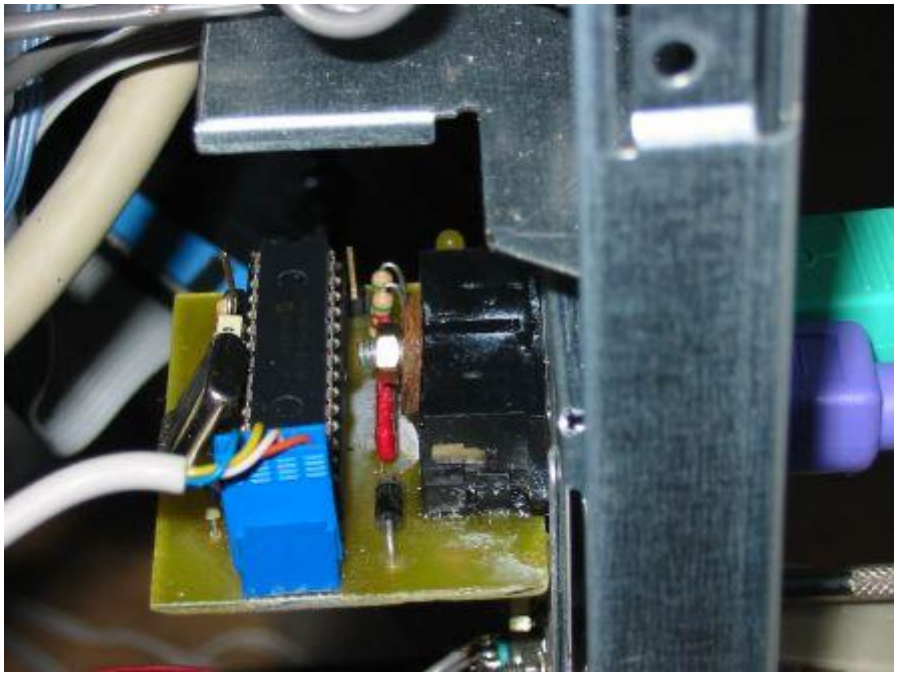
Atari Eiffel 3 Interface PS/2



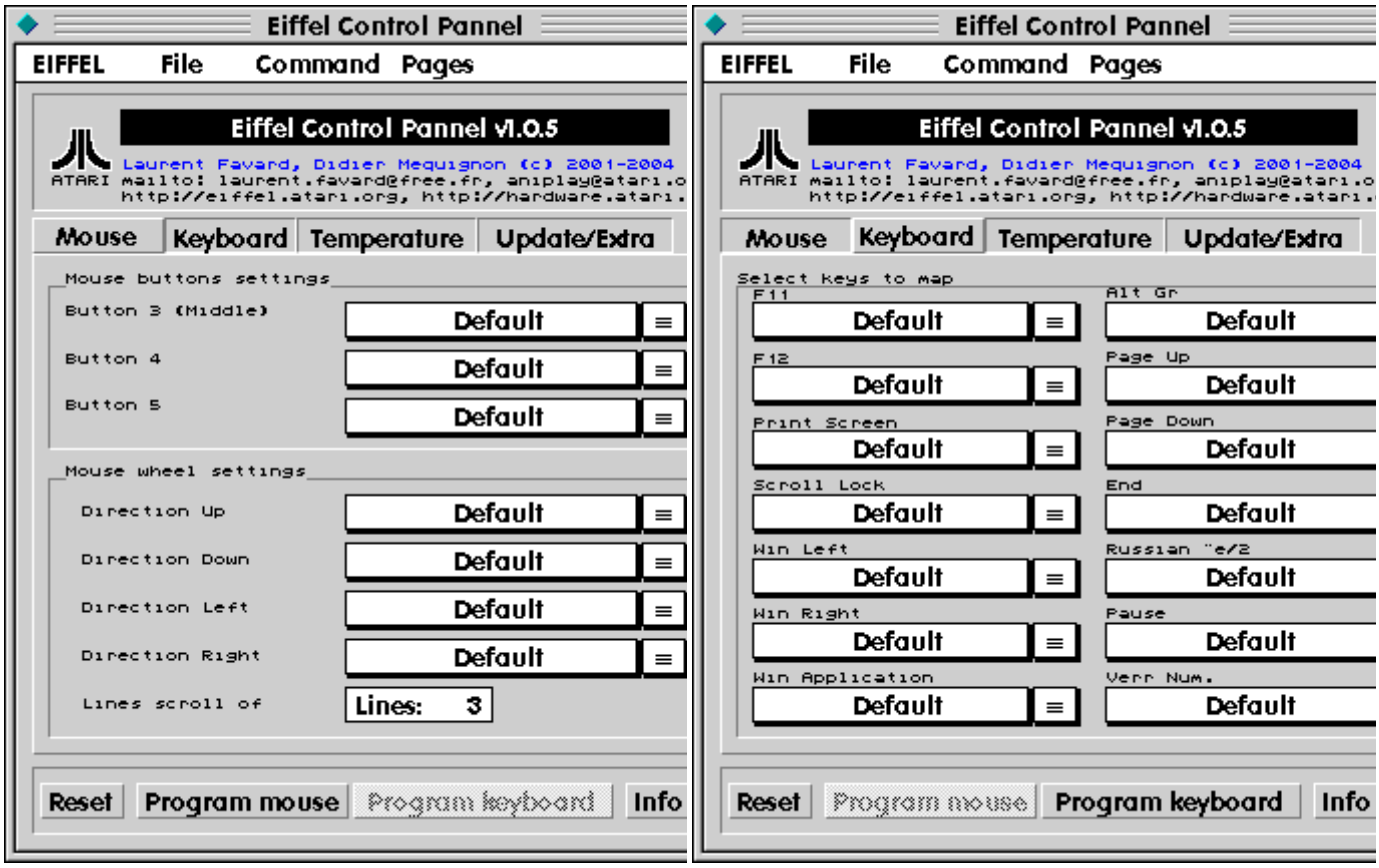
EIFFEL, a free PS/2 Keyboard and Mouse adapter for Atari

