifications - C062062

3.0.0.0 DESIGN GOALS

The ATARI 1400XL Home Computer is designed for use in a domestic environment. As an enhanced version of the ATARI 600XL Home Computer, it provides the following to the end user:

- Entertainment
- Education
- Information Services
- Transaction Services
- Personal Development

To meet these requirements, the ATARI 1400XL Home Computer supports high resolution graphics and has sound generation capabilities. It has been designed to support a wide variety of peripheral devices, including communication devices for accessing remote data bases and for conducting transactions with remote intelligent devices.

The ATARI 1400XL Home Computer is an 8-bit CPU. It is designed to be hardware and software compatible with all existing ATARI Home Computers and peripheral devices.

3.1.0.0 Comparison with Existing Product

The ATARI 1400XL Home Computer differs from the ATARI 800XL Home Computer as follows:

- Larger physical size.
- It has a 5-pin DIN monitor interface connector.
- It contains an integrated (on board) speech synthesizer interface.
- It contains a direct connect integrated (on board) modem.

To achieve cost goals and to improve manufacturability, the ATARI 1400XL Home Computer is integrated on a single logic board. A custom LSI circuit (FREDDIE) replaces some of the discrete semiconductors required. Until FREDDIE is available, discrete TTL chips will be used to perform the same functions.

3.2.0.0 Architecture

The architecture of the ATARI 1400XL Home Computer is identical to the ATARI 600XL/800XL Home Computers. See the ATARI 600XL Home Computer Product Specification, C061611, for details of the Operating System.

(NOTE: ANTIC 'E' is an enhanced version of ANTIC. The ATARI 600XL Home Computer requires ANTIC 'E'. Currently, either ANTIC or ANTIC 'E' can be used in ATARI Home Computers manufactured later than the ATARI 600XL Home Com-

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puter. Where reference is made to ANTIC, the same information is true for ANTIC 'E'.)

3.2.1.0 Speech Synthesizer Interface

The Speech Synthesizer is a VOTRAX SC01 speech chip and resides on the ATARI 1400XL Home Computer mother board. See Atari p/n C062061 for electronic and functional specifications.

3.2.2.0 Modem Interface

The ATARI 1400XL Home Computer contains a Direct Connect Integral Modem (DCIM). The DCIM is resident on the mother board. See Atari p/n C062062 for electronic and functional specifications.

FIGURE 3.01 -- ATARI 1400XL Home Computer Functional Block Diagram

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4.0.0.0 PERFORMANCE

The projected performance requirements for the ATARI 1400XL Home Computer are identical to the ATARI 600XL Home Computer. See the ATARI 600XL Home Computer Product Specification (C061611) for details.

5.0.0.0 HARDWARE DESIGN

5.1.0.0 Packaging and Appearance

5.1.1.0 Dimensions and Weight

Height : 2-3/4 inches
Width : 15-inches
Depth : 12-1/2 inches
Weight : 6-lbs., 2-oz.

5.1.2.0 Package Description

5.1.2.1 Position of Connectors

See Figures 5.02 and 5.03 for position of the connectors.

5.1.2.2 Keyboard

See Figure 5.01 for layout of the ATARI 1400XL Home Computer keyboard.

5.1.3.0 Package Colors

The keyboard and top housing are dark brown (Borg Warner Cycolac #T84816). The bottom housing and the keycap nomenclature are buff white (Borg Warner Cycolac #T81400XL6).

5.1.4.0 Package Materials

The keyboard and the top and bottom housing are made of ABS plastic. The housing is textured with Rawal #RE 6625 or equivalent.

5.1.5.0 Package Subassemblies

The ATARI 1400XL Home Computer has these major package subassemblies:

Console - CA061788
Top cover - CA061789
Bottom cover - CA061790
Keyboard - C060046
Keyboard mask - C061751

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TV switch box - CA014746
RF cable - CA061177

5.1.6.0 Product Safety

The polymeric enclosure material must be UL recognized with a flammability rating of 94HB or higher. The PCB must be UL recognized (under the category of "Wiring-Printed", ZPMV-2) with a flammability rating of 94V-1 or higher.

