DIEGO'S HP-41 MODULES

HPCC 2020

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AGENDA

Table of Content

- Introduction
- Reference
- Overview
- Configuration
- Programming
- NoV Runtime Configuration
- HEPAX RAM Clearing
- Closing Topics

INTRODUCTION

Table of Content

Overview

- This presentation is an introduction to Diego Díaz HP-41 modules.
- The modules can be divided into three categories:
    - Clonix modules allows to you to replace several modules by loading their ROM images into one module.
    - NoV modules emulate the Advanced HEPAX (16K) module and the HEPAX Double Memory (16K) module.
      Also allows you to load several ROM images into the module.
    - USB-41 module emulate an HP-82143A thermal printer using a USB interface connected to a Windows application.
      Also allows you to load several ROM images into the module.
- More information is available at: www.clonix41.org

Notes

- This presentation (105 slides, 40m) is subset of a bigger one (163 slides, 2h) that was planned to be given at HHC2020. More information and the presentation file can be found at these links:

Museum thread ....:	www.hpmuseum.org/forum/thread-15460.html
Museum article ....:	www.hpmuseum.org/forum/thread-15459.html
HHC presentation ...:	www.hhcworld.com/files/hhc2020/sc-hhc2020-p.pdf
HPCC presentation .:	www.hhcworld.com/files/hhc2020/sc-hpcc2020-p.pdf

- All underlined text in this presentation represents a link to another slide, a web page or a web downloadable document.
- In September 2020, Diego updated some of his hardware & software, however, this presentation is mostly based on what was available before that update.

Acknowledgements

- **Diego Díaz …**
  - *for having created these fantastic modules.*
  - *for having created an easy to use application to configure them.*
  - *for his invaluable inputs in making this presentation more accessible.*
  - *for his patience & support.*
- **Monte Dalrymple …**
  - *for his dedication in keeping updated his HP-41 ROM's archive.*
  - *for his work on his 41CL and on his new add-on modules project. (41CL Home)*
  - *for his invaluable inputs in making this presentation more accessible.*
- **Ángel Martin …**
  - *for keeping the HP-41C alive by creating mind-blowing ROMs.*
  - *for his invaluable inputs in making this presentation more accessible.*
- **Robert Prosperi …**
  - *for his invaluable inputs in making this presentation more accessible.*
- **HP-41C users …**
  - *for still using the HP-41C and keeping it alive.*
  - *for buying Diego's modules allowing him to improve and release new versions.*

Goals

- In this presentation we will …
  - Review some key informations about the HP-41C system.
  - Discover Diego Díaz modules.
  - Cover every options of three modules. *(Clonix-D, NoV-64d & USB-41)*
  - Go through the programming process.
  - Go through the NoV runtime configuration.
  - Clear NoV HEPAX RAM content.
  - Transfer QROM page

REFERENCE

Table of Content

Memory Types

Type	Name	Content at power lost	Erase	Write	Used in ...	Comment
RAM	Random Access Memory	Erased	in-circuit (cell level)	in-circuit (cell level)	n/a	This is a family type. RAM Technologies includes: SRAM, DRAM, SDRAM, RDRAM, FRAM & others.
SRAM	Static RAM	Erased	in-circuit (cell level)	in-circuit (cell level)	Box: MLDL, RAMBOX Mod: HEPAX	
FRAM	Ferroelectric RAM	Preserved	in-circuit (cell level)	in-circuit (cell level)	Box: Mod: NoV	
QROM	Quasi-ROM	Follow RAM technology used	in-circuit (word level)	in-circuit (word level)	Box: MLDL, RAMBOX Mod: HEPAX, NoV	Virtual type, build with one of RAM technology. HP-41C ROM cell size is 10 bits word QROM implements ROM word with RAM
ROM	Read Only Memory	Preserved	n/a	at-creation (chip level)	Box: Mod: HP, CMT-20	
PROM	Programmable ROM	Preserved	n/a	out-of-circuit with a programmer (chip level)	Box: Mod: CMT-10	Also called OTP (One Time Programmable)
EPROM	Erasable PROM	Preserved	out-of-circuit ultraviolet light (chip level)	out-of-circuit with a programmer (chip level)	Box: MLDL, ROMBOX Mod: CMT-10, ZEPROM	
EEPROM	Electrically EPROM	Preserved	in-circuit (cell level)	in-circuit (cell level)	Box: Mod:	
Flash	Flash	Preserved	in-circuit (block level)	in-circuit (cell level)	Box: MLDL2000 Mod: NoV, Clonix	Two types of Flash: NOR (memory mapped, same usage as EEPROM) NAND (used for mass storage)

word = 10 bits / cell = generally one byte / block = 2^n bytes (ex.: 256 or 512 bytes) / chip = entire space of the integrated circuit (IC)
in-circuit : IC soldered on PCB or inserted in a socket / out-of-circuit : IC unsoldered from the PCB or removed from its socket

HP-41C ROM Words

- Access Type: direct
- Value Size: 10 bit words
- Addressing: 16 bit (4 bits for page & 12 bits for code => 16 pages of 4K word)
- Bank Switching: yes (4 banks for each 4K page)
- Notes:
  - ROM can also be PROM, EPROM, EEPROM or QROM.
  - A ROM page can be either statically or dynamically assigned to a page.
    - Static page: the 4K printer ROM is hardwired to page 6 even though the printer is plugged in one of the 4 ports at the back of the calculator.
    - Dynamic page: a standard 4K application module inserted into port 1 will normally be either mapped to page 8 or page 9.
  - Currently, on Diego's modules, when a bank switch occurs all pages within the module switches to the selected bank not just the page where switch was requested. Diego is working on a new firmware that will allow bank switch to work at the page level instead of at module level.

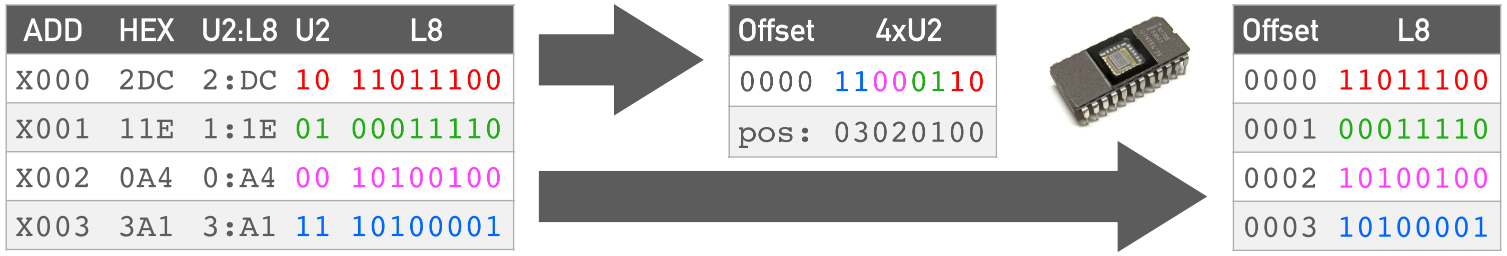
HP-41C RAM Registers

- Access Type: peripheral
- Value Size: 56 bit registers (7 bytes)
- Addressing: 12 bit (4096 registers addressable but only 1024 available)
- Bank Switching: no
- Notes:
  - 41C peripheral types:
    - RAM Registers, Display, Printer, Card-Reader, Wand, Time, HP-IL, etc.
  - Håkan Thörngren has modified the 41OS to access the full range of RAM addressable registers, but in order to use it you need an hardware device allowing 41OS replacement like the 41CL board or the MLDL2000 unit.
    Unfortunately none of Diego's modules has that capability.
    Alternative HP-41CL mainframe (OS ROMs) : www.hpmuseum.org/forum/thread-13729.html
  - Ángel Martin has created for the 41CL several modules (CLMEM, SandMatrix, etc.) that uses either some or all of the addressable registers.
    Documents: systemyde.com/hp41/documents.html & ROM Images: systemyde.com/hp41/archive.html

HP-41C ROM Memory Map

Page	Bank 1	Bank 2	Bank 3	Bank 4	Note
#0	NUT OS 0 ROM	N/A	N/A	N/A	Used by 41C/CV/CX OS
#1	NUT OS 1 ROM	N/A	N/A	N/A	Used by 41C/CV/CX OS
#2	NUT OS 2 ROM	N/A	N/A	N/A	Used by 41C/CV/CX OS
#3	X-Functions ROM (CX)	N/A	N/A	N/A	Avail. for 41C/CV Used by 41CX OS
#4	Disabled HP-IL Printer ROM, Diagnostic ROMs, Lib4 ROM	41CL Lib4 ROM			Takeover & System ROMs
#5	Time ROM, CX Time ROM	CX Ext. Functions ROM			CAT 2 - Start Page Order: #5..#F & #3
#6	Printer ROM				
#7	HP-IL ROM				
#8					Port 1 - Low
#9					Port 1 - High
#A					Port 2 - Low
#B					Port 2 - High
#C					Port 3 - Low
#D					Port 3 - High
#E					Port 4 - Low
#F					Port 4 - High

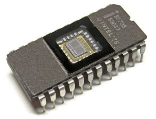
EPROM ROM File Format



ADD	HEX	U2:L8	U2	L8
X000	2DC	2:DC	10	11011100
X001	11E	1:1E	01	00011110
X002	0A4	0:A4	00	10100100
X003	3A1	3:A1	11	10100001

Offset	4xU2
0000	11000110
pos:	03020100

Offset	L8
0000	11011100
0001	00011110
0002	10100100
0003	10100001



- Format used by EPROM boxes and emulators.
- The ten bits word value is broken into two bits upper and eight bits lower.
- The upper two bits is merged with three other upper two bits values to create an eight bits value. All merged two bits values are save in an U2 file.
- All lower eight bits values are save in one or multiple L8 files.
- The U2 and L8 files get written into two or more EPROMs. *(dictated by the box used)*
- Example: for a 4 K (4096 x 10 bits) ROM, these two EPROM would be needed
  - 2708 for the U2 file. (8192 bits = 4096 x 2 bits = 1024 x 8 bits)
  - 2732 for the L8 file. (32768 bits = 4096 x 8 bits)

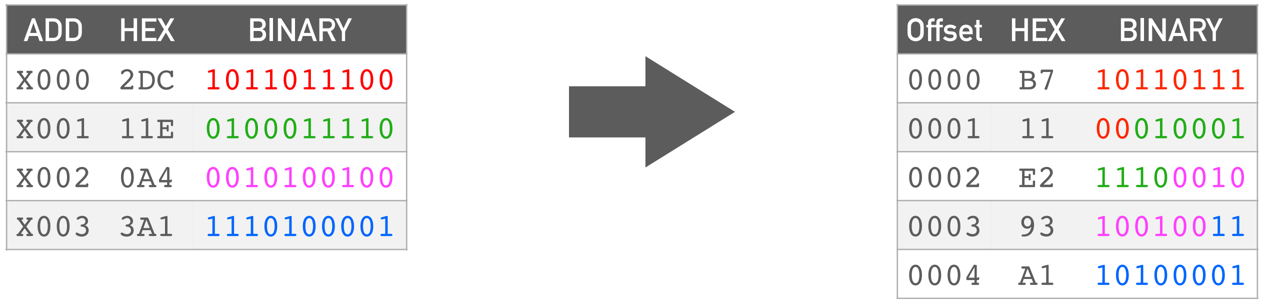
ERAMCO ROM File Format

ADD	HEX	BINARY
X000	2DC	1011011100
X001	11E	0100011110
X002	0A4	0010100100
X003	3A1	1110100001

Offset	HEX	BINARY
0000	C6	11000110
0001	A1	10100001
0002	A4	10100100
0003	1E	00011110
0004	DC	11011100

- Format used by ERAMCO MLDL, ZEPROM and emulators
- Four ten bits words are converted into five bytes.
- A 4096 words ROM is saved into a 5120 bytes file.
- HP-IL mass storage:
  - Save to: ERAMCO SAVEROM & ZEPROM ILSAVE.
  - Read from: ERAMCO GETROM & ZEPROM ILBURN.
- Tools:
  - rom41er convert a padded ROM file into a ERAMCO ROM file with LIF header.
  - er41rom convert a ERAMCO ROM file into a padded ROM file.

HEPAX ROM File Format

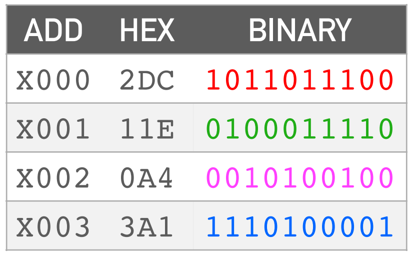


ADD	HEX	BINARY
X000	2DC	1011011100
X001	11E	0100011110
X002	0A4	0010100100
X003	3A1	1110100001

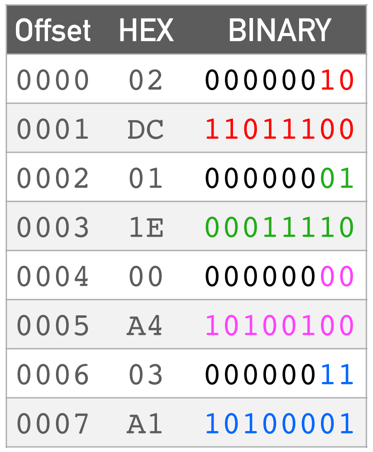
Offset	HEX	BINARY
0000	B7	10110111
0001	11	00010001
0002	E2	11100010
0003	93	10010011
0004	A1	10100001

- Format used by HEPAX and emulators
- Four ten bits words are converted into five bytes.
- A 4096 words ROM is saved into a 5120 bytes file.
- HP-IL mass storage:
  - Save to: HEPAX WRTROM.
  - Read from: HEPAX READROM.
- Tools:
  - rom41hx convert a padded ROM file into a HEPAX ROM file with LIF header.
  - hx41rom convert a HEPAX ROM file with LIF header into a padded ROM file.

Padded ROM File Format

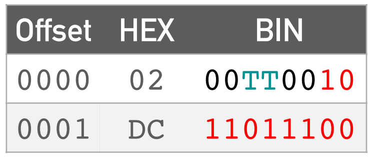


ADD	HEX	BINARY
X000	2DC	1011011100
X001	11E	0100011110
X002	0A4	0010100100
X003	3A1	1110100001



Offset	HEX	BINARY
0000	02	00000010
0001	DC	11011100
0002	01	00000001
0003	1E	00011110
0004	00	00000000
0005	A4	10100100
0006	03	00000011
0007	A1	10100001

- Format used by Clonix & NoV modules, 41CL, MLDL2000, some EPROM boxes and emulators.
- The ten bits word value is left padded with zero's to create a sixteen bits value.
- A 4096 words ROM is saved into a 8192 bytes file.
- 41CL:
  - NEWT processor uses bit 13 & 12 (TT) to manage its turbo feature.
  - 41CL CX system ROMs has been "turbo" modified.



Offset	HEX	BIN
0000	02	00TT0010
0001	DC	11011100

- Tools:
  - rom41lif convert a padded ROM file into a ROM file with LIF header.

MOD ROM Format

ADD	HEX	BINARY
X000	2DC	1011011100
X001	11E	0100011110
X002	0A4	0010100100
X003	3A1	1110100001

Offset	HEX	BINARY
0000	DC	11011100
0001	7A	01111010
0002	44	01000100
0003	4A	01001010
0004	E8	11101000

- Format used in MOD file format.
- Four ten bits words are converted into five bytes.
- A 4096 words ROM is converted into a 5120 bytes array.
- Tools:
  - lifmod can export MOD ROM images to padded ROM files.

MOD File Format

- Format used by MLDL2000, DM41X and emulators.
- Can hold up to 255 ROMs.
- Tools:
  - lifmod can list the content of a MOD file.
  - MLDL2000 GUI can create, read and update a MOD file.

ModuleFileHeader	ModuleFilePages [0..255]		
	ModuleFilePage 0	ModuleFilePage 1	ModuleFilePage X
729 Bytes	5188 Bytes	5188 Bytes	5188 Bytes

```
typedef struct
{
   char FileFormat          [5];
   char Title              [50];
   char Version            [10];
   char PartNumber         [20];
   char Author             [50];
   char Copyright         [100];
   char License           [200];
   char Comments          [255];
   byte Category;
   byte Hardware;
   byte MemModules;
   byte XMemModules;
   byte Original;
   byte AppAutoUpdate;
   byte NumPages;
   byte HeaderCustom       [32];
}
ModuleFileHeader; // struct size = 729 bytes
```

Category	
Value	Description
0	Undefined
1	Operating System
2	Application PAC
3	HP-IL Peripheral
4	Standard Peripheral
5	Custom Peripheral
6	Beta
7	Experimental

MemModules	
Value	Description
0	No Memory Module
1	1 Memory Module
2	2 Memory Modules
3	3 Memory Modules
4	4 Memory Modules

Original	
Value	Description
0	Updated
1	Original

Hardware	
Value	Description
0	None
1	82143A Printer
2	82104A Card Reader
3	82182A Time Module
4	82153A Barcode Wand
5	82160A HP-IL Module
6	82242A IR Printer Module
7	HEPAX Module
8	W&W RAMBox
9	MLDL2000
10	Clonix/NoV Modules

XMemModules	
Value	Description
0	None
1	X-Functions/Memory
2	XFM + 1 X-Mem Module
3	XFM + 2 X-Mem Modules

AppAutoUpdate	
Value	Description
0	Do Not Update
1	Overwrite

```
typedef struct
{
   char Name               [20];
   char ID                  [9];
   byte Page;
   byte PageGroup;
   byte Bank;
   byte BankGroup;
   byte RAM;
   byte WriteProtect;
   byte FAT;
   byte Image            [5120];  // MOD ROM Format
   byte PageCustom         [32];
}
ModuleFilePage; // struct size = 5188 bytes
```

References:

hp.giesselink.com/v41.htm

www.hpcalc.org/details/3695

www.hp41.org/LibView.cfm?Command=View&ItemID=1352 (login required)

MOD File Example

ModuleFileHeader	ModuleFilePages [0..255]		
	ModuleFilePage 0	ModuleFilePage 1	ModuleFilePage X
729 Bytes	5188 Bytes	5188 Bytes	5188 Bytes

FileName: **HPIL.MOD**

ModuleFileHeader
FileFormat: **MOD1**
Title: **HP-IL Module**
Version: **EH**
PartNumber: **82160A**
Author: **Hewlett-Packard**
Copyright: **Hewlett-Packard**
License: **Hewlett-Packard Company makes no warranty as to the accuracy or completeness of the foregoing information and hereby disclaims any responsibility therefore.**
Comments:
Category: **3** *(HP-IL Peripheral)*
Hardware: **5** *(82160A HP-IL Module)*
MemModules: **0** *(no memory modules)*
XMemModules: **0** *(no extended memory)*
Original: **1** *(yes)*
AppAutoUpdate: **0** *(no)*
NumPages: **2**
HeaderCustom:

ModuleFilePage [0]
Name: **ILPrinter-2E**
ID: **PL2E**
Page: **6** *(must be in this location)*
PageGroup: **0** *(not grouped)*
Bank: **1**
BankGroup: **0** *(not grouped)*
RAM: **0** *(no)*
WriteProtect: **0** *(no or not applicable)*
FAT: **1** *(yes)*
Image: **[IL Printer rom image : 5120 bytes in MOD ROM format]**
PageCustom:

ModuleFilePage [1]
Name: **ILModule-1H**
ID: **CS1H**
Page: **7** *(must be in this location)*
PageGroup: **0** *(not grouped)*
Bank: **1**
BankGroup: **0** *(not grouped)*
RAM: **0** *(no)*
WriteProtect: **0** *(no or not applicable)*
FAT: **1** *(yes)*
Image: **[IL Module rom image : 5120 bytes in MOD ROM format]**
PageCustom:

LIF File Header

- Logical Information Format.
- LIF Header length is 32 bytes.
- Craig A. Finseth's LIF Page.
  www.finseth.com/hpdata/lif.php
- Dan McDonald's HP-IL Files.
  www.hpmuseum.org/cgi-sys/cgiwrap/hpmuseum/articles.cgi?read=24
- Joachim Siebold's lifutils.
  github.com/bug400/lifutils
  - Based on works from Tony Duell, Leo Duran, Warren Furlow, Christophe Gottheimer, Heinz W. Werntges & Matrin Kroeker.

Offset	Length	Description
0	10	File name
10	2	File type (see table below)
12	4	Start block
16	4	Allocated length in blocks
20	6	Creation date & time [YYMMDDHHMMSS]
26	6	Miscellaneous data

Type	Name	Description
E020	WAXM41	HP-41 write all with X-Memory
E030	XM41	HP-41 write all with X-Memory
E040	ALL41	HP-41 write all
E050	KEY41	HP-41 user keys assignment
E060	STAT41	HP-41 status
E070	X-M41	HP-41 ROM ERAMCO
E080	PGM41	HP-41 FOCAL program
E0D0	SDATA	HP-41 data file

HEPAX 4K RAM Structure

Addr.	HEX	Comment
X000		XROM Number, HEPAX assign an unused XROM ID
X001	000	CAT Entries, 00 = none, set to zero by HEPAX
X002	000	
X...	000	FAT Space (64 fn + end-of-fat), unused and set to zero by HEPAX
X083	000	
X084	000	
X...	000	Unused by HEPAX
X08F	000	
X090		
X...		HEPAX Data
XFE5		
XFE6	000	Unknown, spacer ?
XFE7	000	HEPAX pages linked list: previous page (000 = end of list)
XFE8	000	HEPAX pages linked list: next page (000 = end of list)
XFE9	091	HEPAX first file address
XFEA	000	0091
XFEB	000	HEPAX active File address
XFEC	000	0000 (0000 = None)
XFED	090	HEPAX usable space start address
XFEE	000	0090
XFEF	091	HEPAX next file address
XFF0	000	0091
XFF1	0E5	HEPAX usable space end address
XFF2	00F	0FE5
XFF3	200	Initial value = 100 and set to 200 after initialization
XFF4	000	IVT Pause Loop, unused and set to zero by HEPAX
XFF5	000	IVT Main Running Loop, unused and set to zero by HEPAX
XFF6	000	IVT Deep Sleep Wake up, no key down, unused and set to zero by HEPAX
XFF7	000	IVT Off, unused and set to zero by HEPAX
XFF8	000	IVT I/O Service, unused and set to zero by HEPAX
XFF9	000	IVT Deep Sleep Wake up, unused and set to zero by HEPAX
XFFA	000	IVT Cold Start, unused and set to zero by HEPAX
XFFB	000	
XFFC	000	ROM Trailer, unused and set to zero by HEPAX
XFFD	000	
XFFE	000	
XFFF	000	Checksum, unused and normally set to zero by HEPAX

Note: HEPAX RAM structure decoding is a work in progress and may contains invalid information, please use with caution.