License: This product is free, GPL-like applied to hardware project. You are free to build and use it.

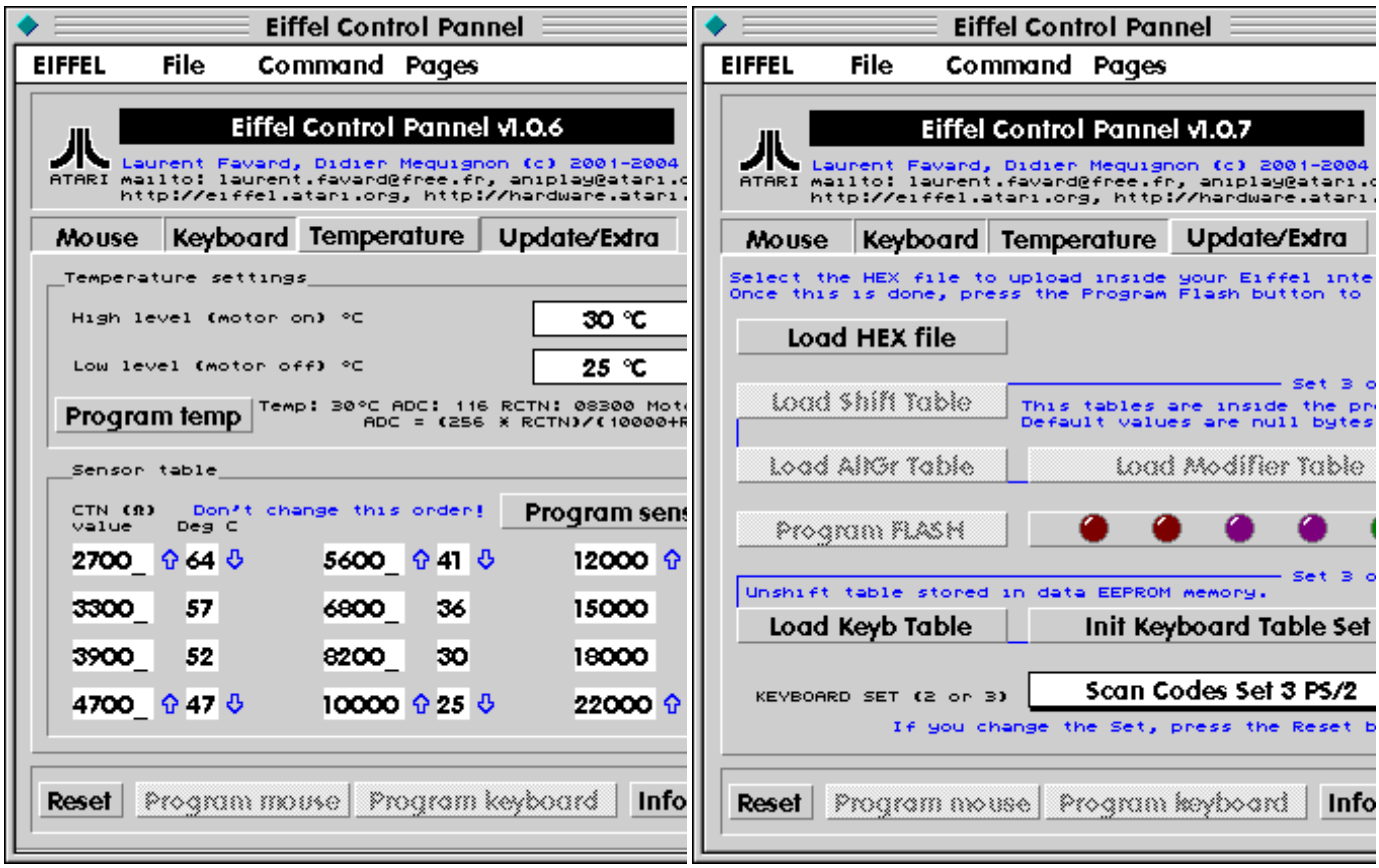
Features

These interface handle all PS/2 Keyboard and mouse:

- Keyboard with 102 or 105 keys and more with the set 2 (AT) or the set 3 (PS/2).
- Since v1.0.7 the keyboard can work without driver and you can build your tables.
- Mouse up to 5 buttons.
- Mouse single and double wheel (IntelliMouse).
- Compatible with ALL Atari computers range (ST, STF, STE, MegaST, MegaSTE, TT and Falcon).
- Two Atari standard joysticks support DB-9.
- Motor command for ventilator and temperature sensor.
- LCD clock and temperature display.
- Near all IKBD supported (only IKBD_SET_MOUSE_THRESHOLD, IKBD_SET_FIRE_BUTTON_MONITOR, and IKBD_CONTROLLER_EXECUTE are not supported).
- Updating eiffel capabilities from GEM application EIFFELCF.APP.
- You can found Eiffel hardware to Satantronic.



The eiffel configuration program...



	Archive	Version	Size	Computer
Eiffel 1.10	eiffel.lzh	1.10 2005 Mar 6	524 KB	Atari ST(E) / Falcon / TT, for Laurant and Lyndon's cards

				UPDATED English/French/German RSC, doc HYP about new E_TEMP.PRG
Eiffel 1.0.9	eiffel109.lzh	1.0.9 2004 Oct 24	355 KB	Atari ST(E) / Falcon / TT, for Laurant and Lyndon's cards
Eiffel 1.0.6	eiffel106.lzh	1.0.6 2004 May 31	167 KB	Atari ST(E) / Falcon / TT
