

# **Electrostatic Manual**

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**COLLABORATORS**

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## Chapter 1

# Electrostatic Manual

### 1.1 Electrostatic Manual

Electrostatic 1.1 - A static binary translator for Atari 2600 ↔  
games

Introduction

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### 1.2 Introduction

Electrostatic is a static binary~translator for Atari~2600 games. ↔

This means

that, unlike ordinary emulators, it permanently translates the game into an Amiga program. This gives a great increase in processor emulation speed.

Unfortunately, emulating the Atari 2600's custom hardware takes up far more time than emulating its CPU, so the benefits of translation are hardly

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noticeable. In spite of this, the use of translation rather than interpretation wasn't pointless, because I developed Electrostatic for a college project. The main aim of the project was to investigate static binary translation.

There are currently quite a few limitations on the Atari 2600 programs that Electrostatic can translate (see `Compatibility` for details). I hope to eliminate some of these limitations in the future.

### 1.3 System Requirements

The following is needed for the translator to run:

- About 1 Mb of free memory.

The following are needed for the translations to run:

- 68020 or better.
- AGA.
- OS 3.0 or greater.

### 1.4 Translating Games

Before you can translate an Atari 2600 game, you must have a `↔` directory named `game` after the game in Electrostatic's drawer. The contents of this drawer must be in a special format.

To translate a game, run "Install Atari 2600 Game" from the Workbench. At the prompt that appears, enter the name of the game's source drawer (there is one game included with this package, Okie Dokie).

Next, select the drawer in which to put the translated game, then wait for it to be translated. This may take several minutes.

### 1.5 Format of Source Game Drawers and Configuration Files

Every source game's drawer must include a ROM image of the game and several description files. There should be three description files: a program file, a segment file and a bank file.

Each of these description files must begin with a blank line. A field heading starts in the first column of a line and ends with a colon. On the next line is the field data, which must be preceded by a tab. Some headings

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can be followed by multiple field data items, or none, each on a separate line.

A program file has the following field headings:

- Name: The name of the game. Required.
- Machine: The location of the machine file to be used. Should currently always be "machine/atari2600". Required.
- Segments: The location of the memory segments included in the game. Multiple.
- Instructions: The location of the files describing any custom hardware within the game's cartridge. Multiple.

A segment file has the following field headings:

- Base Address: The base address of this memory segment. Required.
- Length: The size in bytes of this memory segment. Required.
- Banks: The locations of bank files whose address ranges fall inside this segment. Multiple.

A bank file has the following field headings:

- Memory Type: An integer representing the memory type of this memory bank. Always 0 for the moment. Required.
- Base Address: The base address of this memory bank. Required.
- Length: The size in bytes of this memory bank. Required.
- Data File: The location of the actual ROM image. Required.
- Bank Number: Each bank in a segment must have a number. The first bank's number should be 0. Required.

As an example, here are the program file, segment file and bank file for the game Okie Dokie.

Important: 2kb ROM images must be converted to 4kb by concatenating two copies of the image.

## 1.6 Running Games

The translated games can be run from the Workbench or the Shell.

Every game has a Game menu and a Control menu.

The Game menu:

About:

This option tells you how fast the game has been running since this option was last selected. Very short gaps (eg. two seconds) between calls to this function will result in inaccurate speed reports.

Quit:

Exits the game.

The Control menu:

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Select:

Emulates the Atari 2600's Select button. Selects game options and ends any game in progress.

Reset:

Emulates the Atari 2600's Reset button. Starts or restarts the game.

## 1.7 Compatibility

The following features of the Atari 2600 and its games are not yet emulated:

- Sound.
- Indirect jump instructions.
- Bank switching.
- Playfield priority.
- Any controller besides the first joystick.
- Mid-line colour changes.
- Mid-frame collision reading.

## 1.8 Thanks

I would like to thank the following people:

- Bob Colbert, for allowing Okie Dokie to be distributed with emulators.
- Brian Koetting, for allowing me to extend JoyRide to use two joysticks (not done yet).
- Bradford Mott, for writing Stella, whose source code was very useful as Atari 2600 documentation.
- Fredrik Olsson, whose MOS6502 emulation code gave me some ideas for improving my instruction translations.
- Matthew Stroup, for porting V2600 to the Amiga, which was useful while developing Electrostatic.
- Frank Wille, for allowing me to include GigaPhxAss with Electrostatic.

## 1.9 Contacting the Author

Please send bug reports, suggestions, and any other correspondence to one of the following addresses.

E-mail: [caffer@cs.ucc.ie](mailto:caffer@cs.ucc.ie)

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## 1.10 Legal Information

This software is provided "as is". Use it at your own risk.

The Electrostatic package is Copyright © 1999 Neil Cafferkey, with the following exceptions. The file "MOS6507.i" is public domain. JoyRide is Copyright © 1994 Brian Koetting. GigaPhxAss is copyright © 1994-97 Frank Wille. Okie Dokie is copyright © 1996 RetroWare.

The Electrostatic package is freeware.

## 1.11 PhxAss

PhxAss is a macro assembler written by Frank Wille. It is used in Electrostatic's translation process.

The full package is available from Aminet as "dev/asm/PhxAss439.lha".

## 1.12 JoyRide

JoyRide is a commodity written by Brian Koetting. It allows programs to share the joystick and only respond to joystick events when the program's window is active. Every translation produced by Electrostatic uses JoyRide to handle joystick input.

The full package is available from Aminet as "util/cdity/JoyRide.lha".

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