OVERVIEW

Table of Content

- Modules
- Software

MODULES

Table of Content

- History
- Timeline
- Specification Table
- Specification Notes
- Resources & Web Links

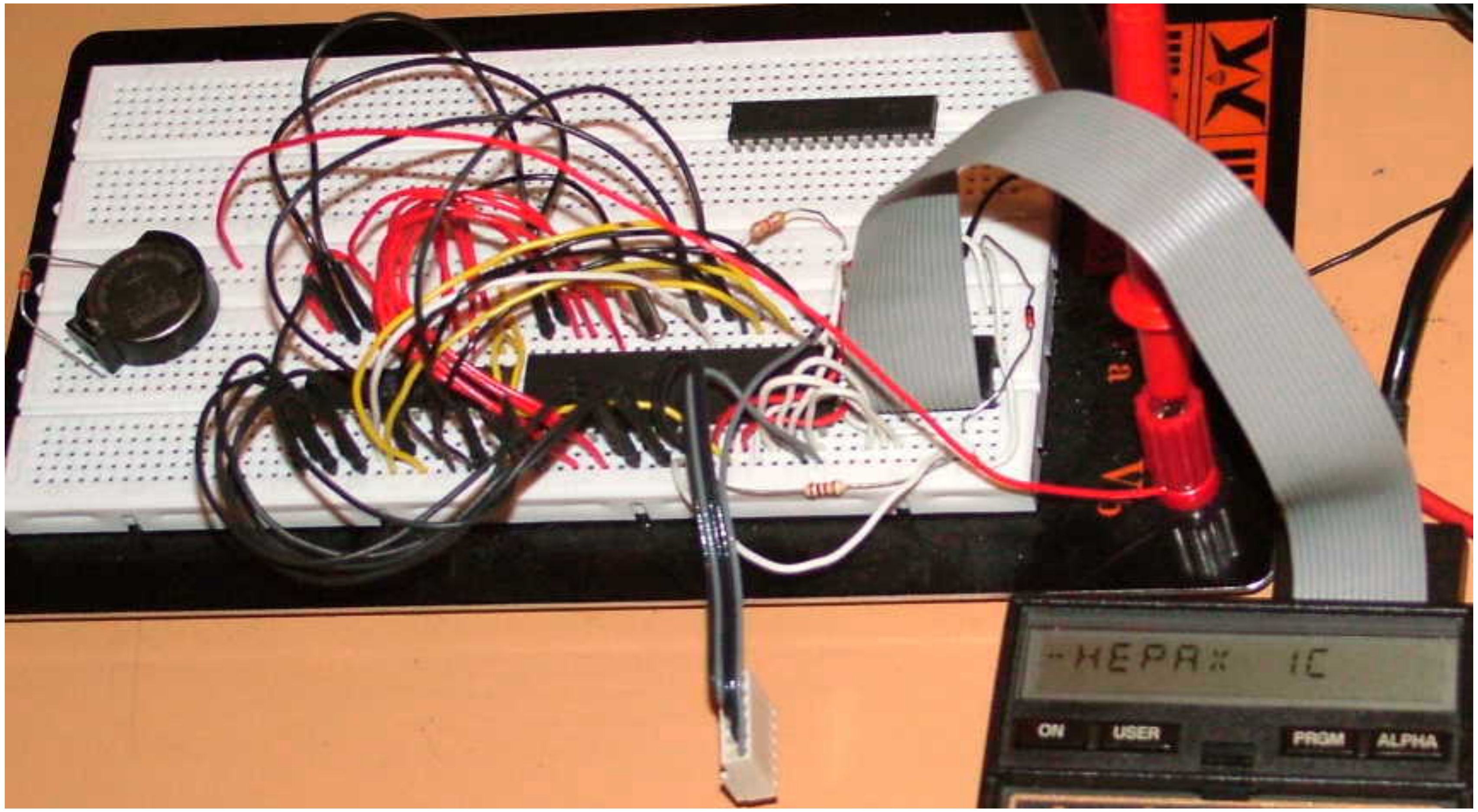
History

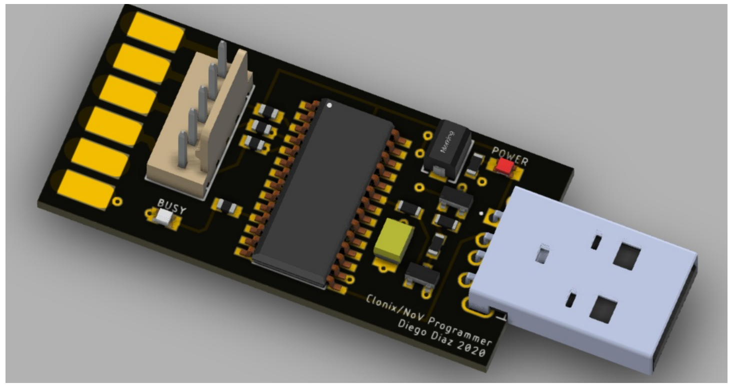
Date	EPROM Devices	MLDL Devices (RAM/EPROM)
Nov 1981	HHP-16K (16K)	
Apr 1982		MLDL-I (4K)
Jun 1982	ProtoEPROM (4K,8K,16K)	ProtoCODER (4K)
??? 1982	HHP-32K (32K)	
Jan 1983	HP-IL EPROM Programmer	MLDL-II
Jun 1983	ERAMCO (24K)	ESMLDL 1 (8K/24K)
Sep 1983	HHP-PE (32K)	
Nov 1983		ProtoCODER-2 (4K)
Jun 1984	MBK-16 (16K)	MBK-ProfiSET (16K/8K)
Aug 1984	ERAMCO (32K)	ESMLDL (8K/24K)
Dec 1984	CMT-100 (4K,8K,16K)	
Aug 1985	CMT-110 (16K,32K)	
	CMT-10 (4K,8K,16K)	
Dec 1985	W&W EPROMBOX (32K)	W&W RAMBOX (32K)
Dec 1985		ERAMCO RSU1 (16K)
Jan 1986	SOS HP-IL EPROM Programmer	
Apr 1988	ZEPROM (16K)	
??? 1988		W&W RAMBOX II (64K)
		ES RAMBOX (32K,64K,128K)
		HEPAX (8K)
		HEPAX Memory (8K)
		Adv. HEPAX (16K)
		HEPAX Double Memory (16K)
Sep 2005		MLDL2000 (512K/2M Flash)

Main reference: Jeremy Smith, CHHU v2n7p59, Nov. 1985

Timeline

Date	Module	Event	
Mar 2003	Clonix	project started	1st Generation
Jul 2003	1st MLDL	built (7)	
Sep 2003	1st Module	built (8)	
Dec 2003	Clonix 41	released (1 & 2)	
Mar 2004	NoVRAM	project started	
Jul 2004	NoVRAM	released (1 & 3)	
Oct 2005	NoV-32	released (1 & 4)	
May 2008	Clonix-D	released (1 & 5)	2nd Generation
Sep 2008	NoV-64	released (1 & 5)	
Apr 2012	USB-41	released (1 & 6)	
Dec 2013	Clonix 41	discontinued	1st Gen. Discontinued & 2nd Gen. Updated
	NoVRAM	discontinued	
	NoV-32	discontinued	
	NoV-64	discontinued	
	NoV-64d	released (1 & 5)	
	Clonix 41d	Anniversary Ed.	
Sep 2020	USB-41	re-released	
Sep 2020	PICkit 2	released	





Specifications Table

Features \ Modules	Clonix 41 ^{silver}	Clonix 41 ^{gold}	Clonix 41d ^{gold}	Clonix-D *	USB-41	USB-41 *	NoVRAM	NoV-32	NoV-64	NoV-64d *
Released ^ Discontinued	2003-12 ^ 2013-12	2003-12 ^ 2013-12	2013-12 ^ 2013-12	2008-05 ^ Now	2012-04 ^ 2020-09	2020-09 ^ Now	2004-07 ^ 2013-12	2005-10 ^ 2013-12	2008-09 ^ 2013-12	2013-12 ^ Now
Microcontroller	PIC18LF252	PIC18LF252	PIC18LF252	PIC18LF2620	PIC18LF2620	PIC18LF2620	PIC18LF252	PIC18LF252	PIC18LF2620	PIC18LF2620
ROM size	24K words	24K words	24K words	48K words	48K words	48K words	24K words	24K words	48K words	48K words
ROM pages	6	6	6	6	12	12	6	6	6	6
ROM blocks	1	1	1	2	1	1	1	1	2	2
ROM blocks mergeable	—	—	—	✓	×	×	—	—	✓	✓
ROM hard preload	none	none	none	none	82143A (4x4K)	82143A (4x4K)	HEPAX (4x4K)	HEPAX (4x4K)	HEPAX (4x4K)	HEPAX (4x4K)
ROM pages available	6	6	6	12	8 (12-4)	8 (12-4)	2 (6-4)	2 (6-4)	8 (12-4)	8 (12-4)
ROM block select (a) (b)	—	—	Port Sensing	Port Sensing	—	—	—	—	Control Word	Control Word
RAM size	512 words	512 words	512 words	—	—	—	16K words	32K words	64K words	64K words
RAM pages (c)	0.125 or 1/8	0.125 or 1/8	0.125 or 1/8	—	—	—	4	4	4	4
RAM blocks	1	1	1	—	—	—	1	2	4	4
RAM block select (b)	—	—	—	—	—	—	—	Control Word	Control Word	Control Word
RAM type (d)	SRAM	SRAM	SRAM	—	—	—	FRAM	FRAM	FRAM	FRAM
Page shadowing (e)	ROM	ROM	ROM	ROM	ROM	ROM	ROM & RAM	ROM & RAM	ROM & RAM	ROM & RAM
HEPAX support	✓ (ROM only)	✓ (ROM only)	✓ (ROM only)	—	—	—	✓	✓	✓	✓
HEPAX ROM relocation	×	×	×	—	—	—	✓	✓	✓	✓
HEPAX RAM protection	—	—	—	—	—	—	✓	✓	✓	✓
HEPAX RAM max mapped	—	—	—	—	—	—	16K	16K	32K	32K
41C 1.7x turbo mode (f)	×	✓	✓	×	×	×	×	×	×	×
41CL compatible	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bank switching (4 banks)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Diagnostic modules	single	single	single & double	single & double	×	×	single	single	single	single
Advantage module	✓	✓	✓	✓	×	×	✓	✓	✓	✓
Forth-41	✓	✓	✓	✓	×	×	×	×	×	×
Double HEPAX RAM	—	—	—	—	—	—	✓	✓	✓	✓
Double X-Memory	×	×	×	✓	×	×	×	×	✓	✓
W&W HP-41CY / RAMBox64	—	—	—	—	—	—	×	×	✓	✓
Page transfer to/from PC	×	×	×	×	✓ (g)	✓ (g)	×	×	✓	✓
USB/RS-232 chip	—	—	—	—	Prolific PL2303	FTDI FT232BL	—	—	—	—
Alternate persona (h)	—	—	— (i)	—	—	—	Clonix 41	Clonix 41	Clonix-D (j)	Clonix-D (k)
Pwr: sleep^{uA}\standby^{uA}\run^{mA}	10 \ 100 \ 9.5	10 \ 100 \ 13.5	10 \ 100 \ 13.5	—	—	—	—	—	—	—
Module price:	—	—	—	100.00 €	—	110.00 €	—	—	—	140.00 €
PICkit2 Programmer price:	—	—	—	40.00 €	—	40.00 €	—	—	—	40.00 €

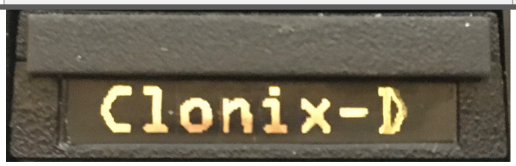
Legend: [✓ : yes] [× : no] [— : n/a]

** Available at www.clonix41.org*

Specifications Table

Features \ Modules	Clonix-D *	NoV-64d *	USB-41 *
ROM size	48K words	48K words	48K words
ROM pages	6	6	12
ROM blocks	2	2	1
ROM blocks mergeable	✓	✓	×
ROM preload	none	HEPAX (4x4K)	82143A (4x4K)
ROM pages available	12	8 (12-4)	8 (12-4)
ROM block select (a) (b)	Port Sensing	Control Word	—
RAM size	—	64K words	—
RAM pages (c)	—	4	—
RAM blocks	—	4	—
RAM block select (b)	—	Control Word	—
RAM type (d)	—	FRAM	—
Page shadowing (e)	ROM	ROM & RAM	ROM
HEPAX support	—	✓	—
HEPAX ROM relocation	—	✓	—
HEPAX RAM protection	—	✓	—
HEPAX RAM max mapped	—	32K	—
Double X-Memory	✓	✓	×
W&W HP-41CY / RAMBox64	—	✓	—
Page transfer to/from PC	×	✓	✓ (g)
Alternate persona (h)	—	Clonix-D (k)	—
Module price:	100.00 €	140.00 €	110.00 €
PICkit2 Programmer price:	40.00 €	40.00 €	40.00 €

Legend: [✓ : yes] [× : no] [— : n/a]



* *Available at www.clonix41.org*

Specifications Notes

a. A port sensing module is able to select a Flash block based on its plugged location (odd or even port).

b. Control word allows to choose which RAM and/or Flash block is mapped into the HP-41C memory space.

c. 4K RAM pages can be configured as HEPAX RAM (default) or QROM.

d. When module is unplugged SRAM content is lost while FRAM content is preserved.

e. Page shadowing allows a physical module to take precedence over a Clonix or NoV module mapped page.

f. When configured with the **Standard 6P** option, the module is able to work in a speed up HP-41C (1.7X turbo hardware upgrade).

g. USB-41 can transfer an HP-41 ROM to a Padded ROM file on a PC but need a RAMBox/MLDL/NoV unit to transfer a Padded ROM file from a PC to a QROM space on the HP-41.

h. NoV modules can be programmed and act as a Clonix module.

i. Clonix 41d Anniversary Edition was delivered pre-loaded with Service Module 1C (C/CV) active in even ports and Service Module 2A (CV/CX) active in odd ports.

j. NoV-64 lack the port sensing hardware of the Clonix-D module.

k. NoV-64d is in fact two modules in one. It can be either configured as a NoV-64 module or as a full Clonix-D module.

Resources and web links

➤ Diego Díaz Projects

1. Clonix & NoV Configuration Utility (v4.2)
   www.clonix41.org/Projects/Updates/Clonix_CD_090315.zip

2. Clonix 41 Project Page & Manual
   www.clonix41.org/Projects/Clonix-41/Cloni41_00.htm
   www.clonix41.org/Projects/Clonix-41/clonix_man.zip

3. NoVRAM Project Page & Support Files
   www.clonix41.org/Projects/Novram/Novram_00.htm
   www.clonix41.org/Projects/Novram/novram-hepax.zip

4. NoV-32 Project Page, Manual & Support Files
   www.clonix41.org/Projects/Nov32/Nov32_00.htm
   www.clonix41.org/Projects/Nov32/New_HW.htm
   www.clonix41.org/Projects/Nov32/NoV-32_Usr-man.pdf
   www.clonix41.org/Projects/Nov32/NoV-32_SW.zip

5. NoV-64 Project Page & Manual
   www.clonix41.org/Projects/Nov64/Nov64_00.htm
   www.clonix41.org/Projects/Nov64/NoV-64v08r_Man3.pdf

6. USB-41 Application, Manual & Support Files
   www.clonix41.org/Projects/USB-82143A/USB-82143A.zip
   www.clonix41.org/Projects/USB-41/USB-41-4.rar

ClonixConfig (v6.1) & Utilities Update (2020-09)
www.dropbox.com/s/ene5dbwq3r8qr14/Updt_2020-09.zip

Other Projects & Files
Modules Chart : *www.clonix41.org/Projects/Clonix-NoV_chart.pdf*
I/O Block : *www.clonix41.org/Maintenance/IO_Block/IO_Block.htm*

➤ Other Projects & Web Sites

7. Based on Lynn A. Wilkins design, developer of the first Machine Language Development Lab. PPC Journal V9N3P27 (PAHHC Jake Schwartz)
   www.pahhc.org/ppccdrom.htm

8. Using the ROM-PAC emulation code for PIC18C252 written by John Ioannidis.
   archived.hpcalc.org/museumforum/thread-9845.html

9. HHP-16K EPROM Emulator Introduction
   www.embeddedcomponents.com/blogs/2007/09/introduction-to-hhp-16k-eprom-emulator/

10. MLDL2000 (Meindert Kuiprs)
    hp41.kuiprs.nl/hp41.htm

HP-41C Dedicated Site (Warren Furlow)
www.hp41.org

HP-41C ROM Images (Monte Dalrymple)
systemyde.com/hp41/archive.html

HP Calculators Museum (David Hicks)
www.hpmuseum.org
www.hpmuseum.org/forum/index.php

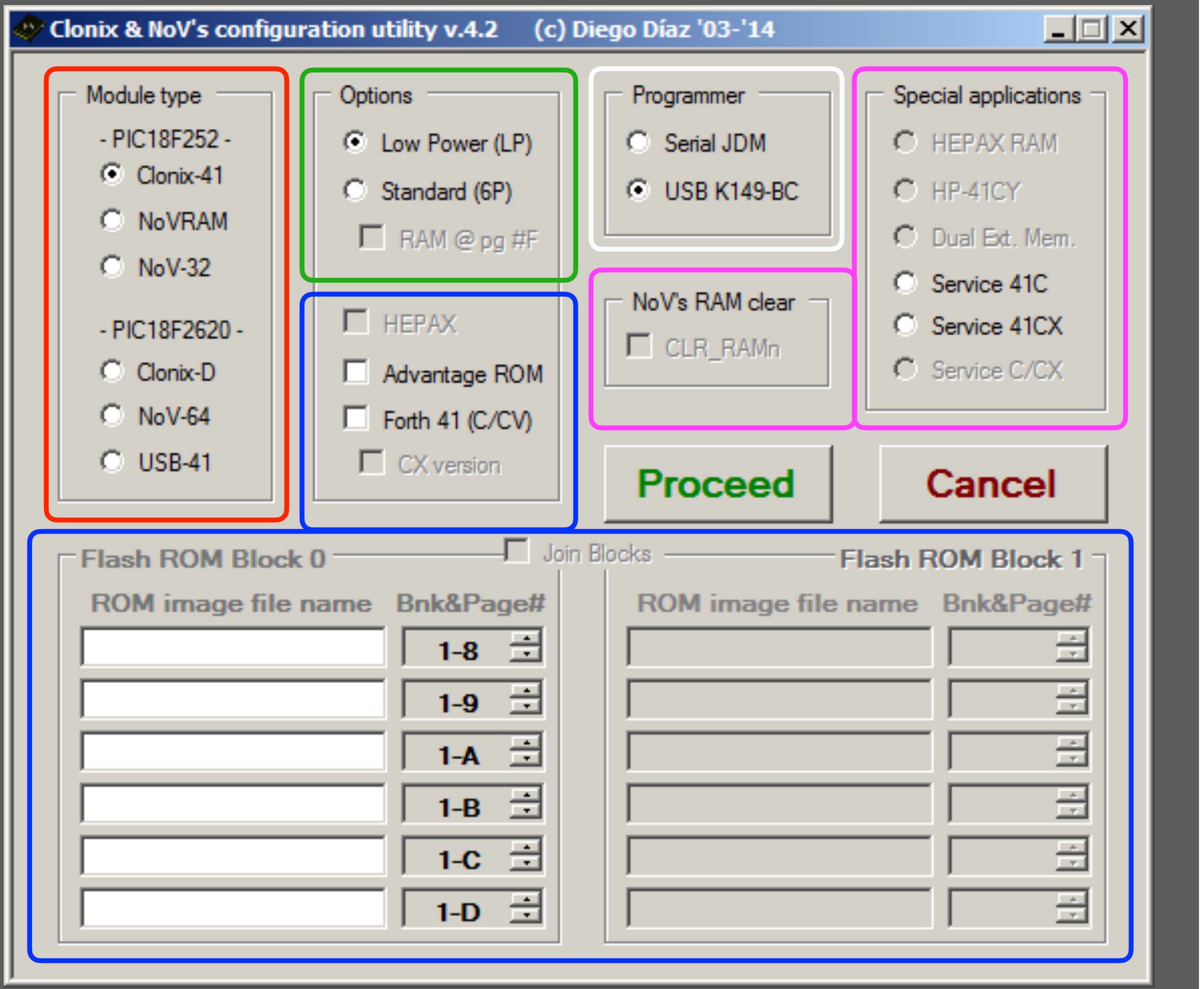
HP Calc. Museum Archives (Eric Rechlin)
archived.hpcalc.org/museumforum/