Special firmware 1.0.6	firmware.zip	1.0.6 2004 June 13	7 KB	Atari ST(E) / Falcon / TT, Debug removed (RB4/5) for Lyndon's cards

Eiffel firmware v2.0

This one have the following features:

- Firmware not compatible with previous version because now Eiffel works at 8 MHz !
  So now latest keyboards, mouses, KVM, and wireless desktop with fast timmings can works without problems (codes lost at 4 MHz).
- PS/2 keyboard can work by interrupts (eiffel_i.hex) like the IKBD clock.
- Add filter for remove AT set 2 repeats (repeats of keys created by the TOS).
- All AT scan-codes set 2 are translated to Atari and Atari to PS/2 set 3 codes, so all keys of the set 2 are editables because all Eiffel tables are PS/2 set 3 to Atari.

Eiffel firmware v1.10

This one have the following features:

- Add IKBD_LCD command for lot of fun user features. This is an example with LCD.SLB for Aniplayer 2.23 but there are others examples inside the archive.

- The Eiffel clock can work by interrupts (better precision) but this feature need to reprogram the PIC (eiffel_i.hex, v1.10i). So it's also possible to use the version without interrupts (eiffel.hex).
- New boot loader in Flash with LCD display.
- Fix AltGr or Shift state if the AltGr/Shift(s) keys are released before the key.

Eiffel firmware v1.0.9

This one have the following features:

- Fix IKBD clock, crash at 0H00 and initialization during power-up.
- IKBD Power-up code is send.