The enclosure material and other components must not contain cadmium as part of their formulation or as a plating. Surface coatings shall not contain lead, cadmium, or other added ingredients which are based on compounds of antimony, arsenic, mercury, selenium, or water soluble barium.

Sharp edges, points, or other cut or puncture points must be avoided.

All small parts or projections that may be grasped by the thumb and forefinger or the teeth, and any captivated parts that protect the user against an increase of the risk of fire, shock, or casualty hazard must withstand a direct pull force of 15-lbs for one minute, applied in the most unfavorable direction, without separation or damage to the captivating means.

The product must meet all requirements of this section, and all applicable government standards. In the event of conflict between this specification and any other document, vendor/manufacturer is responsible to notify Atari Engineering and Corporate Product Safety of the conflict for written disposition from Atari, Inc.

5.2.0.0 Electromechanical Subassemblies

5.2.1.0 Mechanical Details

5.2.1.1 CPU Board

The CPU houses all the intelligent chips of the system and provides connectors for interfacing external modules to the ATARI 1400XL Home Computer. All the functional blocks, except the keyboard, are resident on the CPU board.

5.2.1.2 The Keyboard

The keyboard is connected to the mother board by a 24-connector ribbon cable. Details of electrical parameters are contained in the General Qualification Specification for Keyboards, Atari p/n C099909 and the Keyboard Assembly, Atari p/n C060046.

5.2.2.0 Interface Specifications

The CPU board provides these interfaces:

- SIO
- Parallel Bus Interface (PBI)
- Keyboard
- Controller Jacks
- Cartridge
- Power Input
- Television
- Speech Synthesizer
- Direct Connect Integral Modem

Except for the Speech Synthesizer and the Direct Connect Integral Modem, the above interfaces are identical to the ATARI 600XL Home Computer and are described in the ATARI 600XL Home Computer product Specification, C061611.

See the Speech Synthesizer Interface Specification, C062061, and the Direct Connect Integral Modem Interface Specification, C062062, for details of the specifications for those interfaces.

5.2.3.0 Digital Hardware

The digital hardware consists of the 6502 CPU, the ANTIC display processor, GTIA, POKEY, the PIA, memory (RAM and ROM), and miscellaneous logic. When the FREDDIE chip becomes available, it will be incorporated into the circuitry.

Except for ANTIC (as opposed to ANTIC 'E'), these parts are identical to the ATARI 600XL Home Computer and are covered in detail in that Product Specification, C061611.

5.2.4.0 Analog Circuitry

The Analog Circuitry on the CPU Board consists primarily of the Video Summation Circuitry, the Audio Circuitry, and the RF Modulator.

These parts are identical to the ATARI 600XL Home Computer and are covered in detail in that product specification, C061611.

5.2.5.0 The Keyboard

The layout of the keyboard is shown in Atari drawing C060046. The electrical and mechanical details are specified in the General Qualification Specification for Keyboards, C099909.

5.2.6.0 The Parallel Bus Interface

See the Parallel Bus Specification, C061902, for electromechanical details.

5.2.7.0 Speech Synthesizer Interface

See the Speech Synthesizer Interface Specification, C062061, for electromechanical details.

5.2.8.0 Direct Connect Integral Modem Interface

See the Direct Connect Integral Modem Interface Specification, C062062, for electromechanical details.

5.3.0.0 EMI and Heat Management

EMI shielding <TBD>.

The plastic cover of the ATARI 1400XL Home Computer has louvres cut horizontally on the bottom cover and vertically on the top cover. These louvres allow for convection cooling.