Silicium Forum (French Site, Hand Held Section)
http://www.silicium.org/forum/viewforum.php?f=46

SOFTWARE

Table of Content

Configuration Utility v4.2



Clonix & NoV's configuration utility v.4.2   (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
● Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F

□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

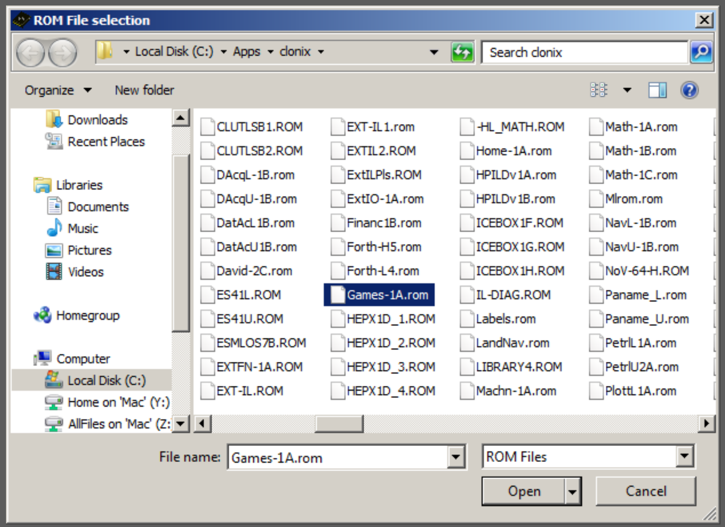
Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Flash ROM Block 0   □ Join Blocks   Flash ROM Block 1

ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
	1-8		
	1-9		
	1-A		
	1-B		
	1-C		
	1-D		



ROM File selection

CLUTLSB1.ROM
CLUTLSB2.ROM
DAcqL-1B.rom
DAcqU-1B.rom
DatAcL1B.rom
DatAcU1B.rom
David-2C.rom
ES41L.ROM
ES41U.ROM
ESMLOS7B.ROM
EXTFN-1A.ROM
EXT-IL.ROM
EXT-IL1.rom
EXTIL2.ROM
ExtILPls.ROM
ExtIO-1A.rom
Financ1B.rom
Forth-H5.rom
Forth-L4.rom
Games-1A.rom
HEPX1D_1.ROM
HEPX1D_2.ROM
HEPX1D_3.ROM
HEPX1D_4.ROM
-HL_MATH.ROM
Home-1A.rom
HPILDv1A.rom
HPILDv1B.rom
ICEBOX1F.ROM
ICEBOX1G.ROM
ICEBOX1H.ROM
IL-DIAG.ROM
Labels.rom
LandNav.rom
LIBRARY4.ROM
Machn-1A.rom
Math-1A.rom
Math-1B.rom
Math-1C.rom
Mlrom.rom
NavL-1B.rom
NavU-1B.rom
NoV-64-H.ROM
Paname_L.rom
Paname_U.rom
PetrlL1A.rom
PetrlU2A.rom
PlottL1A.rom

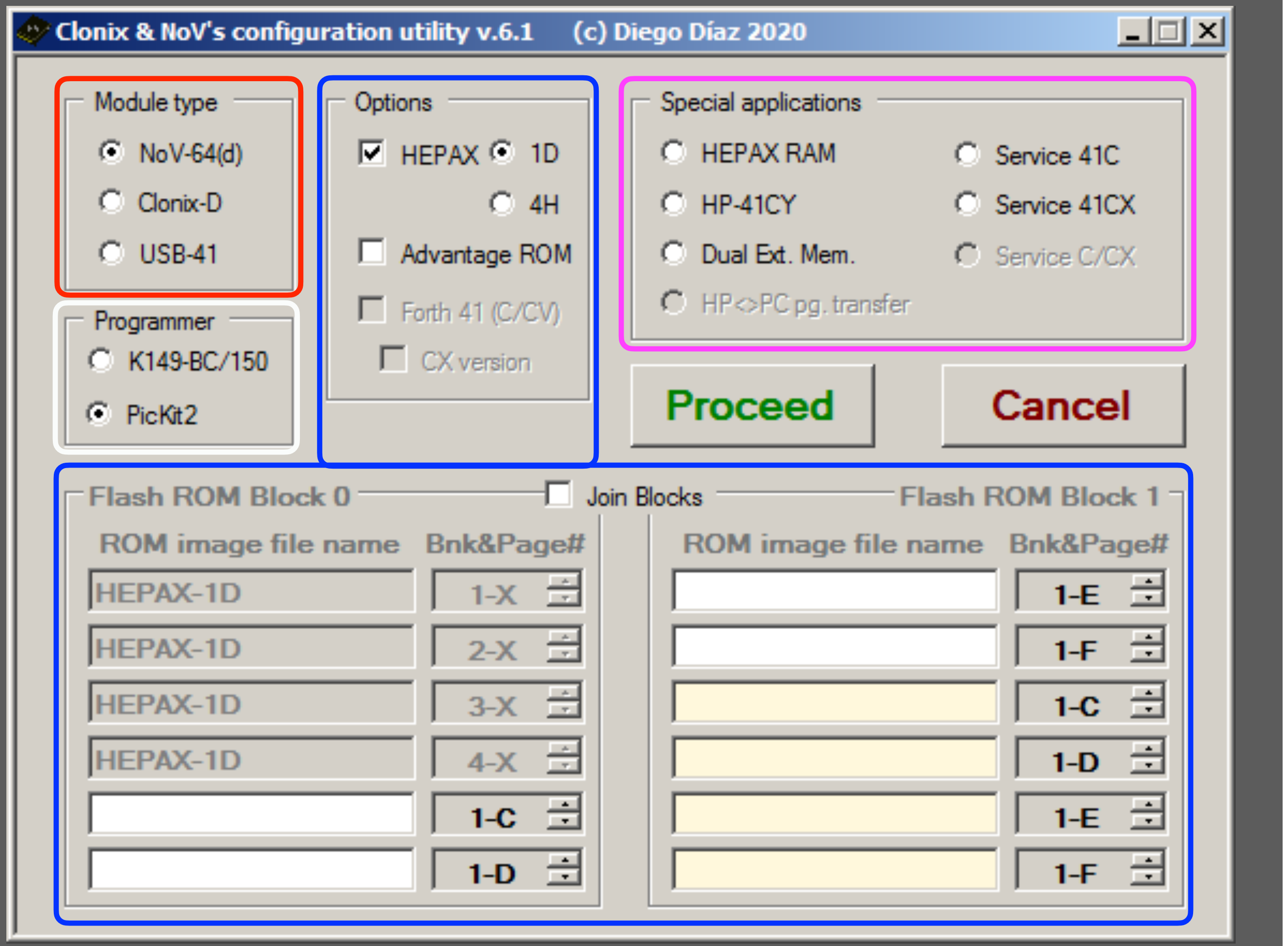
File name: Games-1A.rom   ROM Files

- Windows application for configuring Clonix and NoV modules based on PIC18F2620 or PIC18F252.
- **Module Type** group *(red)* is where you select your module.
- **Options** group *(green)* is specific to the Clonix-41 module.
- **Options** and **Flash ROM** groups *(blue)* is where you select pre-configured ROM images and/or manually loaded ROM images.
  - ROM File Selection dialog box appears each time you click in one of the ROM image file name text boxes.
- **Special applications** and **NoV's RAM clear** groups *(pink)* is where you select an atypical functionality.

Pink and Blue+Green rectangles options are mutually exclusive.

- **Programmer** group *(white)* is where you select which type of PIC programmer you are using: RS-232 or USB.
- **Proceed** button
  - generate an assembly file.
  - call the Microchip PIC assembler that compile the assembly source code and generate an Intel hex file.
  - call the PIC programming software to transfer the hex file to the module.
- **Cancel** button exit the application.

Configuration Utility v6.1



Clonix & NoV's configuration utility v.6.1 (c) Diego Díaz 2020

Module type: ● NoV-64(d) ○ Clonix-D ○ USB-41

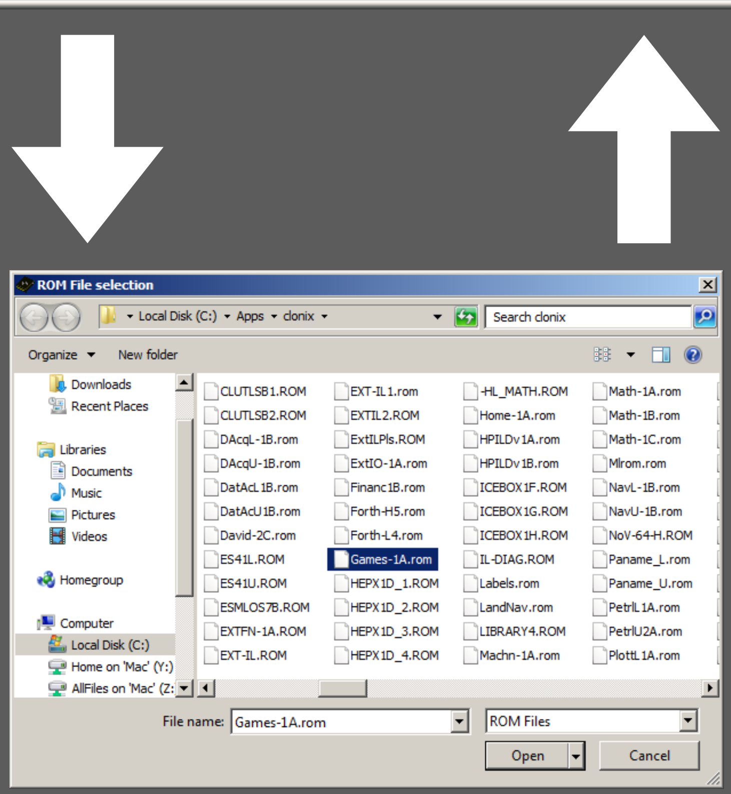
Programmer: ○ K149-BC/150 ● PicKit2

Options: ☑ HEPAX ● 1D ○ 4H; □ Advantage ROM; □ Forth 41 (C/CV); □ CX version

Special applications: ○ HEPAX RAM ○ HP-41CY ○ Dual Ext. Mem. ○ HP<>PC pg. transfer ○ Service 41C ○ Service 41CX ○ Service C/CX

□ Join Blocks

Flash ROM Block 0: ROM image file name	Bnk&Page#	Flash ROM Block 1: ROM image file name	Bnk&Page#
HEPAX-1D	1-X		1-E
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
	1-C		1-E
	1-D		1-F



ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix

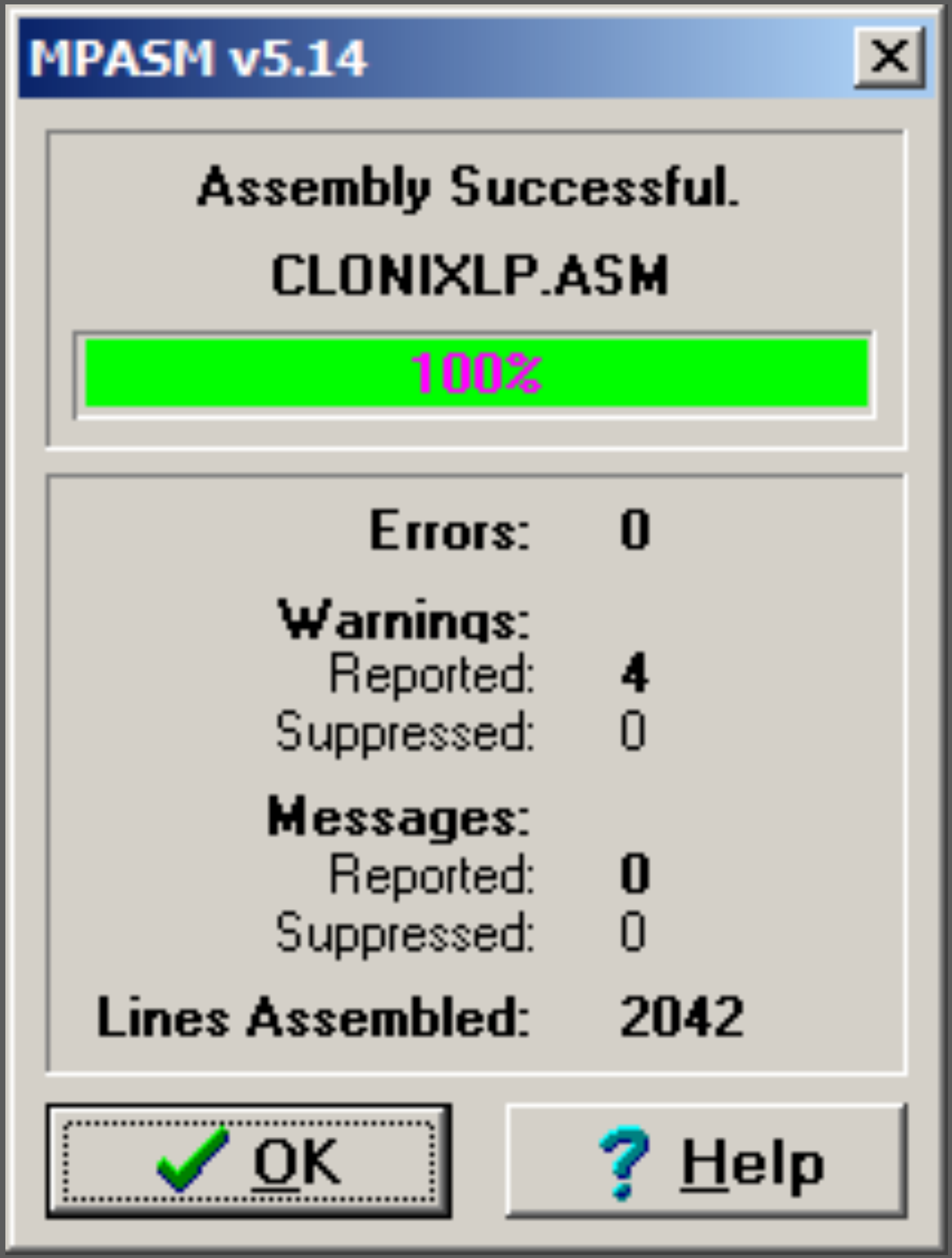
File name: Games-1A.rom

ROM Files

- ➤ Windows application for configuring Clonix and NoV modules based on PIC18F2620 or later.
- ➤ **Module Type** group *(red)* is where you select your module.
- ➤ **Options** and **Flash ROM** groups *(blue)* is where you select pre-configured ROM images and/or manually loaded ROM images.
  - ➤ ROM File Selection dialog box appears each time you click in one of the ROM image file name text boxes.
- ➤ **Special applications** and **NoV's RAM clear** groups *(pink)* is where you select an atypical functionality.

Pink and Blue rectangles options are mutually exclusive.

- ➤ **Programmer** group *(white)* is where you select which type of USB PIC programmer you are using.
- ➤ **Proceed** button
  - ➤ generate an assembly file.
  - ➤ call the Microchip PIC assembler that compile the assembly source code and generate an Intel hex file.
  - ➤ call the PIC programming software to transfer the hex file to the module.
- ➤ **Cancel** button exit the application.



MPASM v5.14

Assembly Successful.

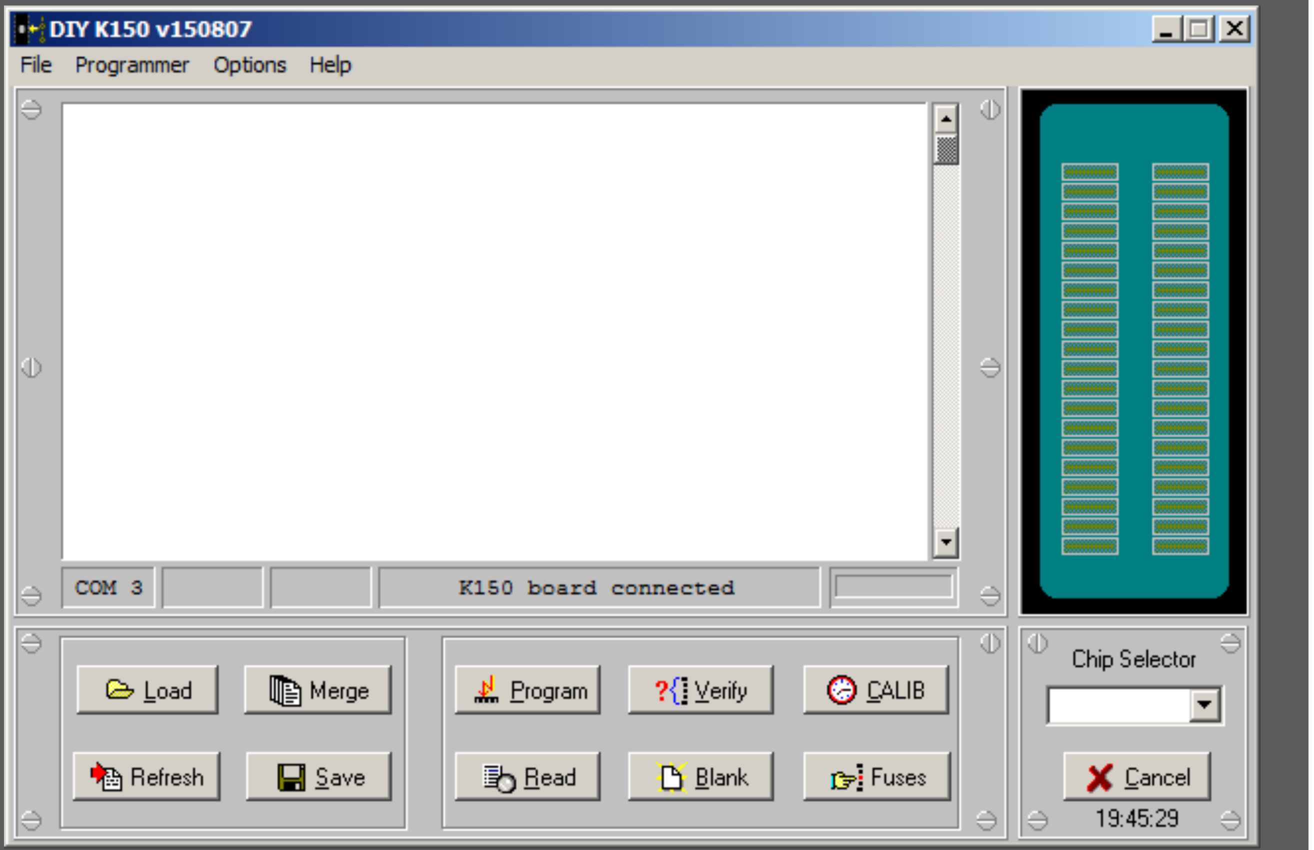
CLONIXLP.ASM

100%

```
          Errors:    0

        Warnings:
        Reported:    4
      Suppressed:    0

        Messages:
        Reported:    0
      Suppressed:    0

Lines Assembled:     2042
```

MPASM

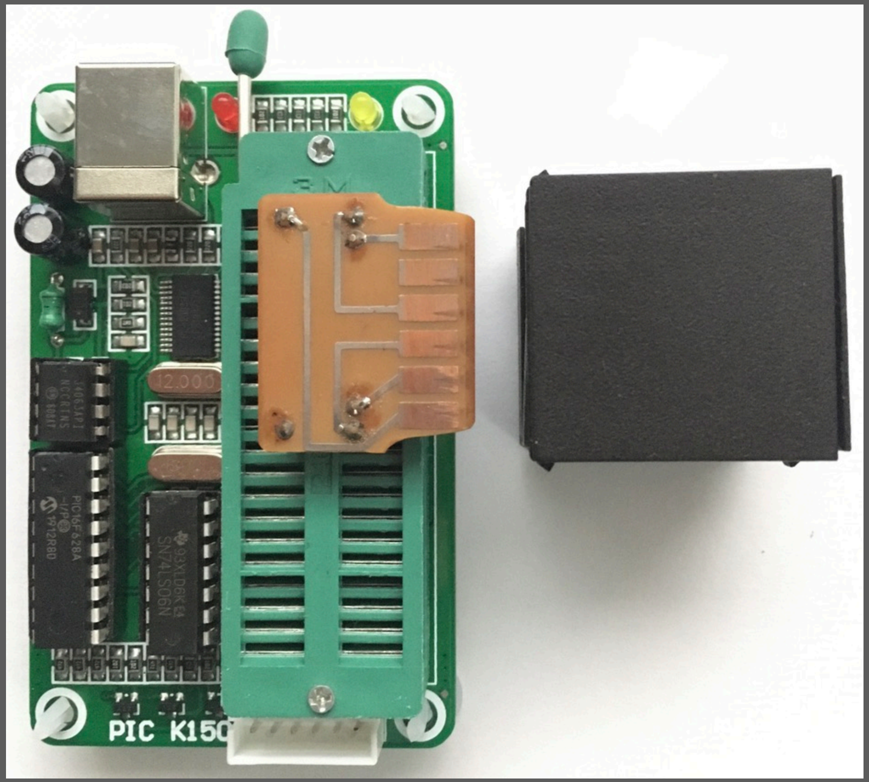
- ➤ Assembler made by Microchip for their Peripheral Interface Controller (PIC) and called by Clonix & NoV Configuration Utility.
- ➤ MPASM take the assembly file created by Clonix & NoV Configuration Utility, generate an executable binary file for the PIC microcontroller then serialize it as an extended Intel HEX file format.
- ➤ Included in Clonix & NoV Configuration Utility v4.2 and v6.1 packages.