- Add LCD display HD44780 compatible on the debug pins RB4 (Data) and RB5 (Clock).

Eiffel firmware v1.0.8

This one have the following features:

- The tables Shift and AltGr inside the flash (program memory) can be used with 50 main characters of the set 2:
  0x07 (F1), 0x0E, 0x0F (F2), 0x11, 0x12, 0x13 (><), 0x15 (AQ),
  0x16 (1), 0x17 (F3), 0x1E (2), 0x1F (F4), 0x24 (E), 0x25 (4),
  0x26 (3), 0x27 (F5), 0x2E (5), 0x2F (F6), 0x36 (6), 0x37 (F7),
  0x39 (ALTGR), 0x3A (,M), 0x3D (7), 0x3E (8), 0x3F (F8), 0x41 (;,),
  0x45 (0), 0x46 (9), 0x47 (F9), 0x49 (:.), 0x4A (!/), 0x4C (M;),
  0x4E ()-), 0x4F (F10), 0x52 (ù'), 0x53 (*\), 0x54 (^[), 0x55 (=),
  0x56 (F11), 0x57 (PRTSCR), 0x59, 0x5B ($]), 0x5E (F12), 0x5F (SCROLL),
  0x62 (PAUSE), 0x65 (END), 0x6D (PAGEDN), 0x6F (PAGEUP), 0x76 (VERRN),
  0x7F (SLEEP), 0x80 (POWER), 0x81 (WAKE), 0x8B (WLEFT), 0x8C (WRIGHT), 0x8E (WAPP).
  Eiffel can work without driver for the sets 2 and 3!
- Inside the tables with the scan-code + 0x80, a status frame is send
  with 0xF6 0x05 0x00 0x00 0x00 0x00 0x00 scan-code
  or 0xF6 0x05 0x00 0x00 0x00 0x00 0x00 scan-code+0x80 for the break code.
- It is preferable to use the status frames with EIFFELCF.APP or edit the .inf files for replace the scan-codes 0x54 to 0x5D because this codes was already affected by Atari for the functions keys F11 to F20 (SHIFT F1 to SHIFT F10).

Eiffel firmware v1.0.7

This one have the following features:

- Eiffel can send different scan-codes for the same key, there are 3 tables Unshift (the normal Eiffel table stored inside the data EEPROM), Shift and AltGr stored inside the Flash program memory. User tables are in a .inf files and are loaded with EIFFELCF.APP. This new feature works only with the PS/2 set 3. But now it's possible to use Eiffel without driver!
- By default Eiffel 1.0.7 is compatible with Eiffel 1.0.6.
- Left Alt key fixed for the set 2, the value is unchanged if you modify the AltGR key with EIFFELCF.APP.

Eiffel firmware v1.0.6

This one have the following features:

- EIFFELCF.APP updated for update the firmware.
- Random problems after Reset normally fixed.
- Better temperature, now there are 12 points of the CTN's curve.

Eiffel firmware v1.0.5

This one have the following features:

- Support of AT set 2 scan-codes.
- Set 2 or 3 selection inside the GEM application EIFFELCF.APP.
- Set 2 support POWER, SLEEP, and WAKE keys.
- Set 2 support Billdoze Multimedia Scan-codes.

Eiffel firmware v1.0.4

This one have the following features:

- Two Atari standard joysticks support DB-9.
- Motor command for ventilator and temperature sensor.
- Near all IKBD commands supported.
- Updating eiffel capabilities from GEM application EIFFELCF.APP.

You need a new hardware if you want use this features: http://hardware.atari.org

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Eiffel firmware v1.0.3

This one have the following features:

- Mouse wheel up to 5 buttons and Mouse double wheels support.
- Middle mouse button return now a scan-code.
- Flash Data PIC programming to change scan-codes returned for Wheels and new buttons 3, 4 and 5.
- Support of second Flash Data programming to change some extra scan-code returned for keyboard.

Technical description

Eiffel adapter use a powerful Microchip microcomputer, a PIC16F876. Check the microchip web site for a complete description.
The firmware handle the both keyboard and mouse DIN PS/2 port, convert the synchronous PS/2 communication to the asynchronous protocol for Atari, translate the PS/2 scan-codes to Atari scan-codes, and convert the mouse's frames to a Atari frame.