FIGURE 5.01 -- ATARI 1400XL Home Computer Keyboard

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FIGURE 5.02 -- ATARI 1400XL Home Computer - 3/4 view

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FIGURE 5.03 -- ATARI 1400XL Home Computer - back view

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FIGURE 5.04 -- ATARI 1400XL Home Computer - left view

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FIGURE 5.05 -- ATARI 1400XL Home Computer - Hardware Block Diagram

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FIGURE 5.06 -- CPU Memory Map

Figure 5.06a shows the memory map for the ATARI 1400XL Home Computer. Figure 5.06b gives details of the I/O mapped devices. For a description of the Cartridge interface RD4 and RD5, see Section 5.2.2.5 of the ATARI 600XL Home Computer Product Specification, C061611.

The region from \$D000 to \$D7FF is the memory mapped I/O space. As shown in Figure 5.09b, the area from \$D000 to \$D0FF is used to address the GTIA internal registers, the area from \$D200 to \$D2FF is used to address the POKEY registers, the area from \$D300 to \$D3FF is used to address the PIA registers, and the area from \$D400 to \$D4FF is used to address the ANTIC internal registers. The region from \$D500 to \$D5FF is reserved for passing control information to the cartridges. When any address of the form \$D5xx is invoked, the Cartridge Control (CCNTL) line on the cartridge interface is enabled. The regions from \$D100 to \$D1FF and \$D600 to \$D7FF are reserved for the Parallel Bus Interface.

Note that when Self Test is invoked, the region from \$5000 to \$5700 is used as the logical address space for the Self Test code. The actual physical location of the Self Test code is in the Operating System ROM from location \$D000 to location \$D7FF and is shadowed by the I/O devices.

FIGURE 5.09b -- CPU Memory Map

FFFF	Operating system if ROM ENABLE asserted.
E000	RAM if ROM ENABLE not asserted.
DFFF	Operating system if ROM ENABLE asserted and MPD not ac-
D800	tive, else RAM. Mapped to PBI ROM if MPD asserted re-
	gardless of ROM enable.
D7FF	Memory mapped I/O space and PBI. Self Test Code Space
D000	(physical) shadowed by I/O devices.
CFFF	Operating system if ROM ENABLE asserted.
C000	RAM if ROM ENABLE not asserted.
BFFF	Mapped to cartridge interface if RD5 asserted. Basic
A000	enabled if BEN active and RD5 not asserted; RAM if
	cartridge and BASIC inactive.
9FFF	Mapped to cartridge interface if RD4 not asserted.
8000	RAM if RD4 not asserted.
7FFF	RAM
5800	
57FF	Self Test Space ROM from D700-D7FF if SELF TEST enabled
5000	and ROM ENABLE asserted. RAM if SELF TEST disabled or
	ROM ENABLE not asserted.
4FFF	RAM
4000	
3FFF	RAM
0000	

FIGURE 5.09b -- Memory Mapped I/O Space

D7FF D700	Parallel Bus Interface RAM	Memory Mapped I/O Devices
D600	Parallel Bus Interface RAM	
D500	Cartridge Control	
D400	ANTIC	
D300	PIA	
D200	POKEY	
D100	Parallel Bus Interface	
D000	GTIA	

6.0.0.0 SOFTWARE EXTERNAL REFERENCE SPECIFICATION

6.1.0.0 The Operating System

The Operating System of the ATARI 1400XL Home Computer is identical to the ATARI 600XL Home Computer. See Section 6 of the ATARI 600XL Home Computer Product Specification, C061611, for specific details.

6.2.0.0 Speech Synthesizer Interface

See Section 6 of the Speech Synthesizer Interface Specification, C062061.

6.3.0.0 Direct Connect Integral Modem

See Section 6 of the Direct Connect Integral Modem Interface Specification, C062062.

7.0.0.0 COMPATIBILITY WITH EXISTING ATARI PRODUCTS

The ATARI 1400XL Home Computer is designed to be as compatible as possible with all existing ATARI Home Computer hardware and software products. Any apparent or real incompatibilities are discussed in Section 7 of the ATARI 600XL Home Computer Product Specification, C061611.