COM 3

K150 board connected

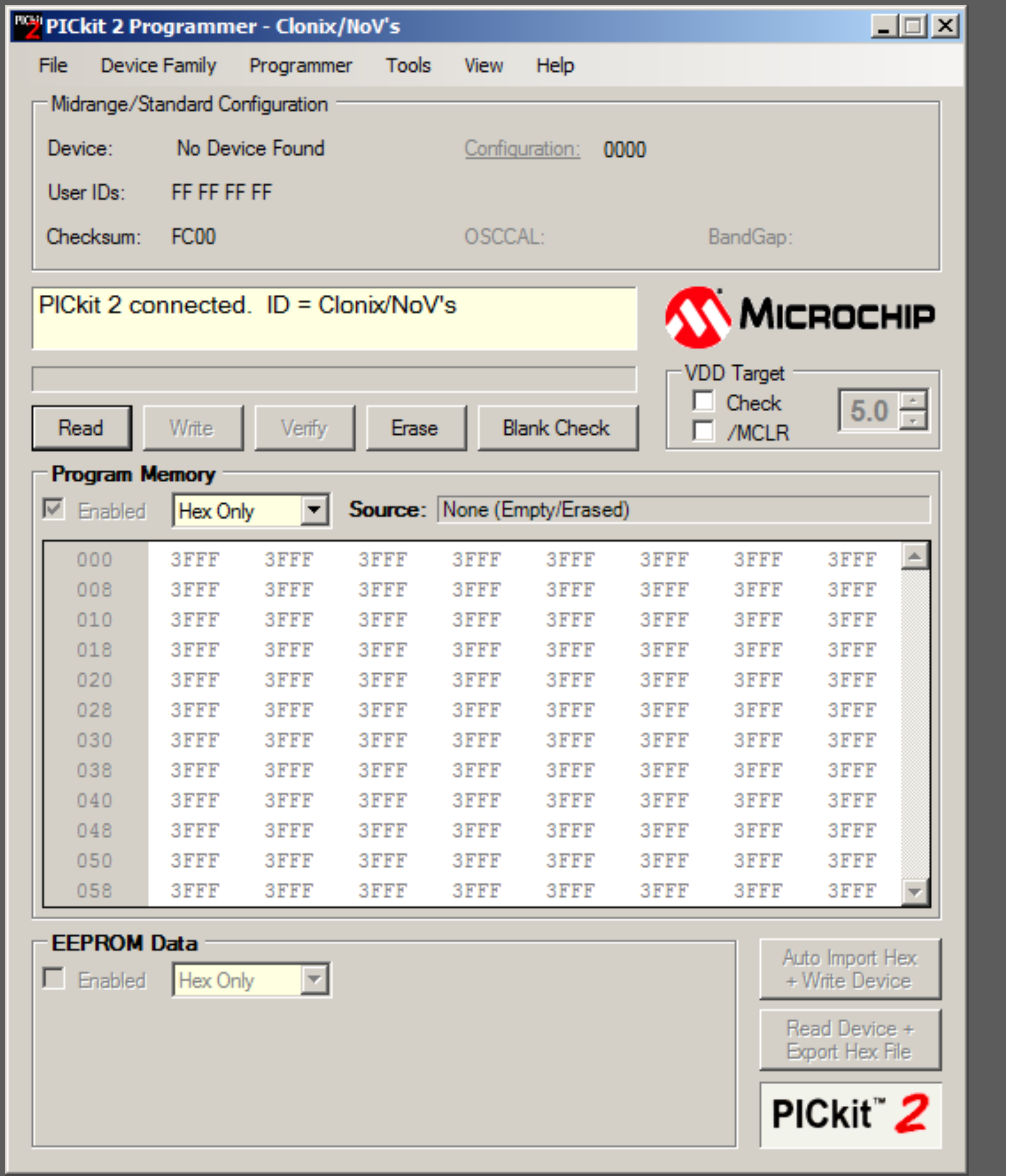
19:45:29



MicroBurn DIY K150

- The purpose of this application is to upload/download a PIC Extended Intel HEX file to/from the microcontroller.
- MicroBrn is a 32 bits Windows application co-developed by DIY Electronics and by Jim Robertson of Newfound Electronics.
- MicroBrn last release is August 2007
- Available at www.kitsrus.com
- Included in Clonix & NoV Configuration Utility v4.2 package.

PICkit 2 Programmer



PICkit 2 Programmer - Clonix/NoV's
File
Device Family
Programmer
Tools
View
Help
Read
Write
Verify
Erase
Blank Check
MICROCHIP
Auto Import Hex + Write Device
Read Device + Export Hex File
PICkit™ 2

Midrange/Standard Configuration

Device: No Device Found

Configuration: 0000

User IDs: FF FF FF FF

Checksum: FC00

OSCCAL:

BandGap:

PICkit 2 connected. ID = Clonix/NoV's

VDD Target: ☐ Check ☐ /MCLR 5.0

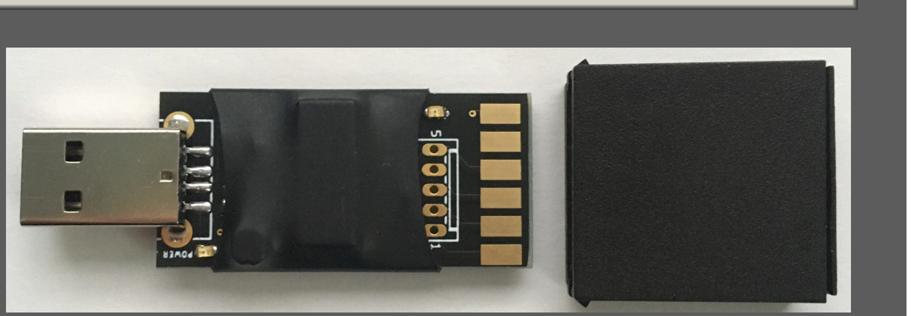
Program Memory

☑ Enabled Hex Only **Source:** None (Empty/Erased)

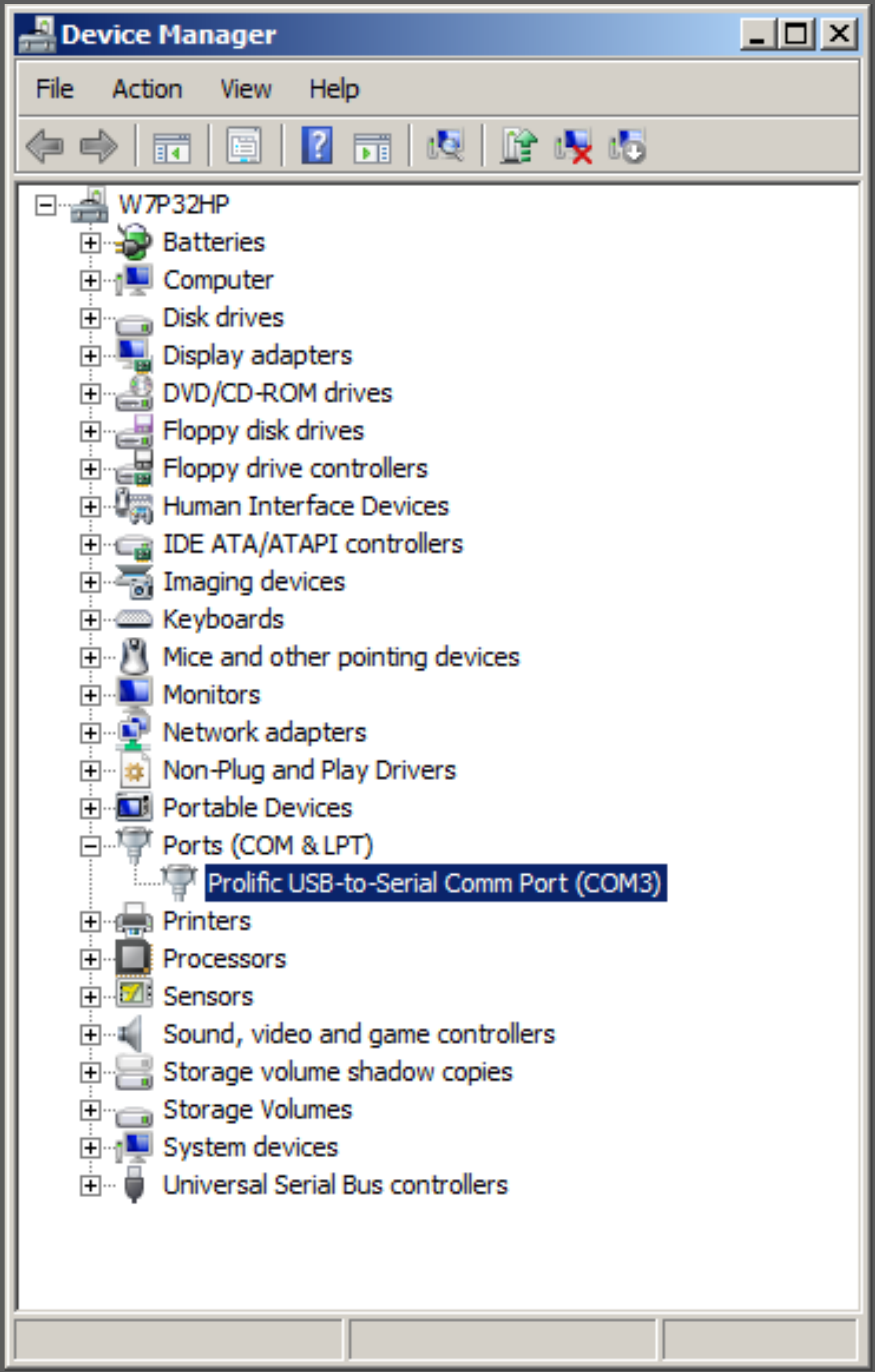
```
000  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
008  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
010  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
018  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
020  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
028  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
030  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
038  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
040  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
048  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
050  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
058  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF  3FFF
```

EEPROM Data

☐ Enabled Hex Only



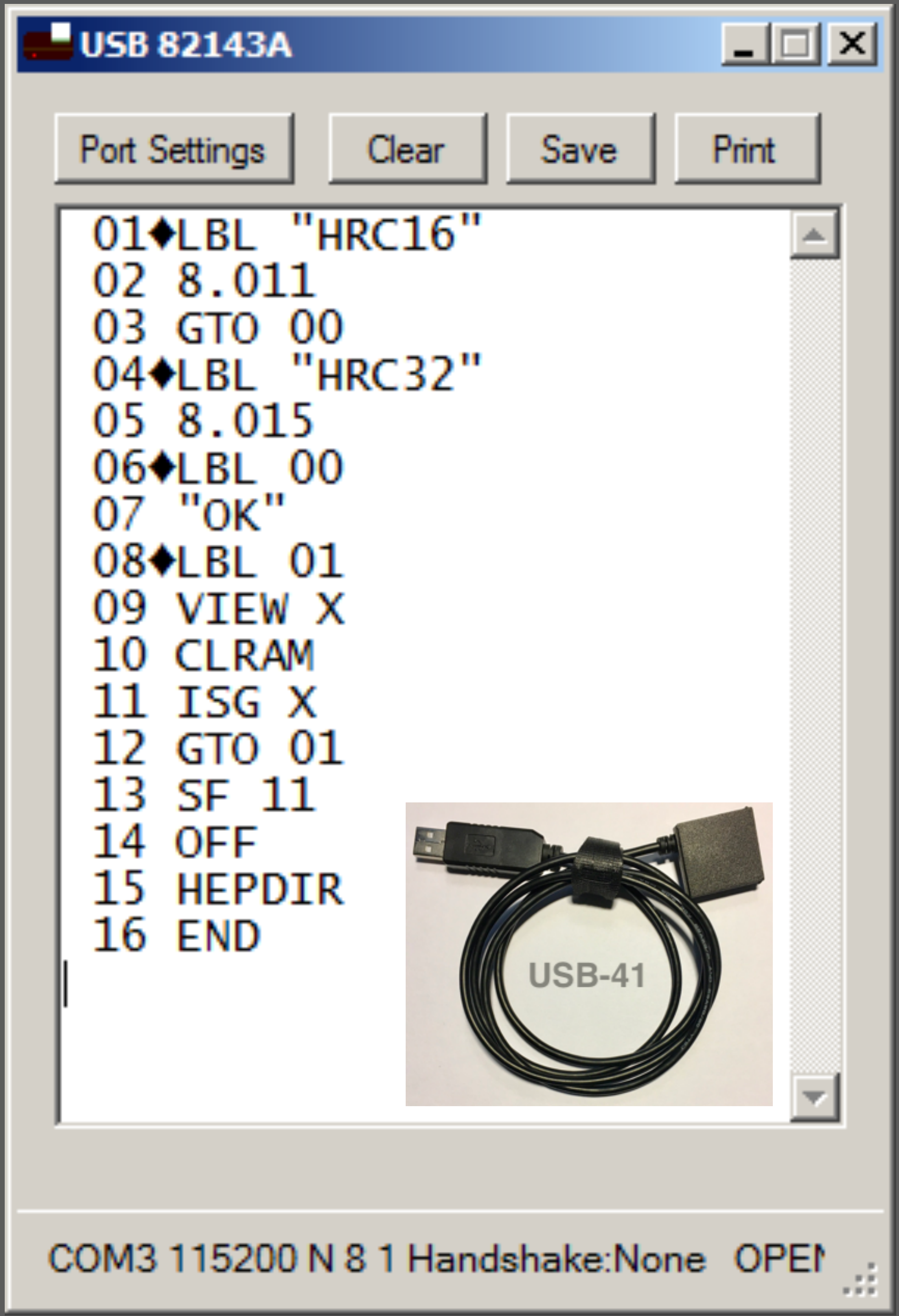
- The purpose of this application is to upload/download a PIC Extended Intel HEX file to/from the microcontroller.
- PICkit 2 is a Windows .NET application developed by Microchip.
- PICkit 2 last release is March 2009
- Available at pickit2.software.informer.com
- Included in Clonix & NoV Configuration Utility v6.1 package.



- W7P32HP
  - Batteries
  - Computer
  - Disk drives
  - Display adapters
  - DVD/CD-ROM drives
  - Floppy disk drives
  - Floppy drive controllers
  - Human Interface Devices
  - IDE ATA/ATAPI controllers
  - Imaging devices
  - Keyboards
  - Mice and other pointing devices
  - Monitors
  - Network adapters
  - Non-Plug and Play Drivers
  - Portable Devices
  - Ports (COM & LPT)
    - Prolific USB-to-Serial Comm Port (COM3)
  - Printers
  - Processors
  - Sensors
  - Sound, video and game controllers
  - Storage volume shadow copies
  - Storage Volumes
  - System devices
  - Universal Serial Bus controllers

Windows Device Manager

- ➤ Windows Device Manager allows you to see on which virtual serial port the USB-41 module has been assigned to.
- ➤ Prolific USB-to-Serial Comm Port is used in USB-41 1st Generation.
- ➤ FTDI USB-to-Serial Comm Port is used in USB-41 2nd Generation.

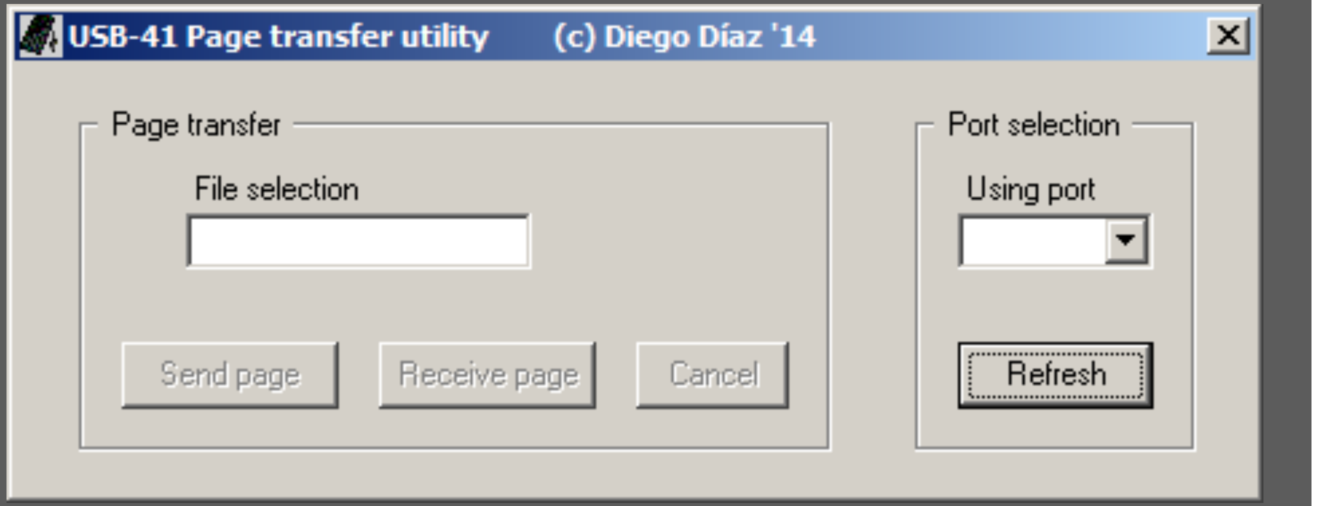


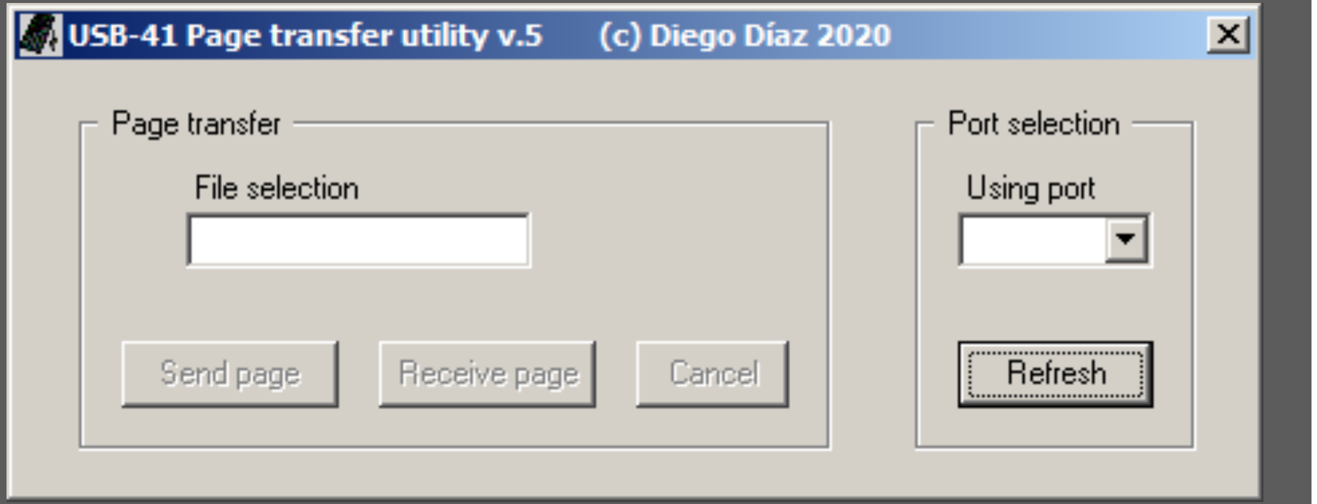
```
01♦LBL "HRC16"
02 8.011
03 GTO 00
04♦LBL "HRC32"
05 8.015
06♦LBL 00
07 "OK"
08♦LBL 01
09 VIEW X
10 CLRAM
11 ISG X
12 GTO 01
13 SF 11
14 OFF
15 HEPDIR
16 END
```

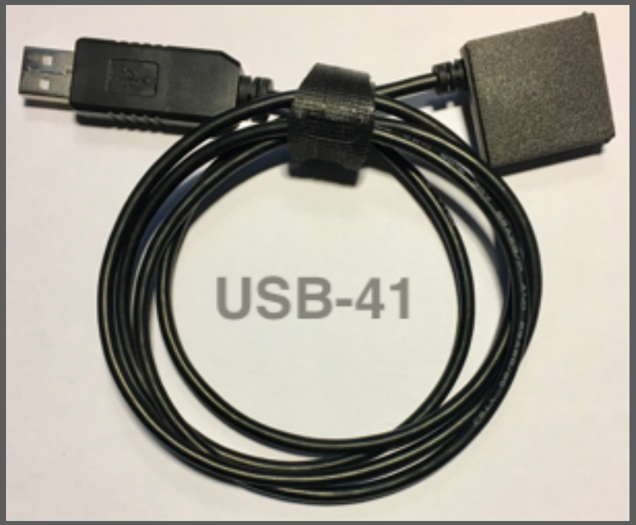
COM3 115200 N 8 1 Handshake:None OPEN

USB 82143A

- HP-82143A simulation includes:
  - A USB-82143A Windows application on PC side.
  - A USB-41 module on HP-41C side.
  - Both pieces are needed to fully simulate a HP-82143A printer.
- Text box content can be:
  - Printed.
  - Saved to a RTF file.
  - Copied & pasted into another Windows application.







USB-41 Page Transfer

- This application with a properly configured USB-41 module allows to:
  - Directly transfer a 4K ROM from an HP-41 to a ROM image file on a Windows PC.
  - Directly transfer a 4K ROM image file from a Windows PC to a 4K QROM page on an HP-41.