Keyboard:

All keys are mapped to Atari scan-codes. The new keys as Win Left, Right, Application, return news scan-codes, not previously used by Atari.
For Atari keys which doesn't exist on PS/2 keyboard, this problem is solved as follow:

- The Atari HELP key is mapped to F11 PS/2 keyboard as default.
- The Atari UNDO key is mapped to F12 PS/2 keyboard as default.

The adapter is responsible to switch on and off, the keyboard LED when you press the CAPS LOCK key. The VERR NUM key has no effect and the VERR NUM LED is now a simple power indicator.

Since the version 1.0.7, Eiffel not need a keyboard driver to map correctly the keys returned (different scan-codes for the same key). Eiffel can use with differents user tables (.inf) for each country, the characters for normal, shift and alternate mode.
For example for get the "{" character you did press SHIFT+ALT+"{" but on PS/2 keyboard this one is on the "4" key...

Mouse:

The Eiffel interface can handle any mouse. Standard PS/2 with 2 or 3 buttons, enhanced wheel mouse, ie IntelliMouse extensions for wheels and extra buttons, new scan-codes for UP, DOWN, LEFT and RIGHT and buttons 3, 4, 5 are returned. But to get a basic mouse working, no driver is required. Theses scan-codes can be changed with the GEM application EIFFELCF.APP.

Table of new scan-codes:

This is the scan-codes list for keyboard and mouse. If you want to use them in your applications or to write your own driver...

Keys set 2 (AT) and set 3 (PS/2)	Atari scan-code firmware v1.0.3 and +	Atari scan-code firmware v1.0.8 and +
ALT GR	ALT as default, can be programmed	ALT as default, can be programmed
F11	HELP as default, can be programmed	HELP as default, can be programmed
F12	UNDO as default, can be programmed	UNDO as default, can be programmed
SCROLL LOCK	$4C as default, can be programmed	$4C as default, can be programmed
PAGE UP	$45 as default, can be programmed	$45 as default, can be programmed
PAGE DOWN	$46 as default, can be programmed	$46 as default, can be programmed
PRINT SCREEN	$49 as default, can be programmed	$49 as default, can be programmed
PAUSE	$4F as default, can be programmed	$4F as default, can be programmed
VERR NUM	$54 (F11 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $54
END	$55 (F12 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $55
LEFT WIN	$56 (F13 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $56
RIGHT WIN	$57 (F14 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $57
WIN APP	$58 (F15 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $58
Key <²> beside <1> key (Russian "ë")	$5B (F18 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $5B
Keys set 2 (AT)	**Atari scan-code firmware 1.0.0 up to 1.0.4**	**Atari scan-code firmware 1.0.5 and 1.0.8**
POWER	-	$73 (CTRL <- inside the TOS) It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $73
SLEEP	-	$74 (CTRL -> inside the TOS) It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $74
WAKE	-	$75 It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $75
NEXT TRACK	-	$F6 $05 $00 $00 $00 $00 $00 $4D

PREVIOUS TRACK	-	$F6 $05 $00 $00 $00 $00 $00 $15
STOP	-	$F6 $05 $00 $00 $00 $00 $00 $3B
PLAY/PAUSE	-	$F6 $05 $00 $00 $00 $00 $00 $34
MUTE	-	$F6 $05 $00 $00 $00 $00 $00 $23
VOLUME UP	-	$F6 $05 $00 $00 $00 $00 $00 $32
VOLUME DOWN	-	$F6 $05 $00 $00 $00 $00 $00 $21
MEDIA SELECT	-	$F6 $05 $00 $00 $00 $00 $00 $50
E-MAIL	-	$F6 $05 $00 $00 $00 $00 $00 $48
CALCULATOR	-	$F6 $05 $00 $00 $00 $00 $00 $2B
MY COMPUTER	-	$F6 $05 $00 $00 $00 $00 $00 $40
WWW SEARCH	-	$F6 $05 $00 $00 $00 $00 $00 $10
WWW HOME	-	$F6 $05 $00 $00 $00 $00 $00 $3A
WWW BACK	-	$F6 $05 $00 $00 $00 $00 $00 $38
WWW FORWARD	-	$F6 $05 $00 $00 $00 $00 $00 $30
WWW STOP	-	$F6 $05 $00 $00 $00 $00 $00 $28
WWW REFRESH	-	$F6 $05 $00 $00 $00 $00 $00 $20
WWW FAVORITES	-	$F6 $05 $00 $00 $00 $00 $00 $18