Table of Content

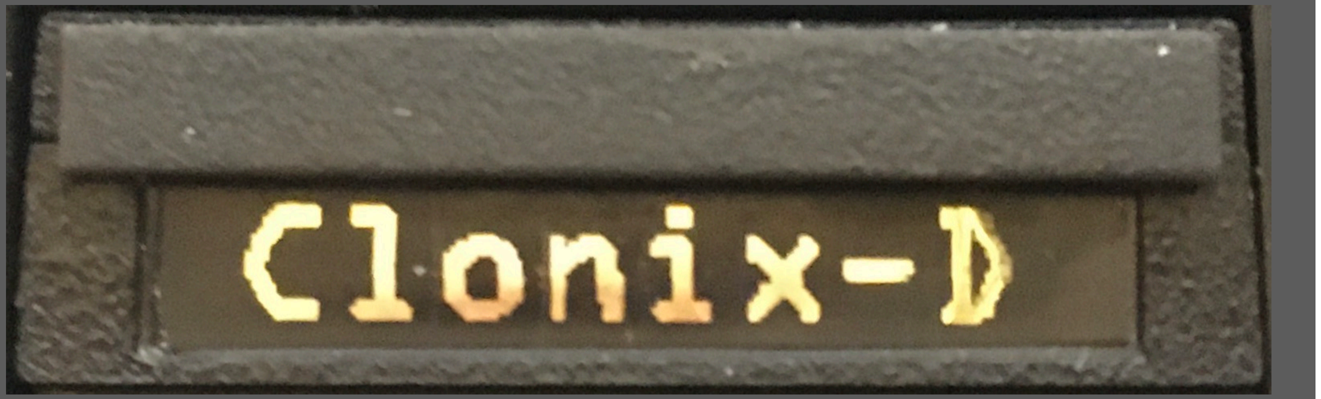
CONFIGURATION

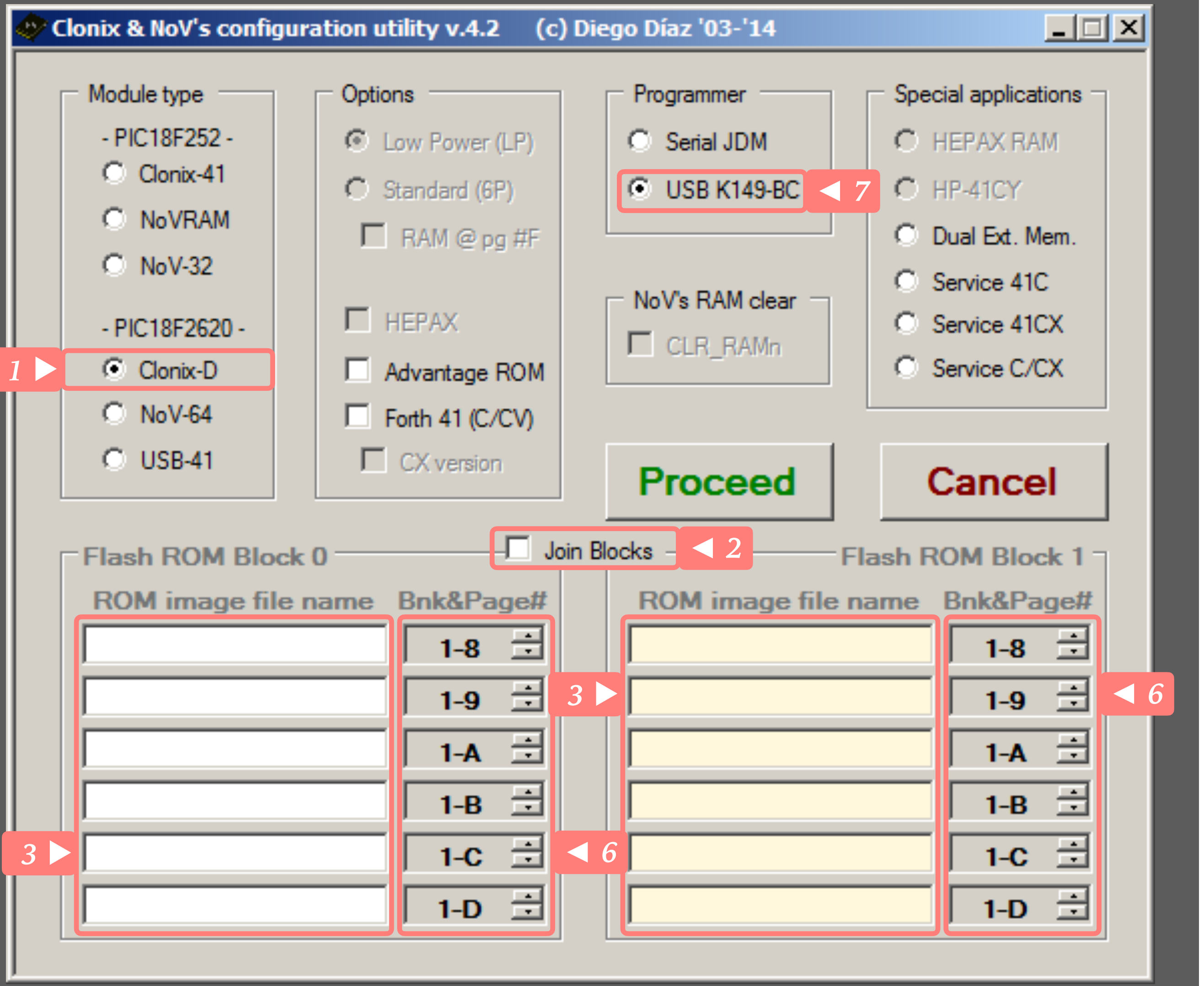
Clonix/NoV Utility v4.2

Clonix-D

Configuration

Table of Content




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

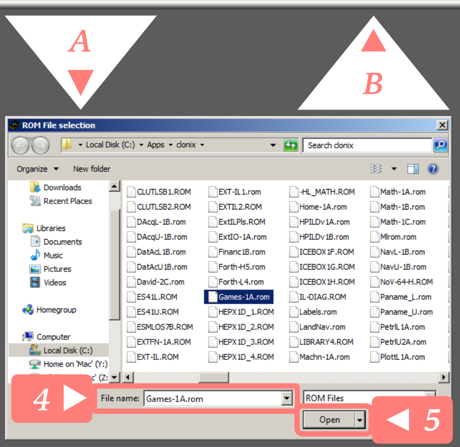
NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed | Cancel

□ Join Blocks

Flash ROM Block 0: ROM image file name	Bnk&Page#	Flash ROM Block 1: ROM image file name	Bnk&Page#
	1-8		1-8
	1-9		1-9
	1-A		1-A
	1-B		1-B
	1-C		1-C
	1-D		1-D


ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix

Search clonix

Organize ▾ New folder

Downloads, Recent Places, Libraries, Documents, Music, Pictures, Videos, Homegroup, Computer, Local Disk (C:), Home on 'Mac' (Y:)

CLUTLSB1.ROM, CLUTLSB2.ROM, DAcqL-1B.rom, DAcqU-1B.rom, DatAcL1B.rom, DatAcU1B.rom, David-2C.rom, ES41L.ROM, ES41U.ROM, ESMLOS7B.ROM, EXTFN-1A.ROM, EXT-IL.ROM, EXT-IL1.rom, EXTIL2.ROM, ExtILPls.ROM, ExtIO-1A.rom, Financ1B.rom, Forth-H5.rom, Forth-L4.rom, Games-1A.rom, HEPX1D_1.ROM, HEPX1D_2.ROM, HEPX1D_3.ROM, HEPX1D_4.ROM, -HL_MATH.ROM, Home-1A.rom, HPILDv1A.rom, HPILDv1B.rom, ICEBOX1F.ROM, ICEBOX1G.ROM, ICEBOX1H.ROM, IL-DIAG.ROM, Labels.rom, LandNav.rom, LIBRARY4.ROM, Machn-1A.rom, Math-1A.rom, Math-1B.rom, Math-1C.rom, Mlrom.rom, NavL-1B.rom, NavU-1B.rom, NoV-64-H.ROM, Paname_L.rom, Paname_U.rom, PetrlL1A.rom, PetrlU2A.rom, PlottL1A.rom

File name: Games-1A.rom

ROM Files

Open

Standard

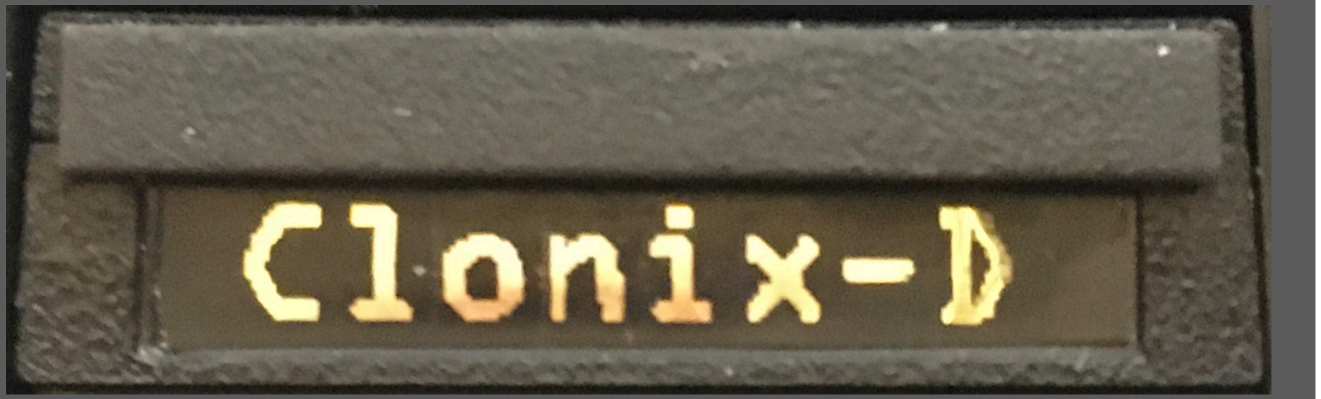
Goal: loading ROMs into the module.

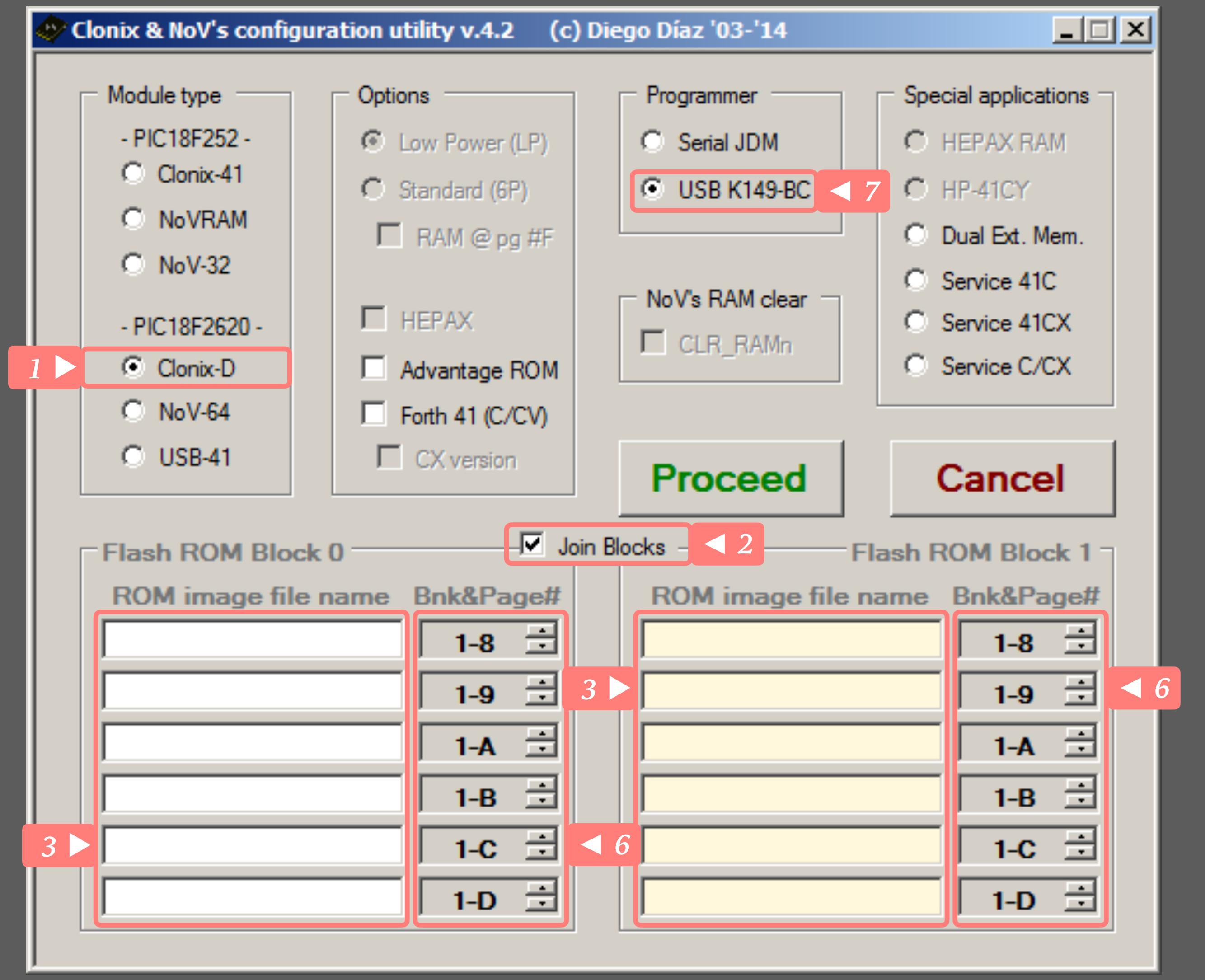
1. Select **Clonix-D** option.
2. Unselect **Join Blocks**.
   Flash ROM Block 0 (white) and Block 1 (yellow) are two separated blocks. ROM's specified in Flash ROM Block 0 (white) will be visible when the module is inserted into an odd port, while Flash ROM Block 1 (yellow) will be visible when the module is inserted into an even port.

For each ROM file you want to map:

3. Click in one the **ROM image file name** white space to show file selection dialog.
4. Select ROM file name.
5. Click on **Open** button.
6. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

*Go to **Programming** section.*




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

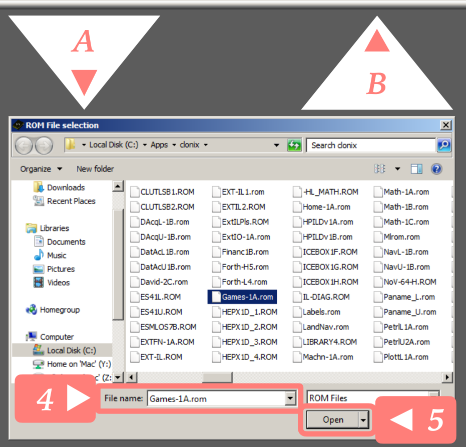
NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed | Cancel

☑ Join Blocks

Flash ROM Block 0: ROM image file name	Bnk&Page#	Flash ROM Block 1: ROM image file name	Bnk&Page#
	1-8		1-8
	1-9		1-9
	1-A		1-A
	1-B		1-B
	1-C		1-C
	1-D		1-D


ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix

File name: Games-1A.rom | ROM Files | Open

Standard + Merged Blocks

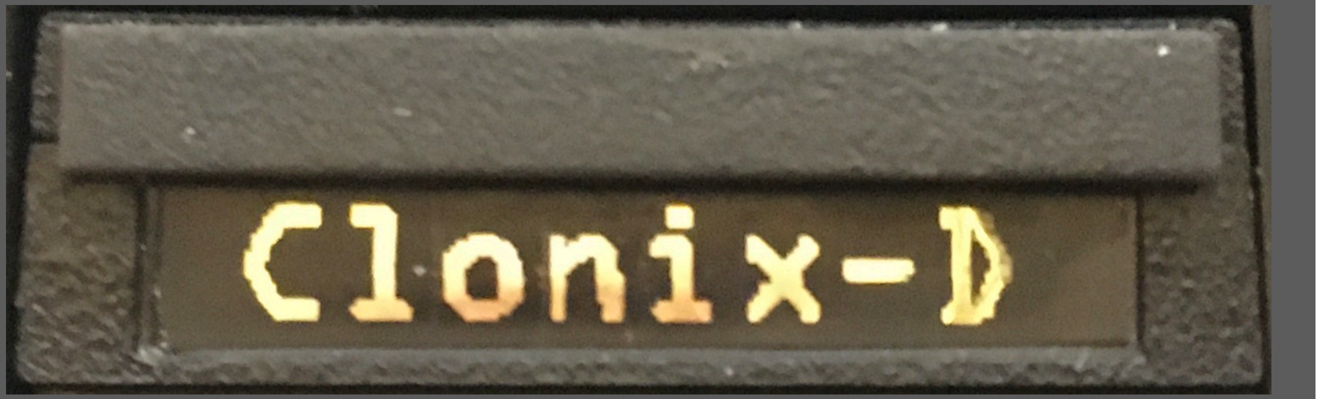
Goal: loading ROMs into the module. Flash blocks are merged allowing more ROM's to be mapped.

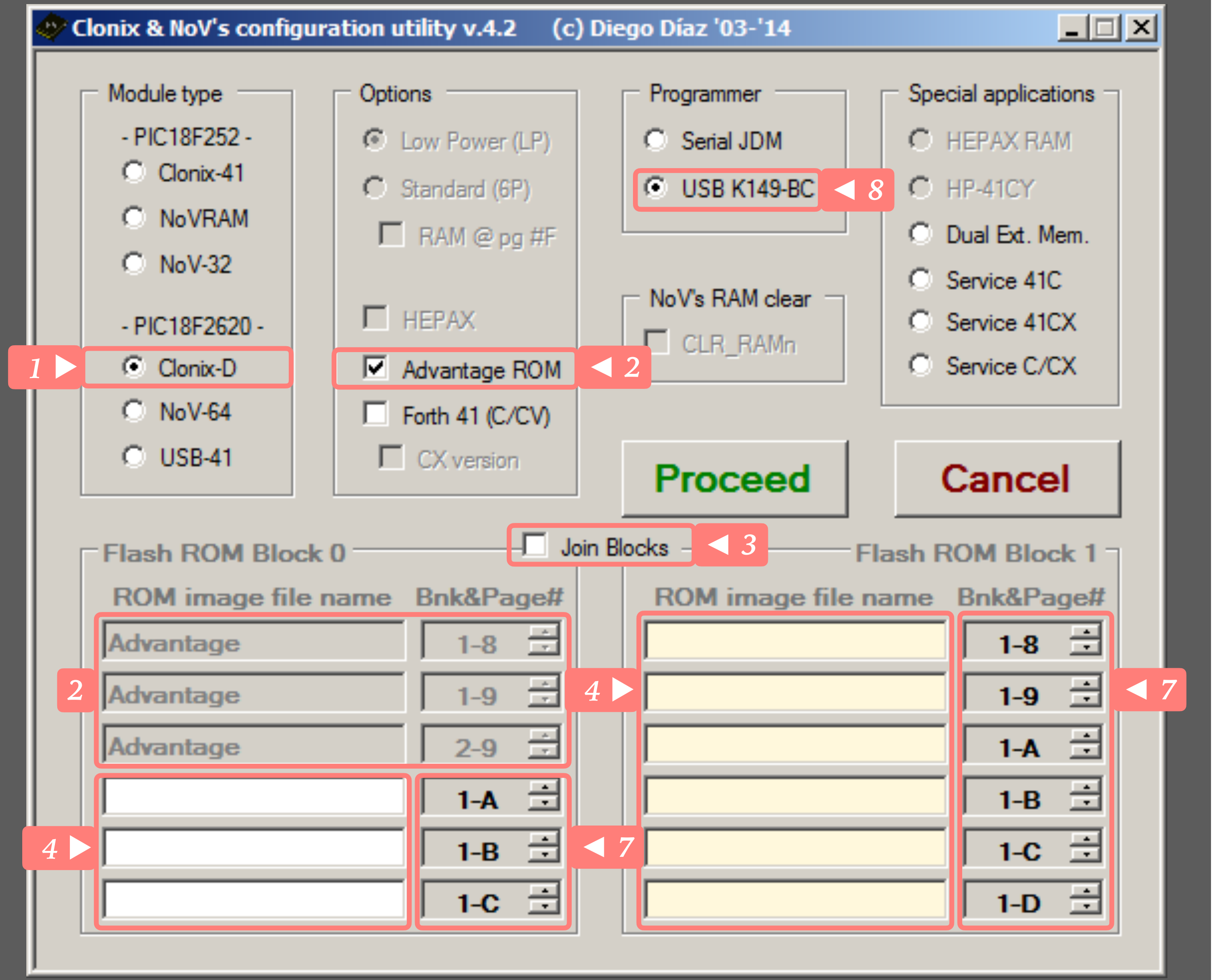
1. Select **Clonix-D** option.
2. Select **Join Blocks**.
   Flash ROM Block 0 (white) and Block 1 (yellow) are merged into a single block.