Mouse elements	Atari scan-code firmware v1.0.3 and +	Atari scan-code firmware v1.0.8 and +
Vertical wheel UP	$59 (F16 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $59
Vertical wheel DOWN	$5A (F17 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $5A
Horizontal wheel LEFT	$5C (F19 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $5C
Horizontal wheel RIGHT	$5D (F20 Atari) as default, can be programmed	It's possible to use the status frame $F6 $05 $00 $00 $00 $00 $00 $5D
Button 3 (Middle)	$37 as default, can be programmed	$37 as default, can be programmed
Button 4	$5E as default, can be programmed	$5E as default, can be programmed
Button 5	$5F as default, can be programmed	$5F as default, can be programmed

Table of Eiffel IKBD commands:

Command	Format	Action on Eiffel	Version
GETTEMP	<$03>	Get temperature from sensor	1.0.4
PROGTEMP	<$04><index><code>	Program temperature	1.0.4
PROGKB	<$05><index><code>	Program a keyboard's scan-code If index is $FF, code is set 2 or 3	1.0.3 1.0.5
PROGMS	<$06><index><code>	Program a mouse's scan-code	1.0.3
LCD	<$23><len><data(s)>	Send a command or data(s) to the LCD Len to $00: Data is a command, lock the LCD Len to $FF: Unlock the LCD for Eiffel Len to $01-$FE: send datas	1.10

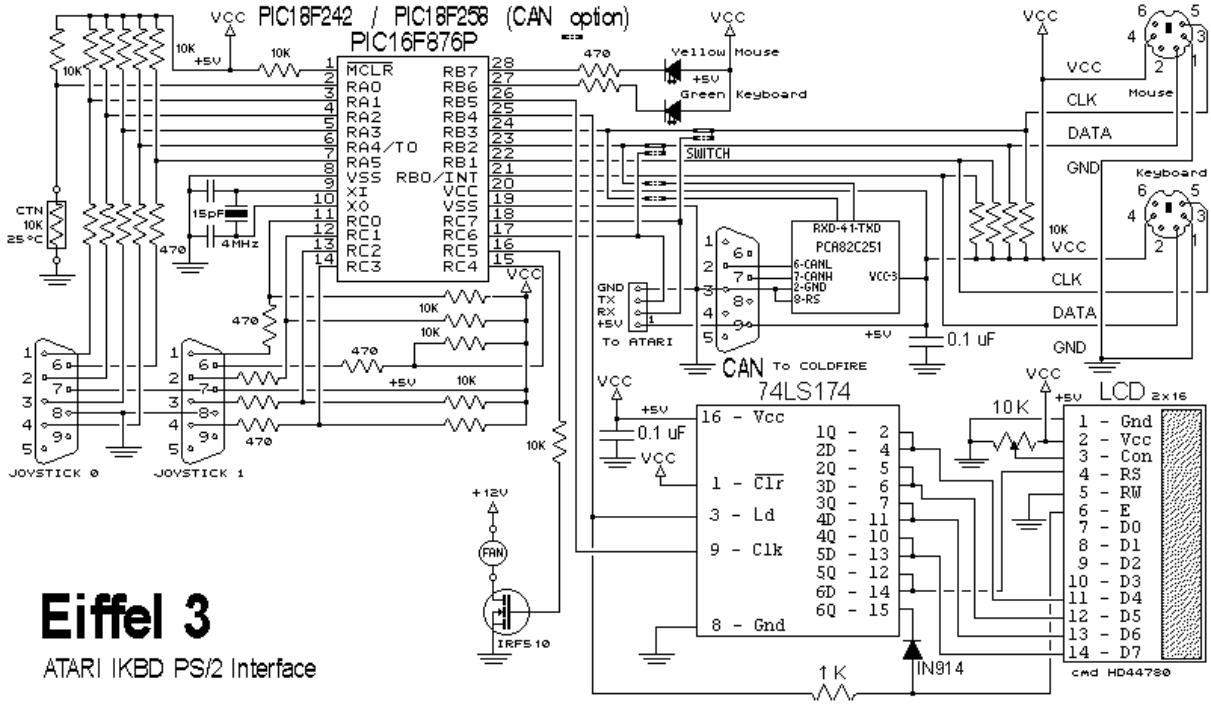
Table of Eiffel Atari IKBD commands:

Command	Format	Special action on Eiffel	Version
IKBD_SET_MOUSE_BUTTON_ACTION	<$07><00000mss>	-	1.0.4

IKBD_REL_MOUSE_POS_REPORT	<$08>	-	1.0.4
IKBD_ABS_MOUSE_POSITIONING	<$09> <XMSB><XLSB> <YMSB><YLSB>	-	1.0.4
IKBD_SET_MOUSE_KEYCODE_CODE	<$0A><deltax><deltay>	-	1.0.4
IKBD_SET_MOUSE_THRESHOLD	<$0B>><X><Y>	-	Not supported
IKBD_SET_MOUSE_SCALE	<$0C>><X><Y>	-	1.0.4
IKBD_INTERROGATE_MOUSE_POS	<$0D>	-	1.0.4
IKBD_LOAD_MOUSE_POS	<$0E><$00> <XMSB><XLSB> <YMSB><YLSB>	-	1.0.4
IKBD_SET_Y0_AT_BOTTOM	<$0F>	-	1.0.4
IKBD_SET_Y0_AT_TOP	<$10>	-	1.0.4
IKDB_RESUME	<$11>	-	1.0.4
IKDB_DISABLE_MOUSE	<$12>	-	1.0.4
IKDB_PAUSE_OUTPUT	<$13>	-	1.0.4
IKBD_SET_JOY_EVNT_REPORT	<$14>	-	1.0.4
IKBD_SET_JOY_INTERROG_MODE	<$15>	-	1.0.4
IKBD_JOY_INTERROG	<$16>	-	1.0.4
IKBD_SET_JOY_MONITOR	<$17><rate>	-	1.0.4
IKBD_SET_FIRE_BUTTON_MONITOR	<$18>	-	Not supported
IKBD_SET_JOY_KEYCODE_MODE	<$19> <RX><RY> <TX><TY> <VX><VY>	-	1.0.4
IKDB_DISABLE_JOYSTICKS	<$1A>	-	1.0.4
IKBD_TIME_OF_DAY_CLOCK_SET	<$1B> <YY><MM><DD> <hh><mm><ss>	-	1.0.4
IKBD_INTERROG_TIME_OF_DAY	<$1C>	-	1.0.4
IKBD_MEMORY_LOAD	<$20> <ADRMSB><ADRLSB> <NUM>	$0000 to $01FF: RAM $0000 $00: FLASH (firmware)	1.0.4
IKBD_MEMORY_READ	<$21> <ADRMSB><ADRLSB>	$0000 to $01FF: RAM $2100 to $20FF: EEPROM $8000 to $FFFF: FLASH (0-$1FFF)	1.0.4
IKBD_CONTROLLER_EXECUTE	<$22> <ADRMSB><ADRLSB>	-	Not supported
IKBD_RESET	<$80><$01>	-	1.0.2
IKBD_STATUS_MOUSE_BUT_ACTION	<$87>	-	1.0.4
IKBD_STATUS_MOUSE_MODE_R	<$88>	-	1.0.4
IKBD_STATUS_MOUSE_MODE_A	<$89>	-	1.0.4
IKBD_STATUS_MOUSE_MODE_K	<$8A>	-	1.0.4

IKBD_STATUS_MOUSE_THRESHOLD	<$8B>	-	1.0.4
IKBD_STATUS_MOUSE_SCALE	<$8C>	-	1.0.4
IKBD_STATUS_MOUSE_Y0_AT_B	<$8F>	-	1.0.4
IKBD_STATUS_MOUSE_Y0_AT_T	<$90>	-	1.0.4
IKDB_STATUS_DISABLE_MOUSE	<$92>	-	1.0.4
IKBD_STATUS_JOY_MODE_E	<$94>	-	1.0.4
IKBD_STATUS_JOY_MODE_I	<$95>	-	1.0.4
IKBD_STATUS_JOY_MODE_K	<$99>	-	1.0.4
IKDB_STATUS_DISABLE_JOY	<$9A>	-	1.0.4

Schematic:



PIC firmware:

To program yourself the PIC chip, get the HEX file Eiffel (Intel format).
You can use the very good programming software under your Atari: Prog84 / Gputils / Sdcc.

Installation:

http://hardware.atari.org

Usefull documentations:

- Microchip PIC16F876
- HD44780-Based LCD Modules