For each ROM file you want to map:

3. Click in one the **ROM image file name** white space to show file selection dialog.
4. Select ROM file name.
5. Click on **Open** button.
6. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

*Go to **Programming** section.*




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
☑ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

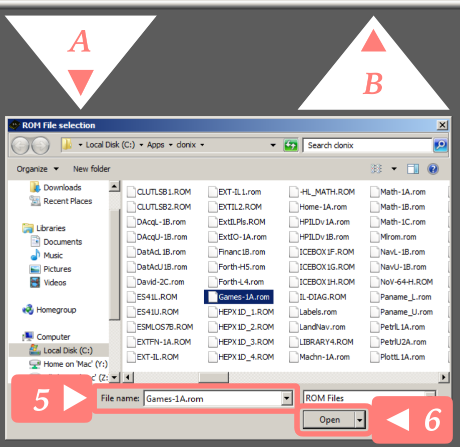
□ Join Blocks

Flash ROM Block 0

ROM image file name	Bnk&Page#
Advantage	1-8
Advantage	1-9
Advantage	2-9
	1-A
	1-B
	1-C

Flash ROM Block 1

ROM image file name	Bnk&Page#
	1-8
	1-9
	1-A
	1-B
	1-C
	1-D


ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix

File name: Games-1A.rom

ROM Files

Advantage

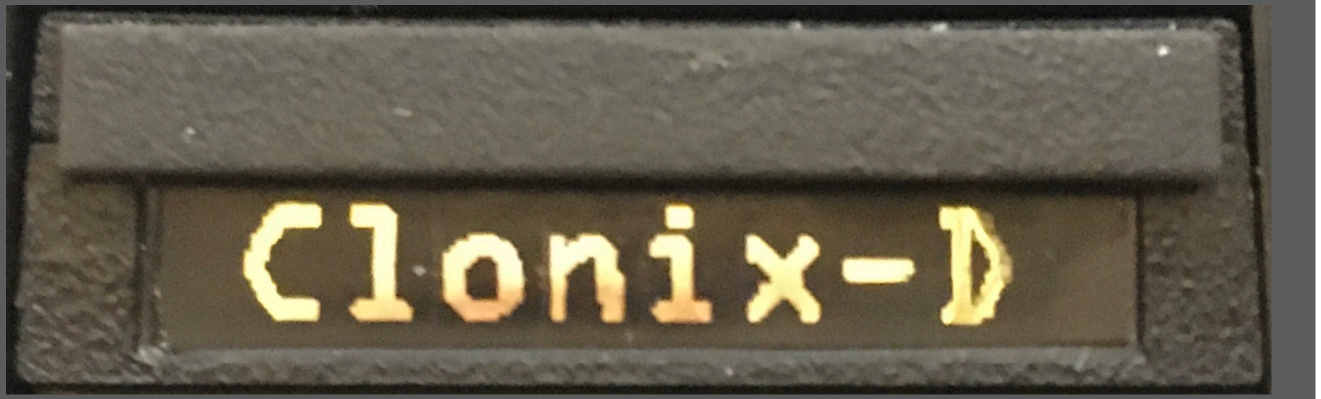
Goal: loading HP Advantage ROM and optionally other ROMs into the module.

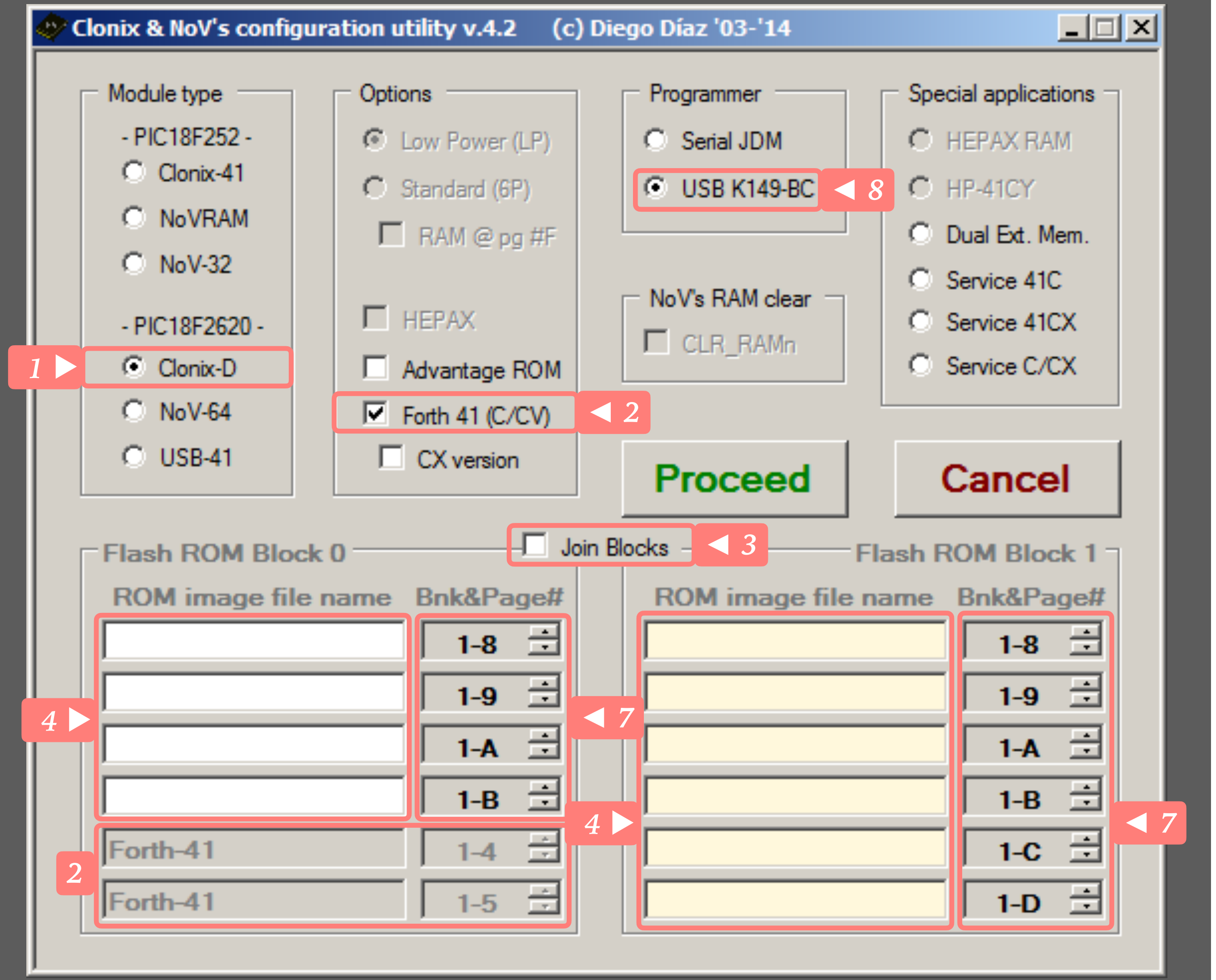
1. Select **Clonix-D** option.
2. Select **Advantage ROM**.
   Load ROM images at pages #8, #9 & #9 bank 2.
3. Optional: unselect or select **Join Blocks**.
   Flash ROM Block 0 (white) and Block 1 (yellow) are either two separated blocks or merged into a single block.

For each ROM file you want to map:

4. Click in one the **ROM image file name** white space to show file selection dialog.
5. Select ROM file name.
6. Click on **Open** button.
7. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

Go to ***Programming*** *section.*





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
☑ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

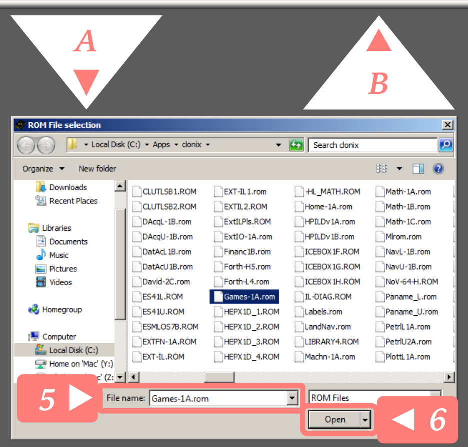
NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed
Cancel

□ Join Blocks

Flash ROM Block 0 ROM image file name	Bnk&Page#	Flash ROM Block 1 ROM image file name	Bnk&Page#
	1-8		1-8
	1-9		1-9
	1-A		1-A
	1-B		1-B
Forth-41	1-4		1-C
Forth-41	1-5		1-D



ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix

Search clonix

Organize ▾ New folder

Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Homegroup
Computer
Local Disk (C:)
Home on 'Mac' (Y:)

CLUTLSB1.ROM	EXT-IL1.rom	-HL_MATH.ROM	Math-1A.rom
CLUTLSB2.ROM	EXTIL2.ROM	Home-1A.rom	Math-1B.rom
DAcqL-1B.rom	ExtILPls.ROM	HPILDv1A.rom	Math-1C.rom
DAcqU-1B.rom	ExtIO-1A.rom	HPILDv1B.rom	Mlrom.rom
DatAcL1B.rom	Financ1B.rom	ICEBOX1F.ROM	NavL-1B.rom
DatAcU1B.rom	Forth-H5.rom	ICEBOX1G.ROM	NavU-1B.rom
David-2C.rom	Forth-L4.rom	ICEBOX1H.ROM	NoV-64-H.ROM
ES41L.ROM	Games-1A.rom	IL-DIAG.ROM	Paname_L.rom
ES41U.ROM	HEPX1D_1.ROM	Labels.rom	Paname_U.rom
ESMLOS7B.ROM	HEPX1D_2.ROM	LandNav.rom	PetrlL1A.rom
EXTFN-1A.ROM	HEPX1D_3.ROM	LIBRARY4.ROM	PetrlU2A.rom
EXT-IL.ROM	HEPX1D_4.ROM	Machn-1A.rom	PlottL1A.rom

File name: Games-1A.rom

ROM Files

Open

Forth 41 C/CV

Goal: loading a subset version of the Forth language for the 41C/CV and optionally other ROMs into the module.

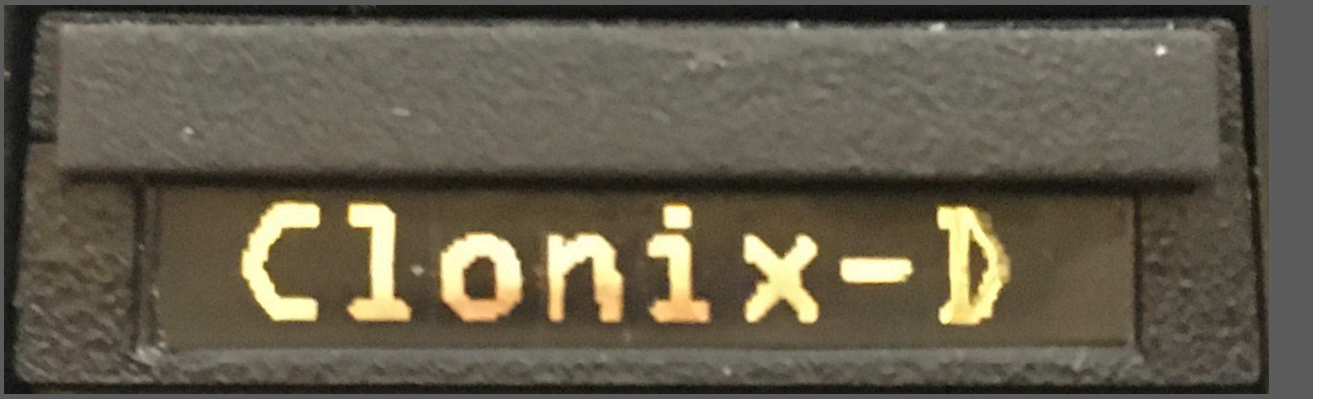
1. Select **Clonix-D** option.
2. Select **Forth 41 (C/CV)**.
   Load ROM images at pages #4 & #5.
3. Optional: unselect or select **Join Blocks**.
   Flash ROM Block 0 (white) and Block 1 (yellow) are either two separated blocks or merged into a single block.

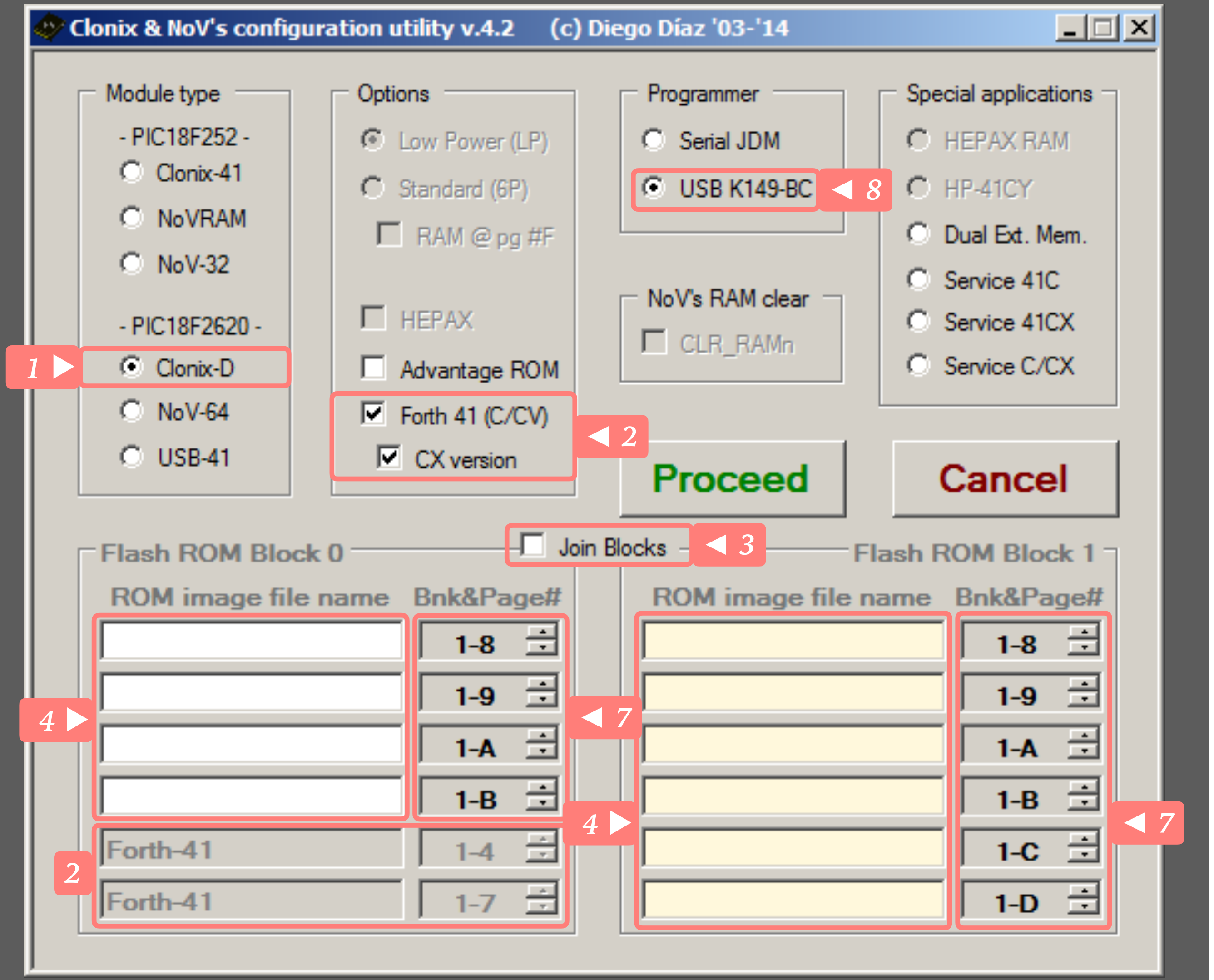
For each ROM file you want to map:

4. Click in one the **ROM image file name** white space to show file selection dialog.
5. Select ROM file name.
6. Click on **Open** button.
7. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

*Go to **Programming** section.*

Forth 41 CX




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
☑ Forth 41 (C/CV)
☑ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed

Cancel

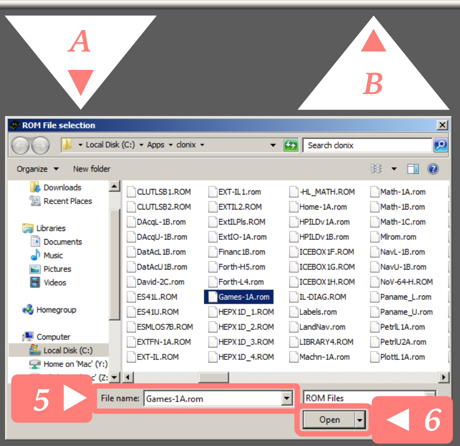
Flash ROM Block 0

□ Join Blocks

ROM image file name	Bnk&Page#
	1-8
	1-9
	1-A
	1-B
Forth-41	1-4
Forth-41	1-7

Flash ROM Block 1

ROM image file name	Bnk&Page#
	1-8
	1-9
	1-A
	1-B
	1-C
	1-D



ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix ▸ Search clonix

Organize ▾ New folder

Downloads
Recent Places
Libraries
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Music
Pictures
Videos
Homegroup
Computer
Local Disk (C:)
Home on 'Mac' (Y:)

CLUTLSB1.ROM, CLUTLSB2.ROM, DAcqL-1B.rom, DAcqU-1B.rom, DatAcL1B.rom, DatAcU1B.rom, David-2C.rom, ES41L.ROM, ES41U.ROM, ESMLOS7B.ROM, EXTFN-1A.ROM, EXT-IL.ROM, EXT-IL1.rom, EXTIL2.ROM, ExtILPls.ROM, ExtIO-1A.rom, Financ1B.rom, Forth-H5.rom, Forth-L4.rom, Games-1A.rom, HEPX1D_1.ROM, HEPX1D_2.ROM, HEPX1D_3.ROM, HEPX1D_4.ROM, -HL_MATH.ROM, Home-1A.rom, HPILDv1A.rom, HPILDv1B.rom, ICEBOX1F.ROM, ICEBOX1G.ROM, ICEBOX1H.ROM, IL-DIAG.ROM, Labels.rom, LandNav.rom, LIBRARY4.ROM, Machn-1A.rom, Math-1A.rom, Math-1B.rom, Math-1C.rom, Mlrom.rom, NavL-1B.rom, NavU-1B.rom, NoV-64-H.ROM, Paname_L.rom, Paname_U.rom, PetrlL1A.rom, PetrlU2A.rom, PlottL1A.rom

File name: Games-1A.rom

ROM Files

Open

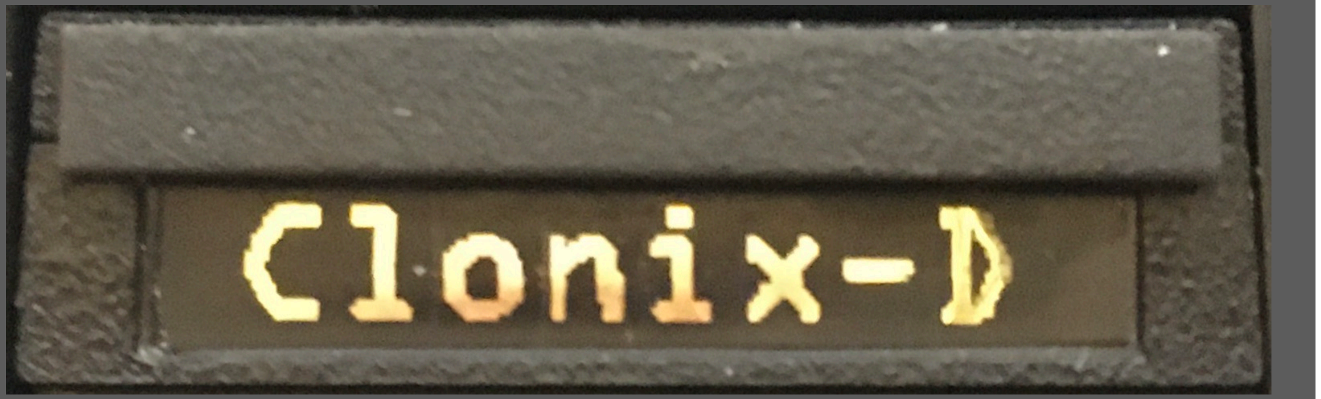
Goal: loading a subset version of the Forth language for the 41CX and optionally other ROMs into the module.

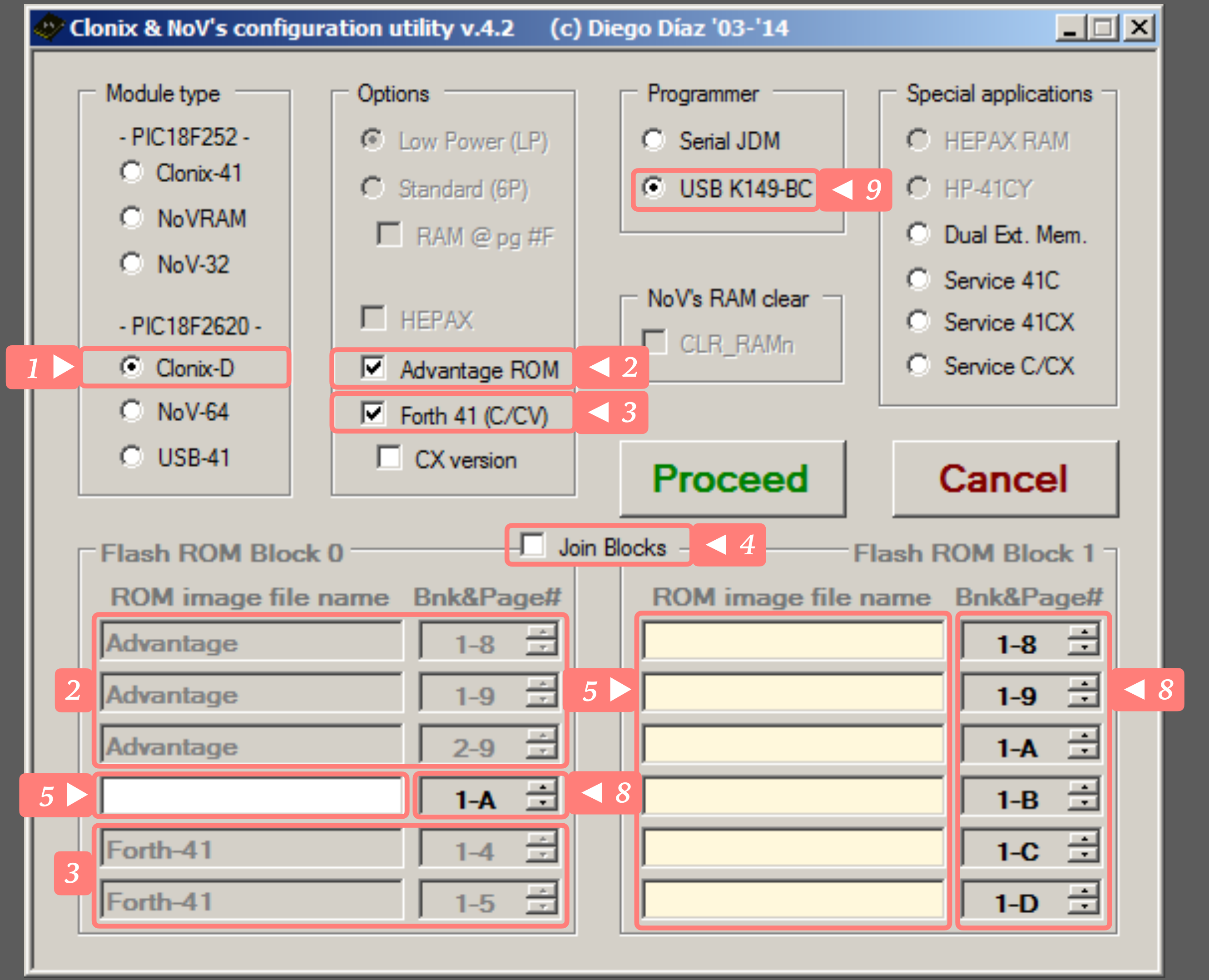
1. Select **Clonix-D** option.
2. Select **Forth 41 (C/CV)**.
   Load ROM images at pages #4 & #7.
3. Optional: unselect or select **Join Blocks**.
   Flash ROM Block 0 (white) and Block 1 (yellow) are either two separated blocks or merged into a single block.

For each ROM file you want to map:

4. Click in one the **ROM image file name** white space to show file selection dialog.
5. Select ROM file name.
6. Click on **Open** button.
7. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

*Go to **Programming** section.*





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D 1
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
☑ Advantage ROM 2
☑ Forth 41 (C/CV) 3
□ CX version

Programmer
○ Serial JDM
● USB K149-BC 9

NoV's RAM clear
□ CLR_RAMn

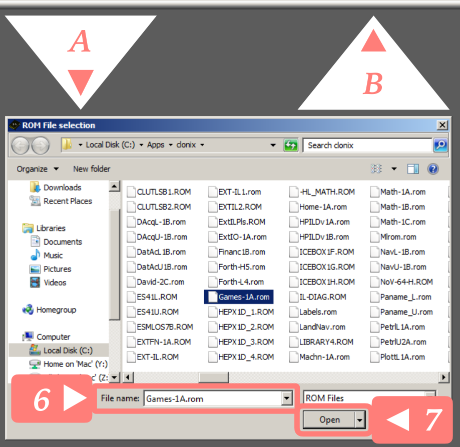
Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed

Cancel

□ Join Blocks 4

Flash ROM Block 0 ROM image file name	Bnk&Page#	Flash ROM Block 1 ROM image file name	Bnk&Page#
Advantage	1-8		1-8
Advantage	1-9		1-9
Advantage	2-9		1-A
	1-A		1-B
Forth-41	1-4		1-C
Forth-41	1-5		1-D



File name: Games-1A.rom

ROM Files

Advantage + Forth 41 C/CV

Goal: loading HP Advantage ROM, a subset version of the Forth language for the 41C/CV and optionally other ROMs into the module.

1. Select **Clonix-D** option.
2. Select **Advantage ROM**.
   Load ROM images at pages #8, #9 & #9 bank 2.
3. Select **Forth 41 (C/CV)**.
   Load ROM images at pages #4 & #5.
4. Optional: unselect or select **Join Blocks**.
   Flash ROM Block 0 (white) and Block 1 (yellow) are either two separated blocks or merged into a single block.

For each ROM file you want to map:

5. Click in one the **ROM image file name** white space to show file selection dialog.
6. Select ROM file name.
7. Click on **Open** button.
8. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

*Go to **Programming** section.*

Advantage + Forth 41 CX

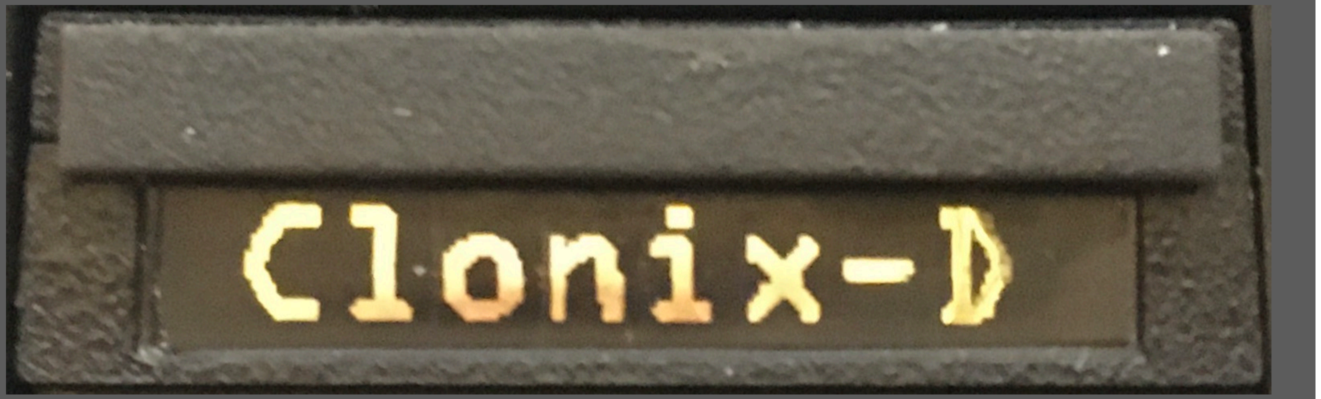
Goal: loading HP Advantage ROM, a subset version of the Forth language for the 41CX and optionally other ROMs into the module.

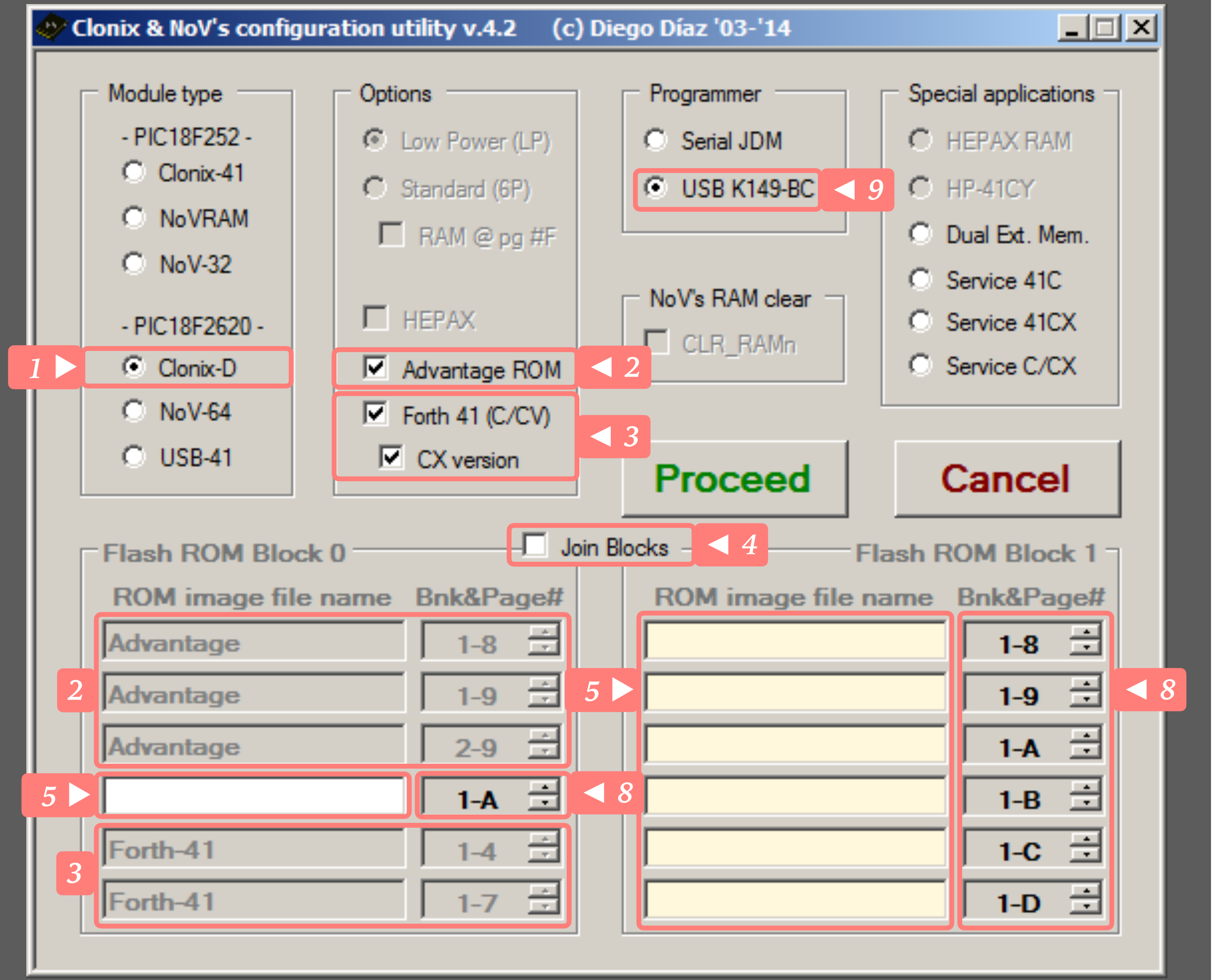
1. Select **Clonix-D** option.
2. Select **Advantage ROM**.
   Load ROM images at pages #8, #9 & #9 bank 2.
3. Select **Forth 41 (C/CV)** then **CX version**.
   Load ROM images at pages #4 & #7.
4. Optional: unselect or select **Join Blocks**.
   Flash ROM Block 0 (white) *and Block 1* (yellow) *are either two separated blocks or merged into a single block.*

For each ROM file you want to map:

5. Click in one the **ROM image file name** white space to show file selection dialog.
6. Select ROM file name.
7. Click on **Open** button.
8. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

Go to ***Programming*** *section.*




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
☑ Advantage ROM
☑ Forth 41 (C/CV)
☑ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed

Cancel

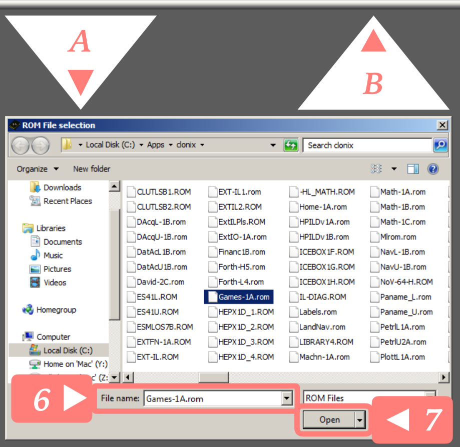
□ Join Blocks

Flash ROM Block 0

ROM image file name	Bnk&Page#
Advantage	1-8
Advantage	1-9
Advantage	2-9
	1-A
Forth-41	1-4
Forth-41	1-7

Flash ROM Block 1

ROM image file name	Bnk&Page#
	1-8
	1-9
	1-A
	1-B
	1-C
	1-D


ROM File selection

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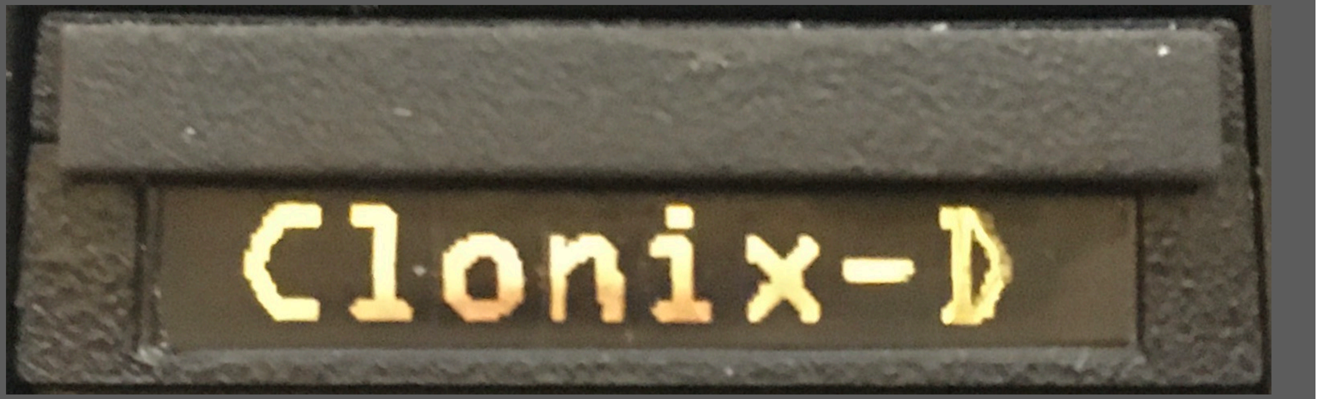
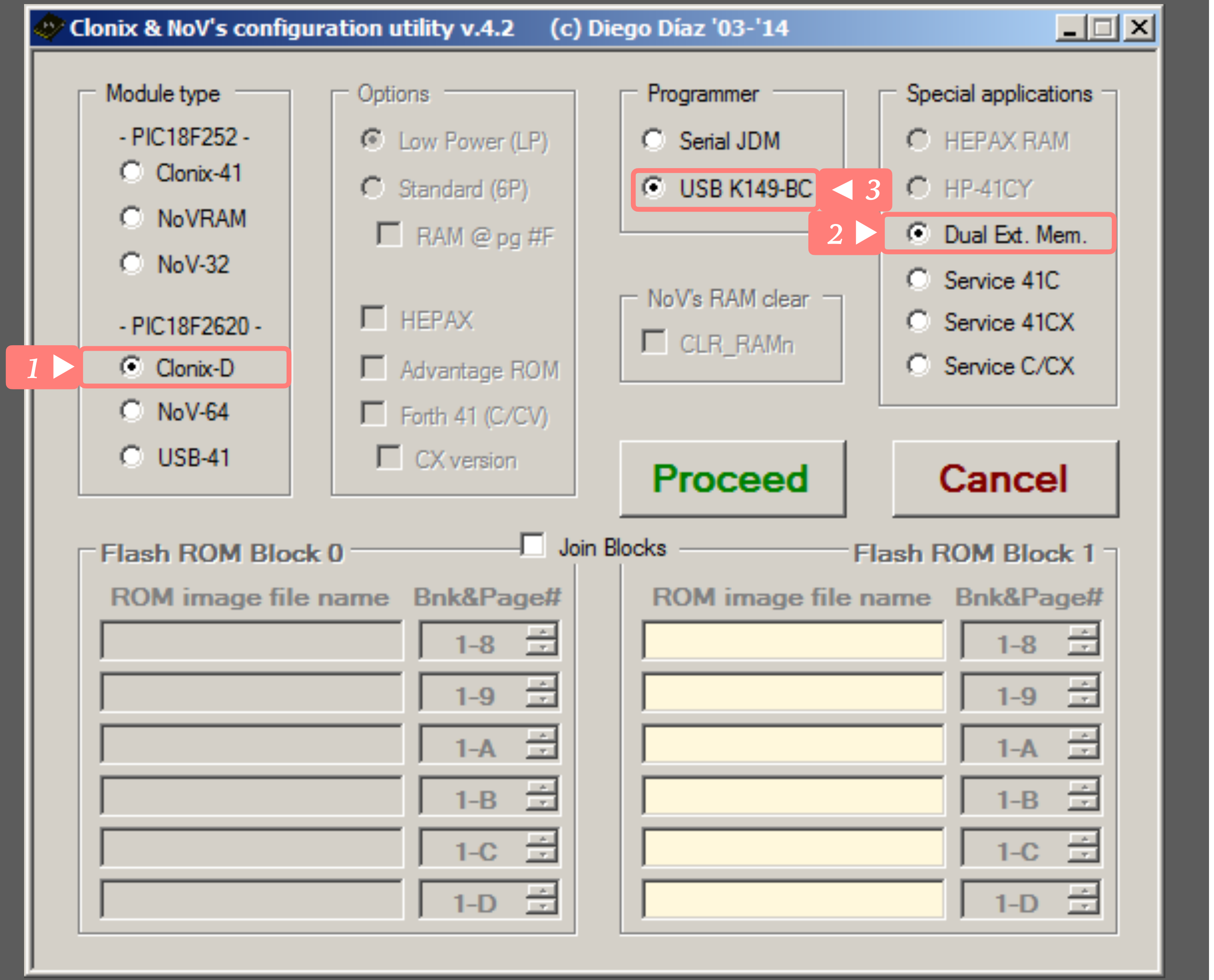
CLUTLSB1.ROM, CLUTLSB2.ROM, DAcqL-1B.rom, DAcqU-1B.rom, DatAcL1B.rom, DatAcU1B.rom, David-2C.rom, ES41L.ROM, ES41U.ROM, ESMLOS7B.ROM, EXTFN-1A.ROM, EXT-IL.ROM, EXT-IL1.rom, EXTIL2.ROM, ExtILPls.ROM, ExtIO-1A.rom, Financ1B.rom, Forth-H5.rom, Forth-L4.rom, Games-1A.rom, HEPX1D_1.ROM, HEPX1D_2.ROM, HEPX1D_3.ROM, HEPX1D_4.ROM, -HL_MATH.ROM, Home-1A.rom, HPILDv1A.rom, HPILDv1B.rom, ICEBOX1F.ROM, ICEBOX1G.ROM, ICEBOX1H.ROM, IL-DIAG.ROM, Labels.rom, LandNav.rom, LIBRARY4.ROM, Machn-1A.rom, Math-1A.rom, Math-1B.rom, Math-1C.rom, Mlrom.rom, NavL-1B.rom, NavU-1B.rom, NoV-64-H.ROM, Paname_L.rom, Paname_U.rom, PetrlL1A.rom, PetrlU2A.rom, PlottL1A.rom

File name: Games-1A.rom

ROM Files

Open





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
1 ▶ ● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC ◀ 3

NoV's RAM clear
□ CLR_RAMn

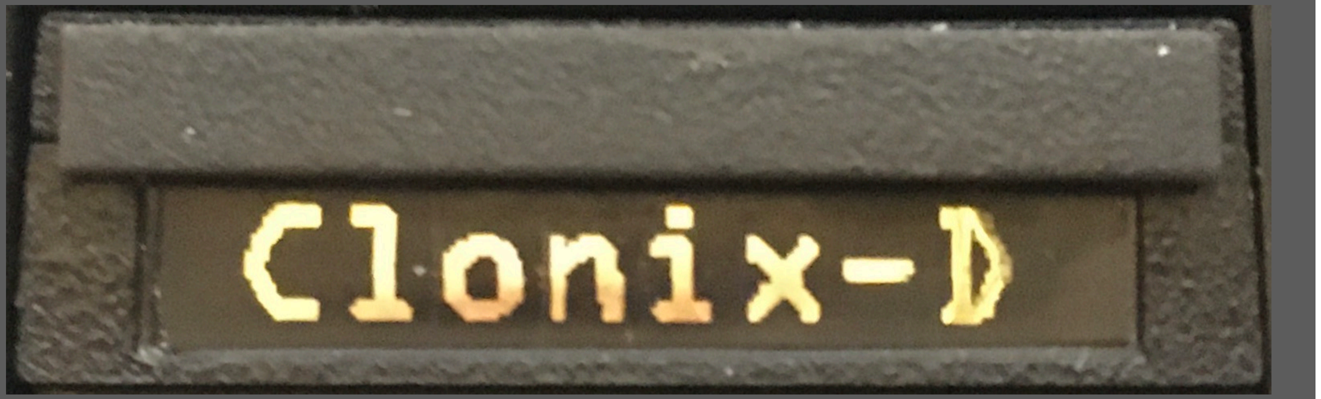
Special applications
○ HEPAX RAM
○ HP-41CY
2 ▶ ● Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

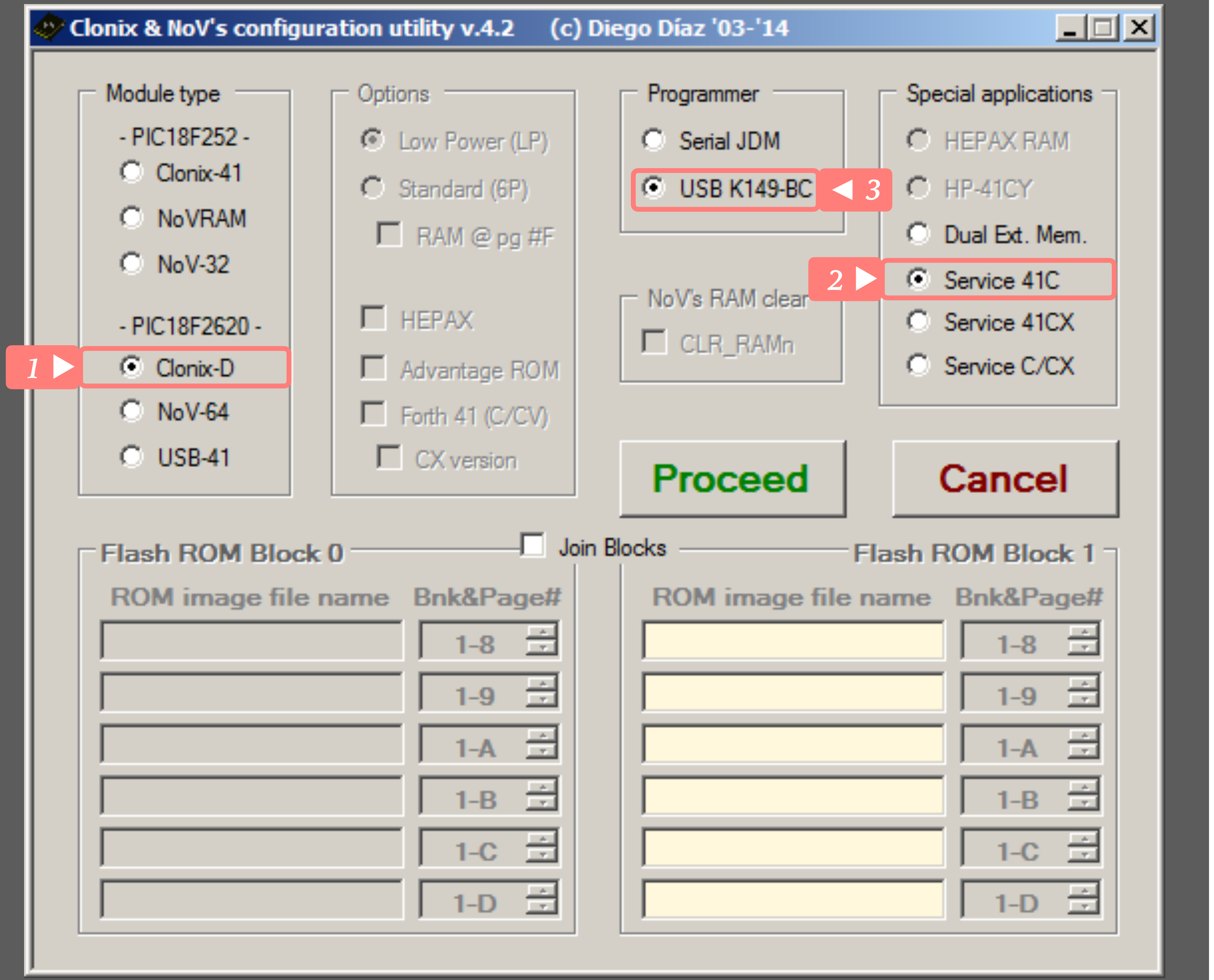
Dual X-Memory

Goal: loading a program into the module that simulate two 82181A X-Memory modules.

1. Select **Clonix-D** option.
2. Select **Dual Ext. Mem.** to configure the module as a Double X-Memory module.
   This configuration add 476 of Extended-Registers RAM to the system. RAM content is lost when the module is unplugged from the calculator.

Go to ***Programming*** *section.*





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
● Service 41C
○ Service 41CX
○ Service C/CX

Flash ROM Block 0 □ Join Blocks Flash ROM Block 1

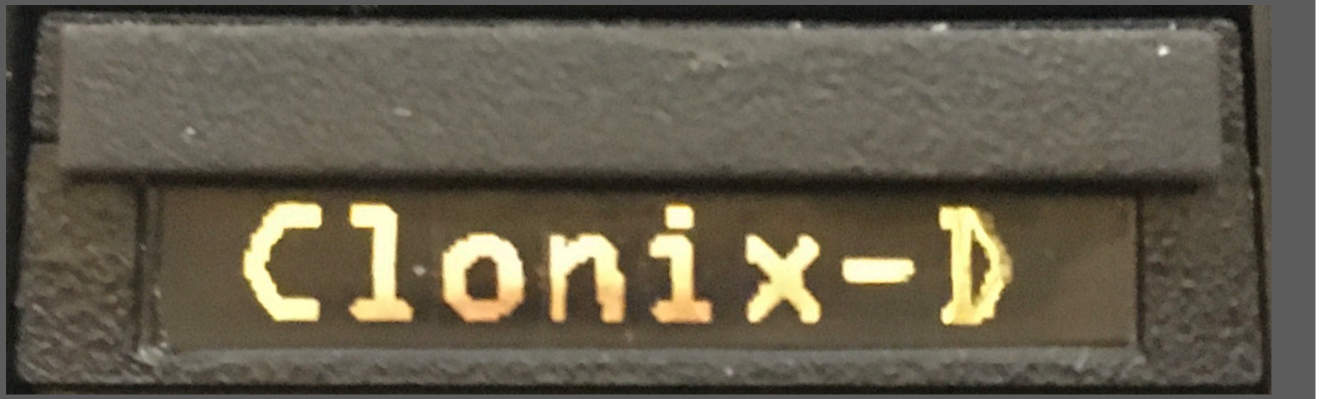
ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
	1-8		1-8
	1-9		1-9
	1-A		1-A
	1-B		1-B
	1-C		1-C
	1-D		1-D

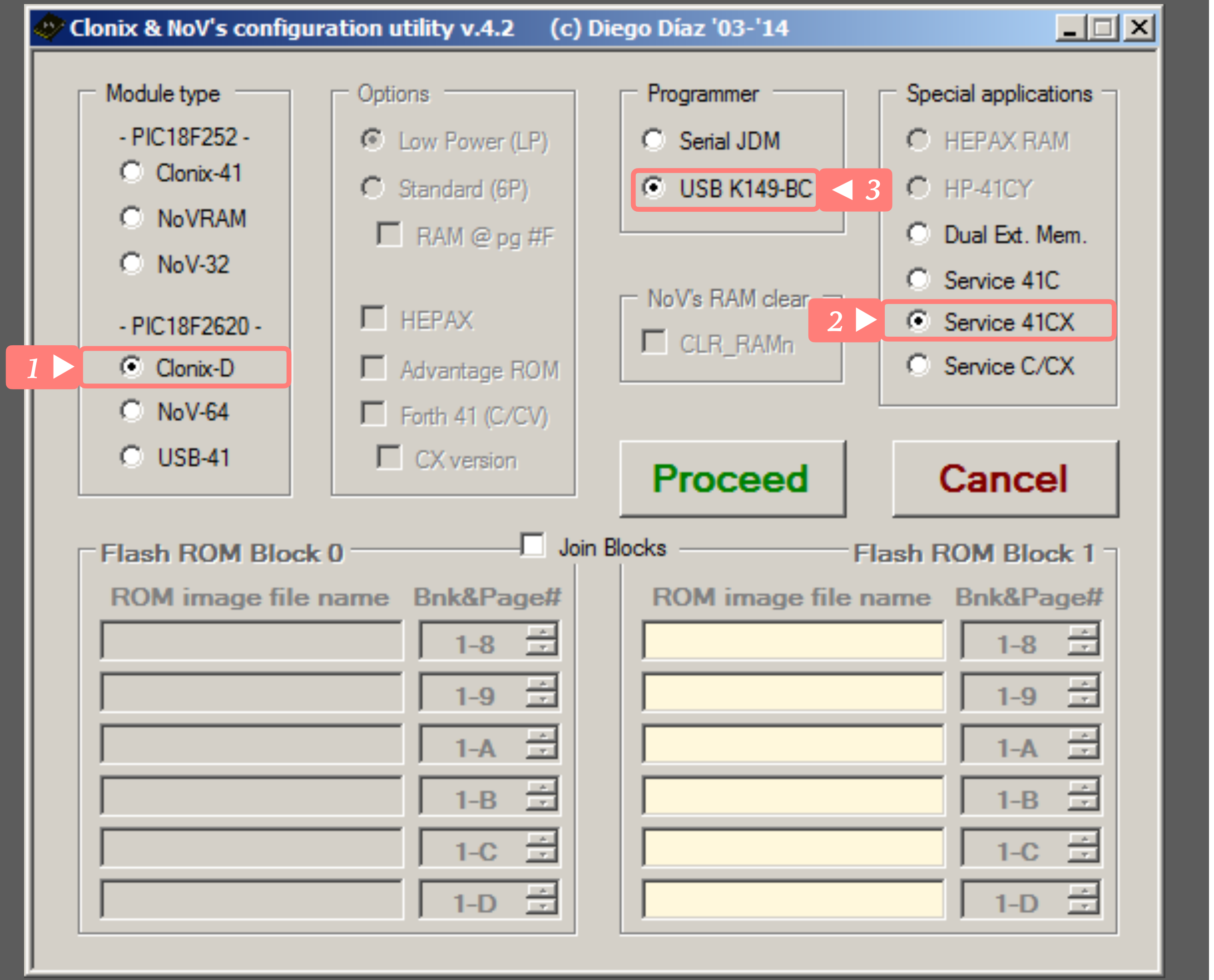
Service 41C/CV

Goal: loading HP Service ROM into the module. Support: 41C, 41CV, RAM (x1 & x4), ROM (4K & 8K) & Card Reader.

1. Select **Clonix-D** option.
2. Select **Service 41C**.
   Load HP Service ROM [SM-1C] image in page #4.

*Go to **Programming** section.*




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
1 ▶ ● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC ◀ 3

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
2 ▶ ● Service 41CX
○ Service C/CX

Proceed
Cancel

Flash ROM Block 0 □ Join Blocks Flash ROM Block 1

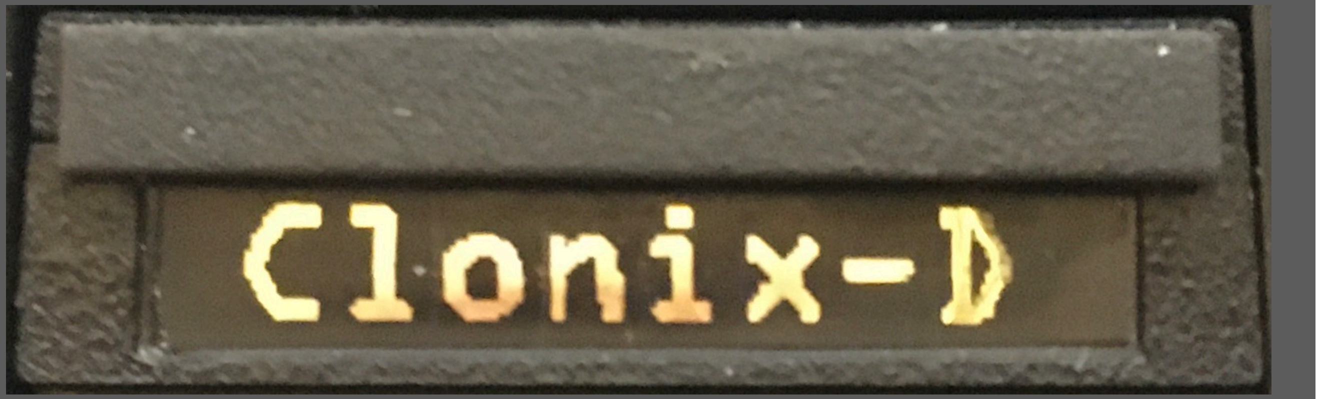
ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
	1-8		1-8
	1-9		1-9
	1-A		1-A
	1-B		1-B
	1-C		1-C
	1-D		1-D

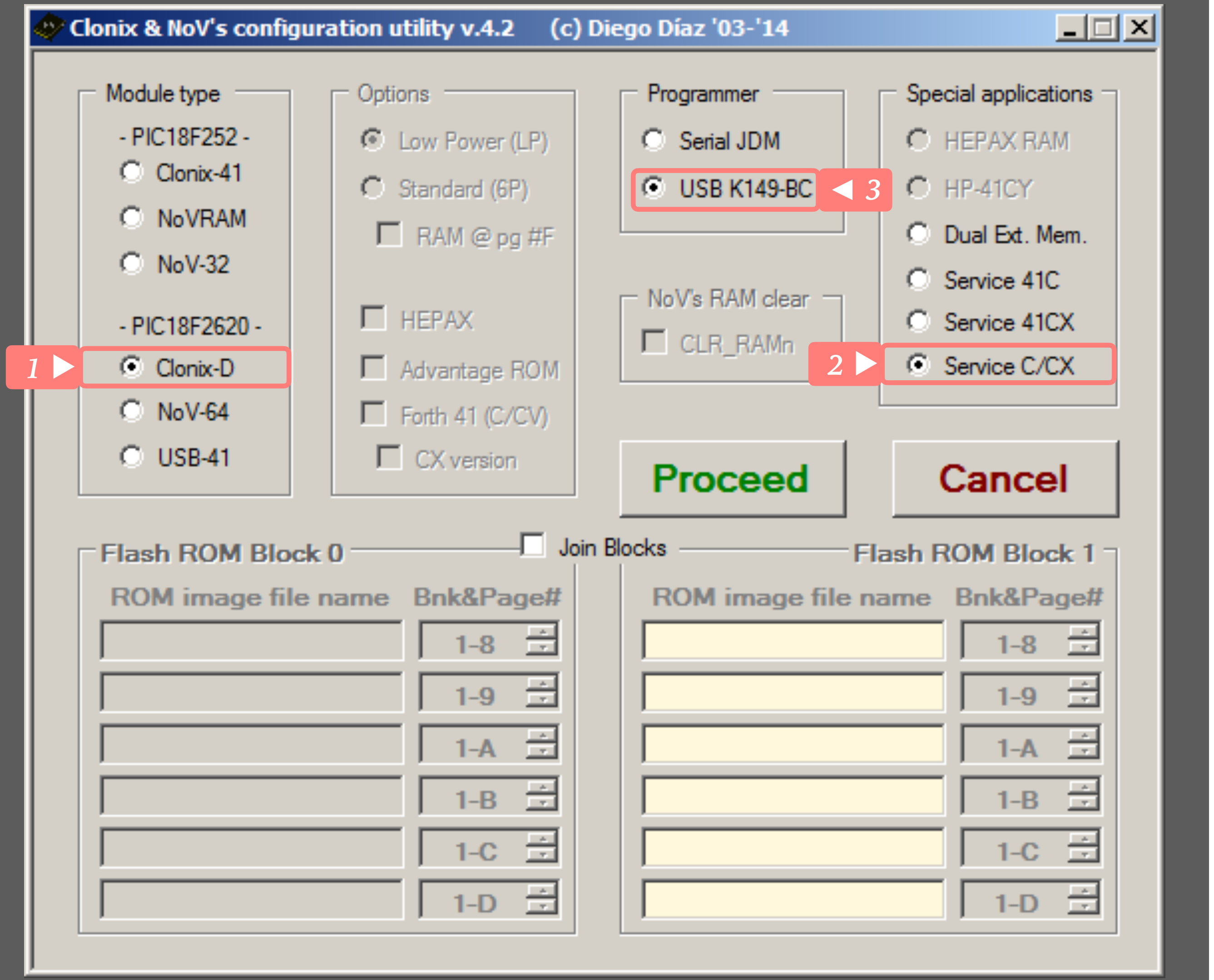
Service 41CX

Goal: loading HP Service ROM into the module. Support: 41CV, 41CX, Time, X-Fnc, X-Mem, RAM (x1 & x4), ROM (4K to 16K).

1. Select **Clonix-D** option.
2. Select **Service 41CX.**
   Load HP Service ROM [SM-2A] image in page #4.

*Go to **Programming** section.*




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
1 ● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC 3

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
2 ● Service C/CX

Flash ROM Block 0 □ Join Blocks Flash ROM Block 1

ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
	1-8		1-8
	1-9		1-9
	1-A		1-A
	1-B		1-B
	1-C		1-C
	1-D		1-D

Service C/CX

Goal: loading HP Service ROMs into the module.
Note: this option was first created for the Clonix 41d Anniversary Ed.

1. Select **Clonix-D** option.

2. Select **Service C/CX**.
   Load Service 41C/CV ROM [SM-1C] image in page #4 block 0.
   Load Service 41CX ROM [SM-2A] image in page #4 block 1.
   Inserting the module into an odd port activates block 0.
   Inserting the module into an even port activates block 1.

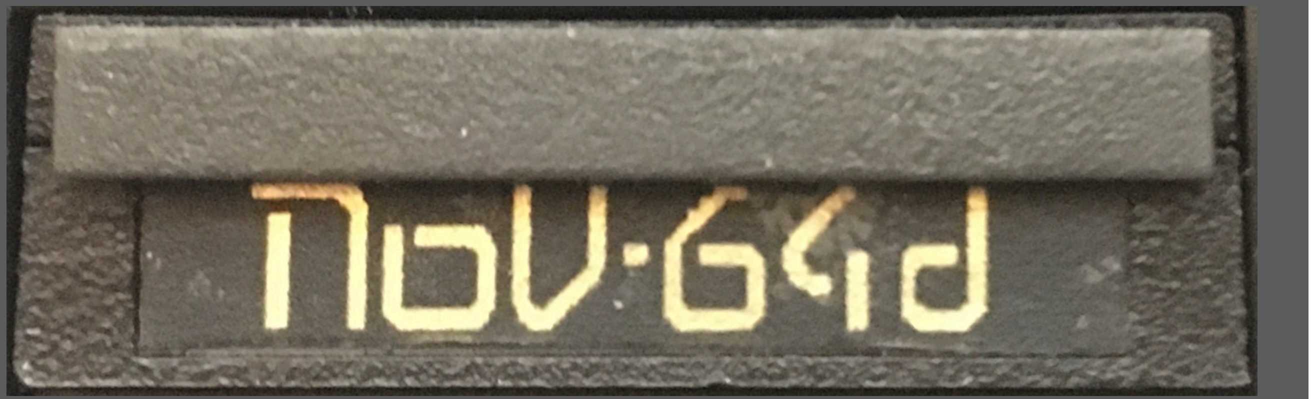
*Go to **Programming** section.*

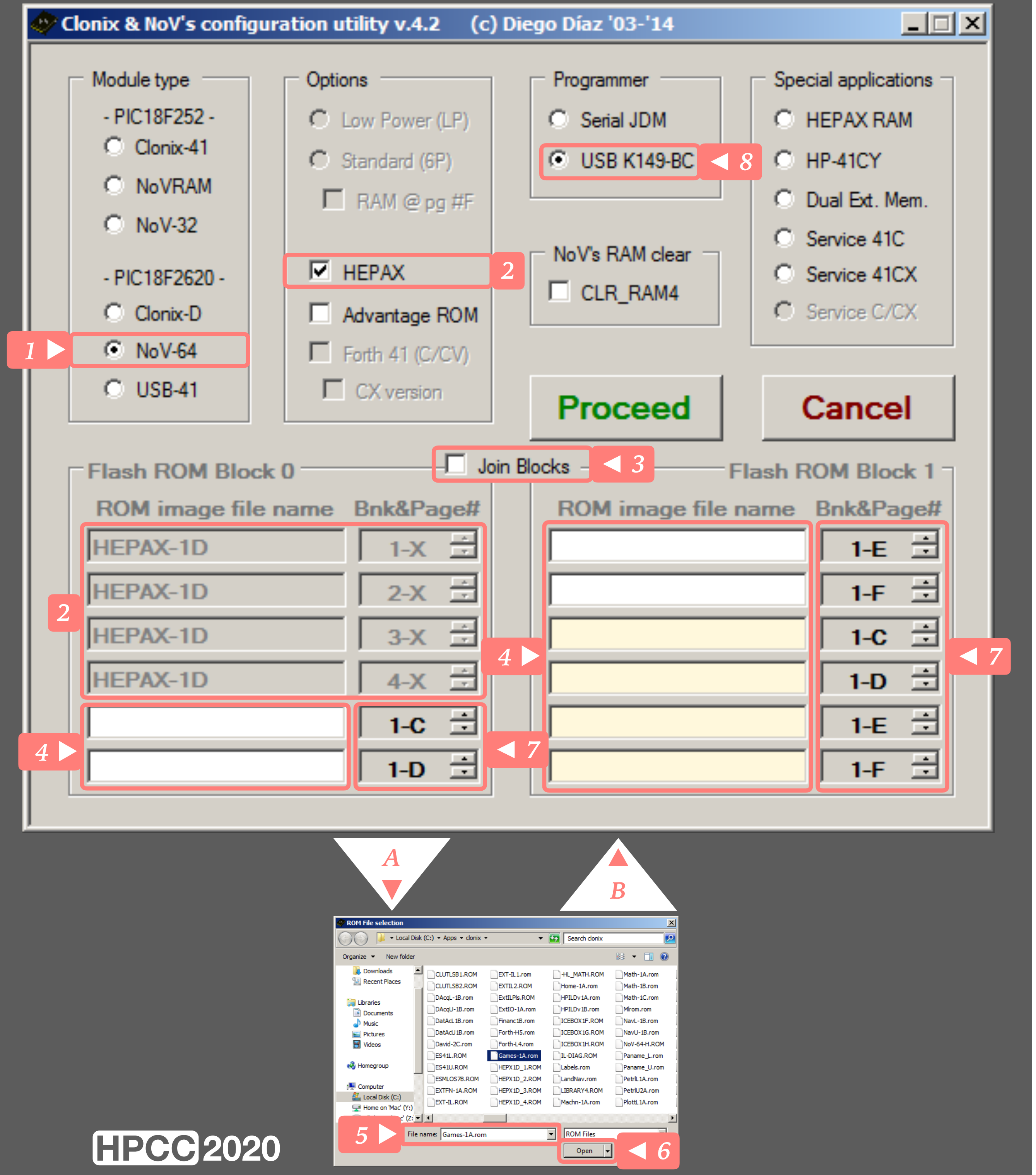
NoV-64(d)

Configuration

Table of Content

- ➤ HEPAX
- ➤ HEPAX + Merged Blocks
- ➤ HEPAX + Advantage
- ➤ NoV's RAM Clear
- ➤ HEPAX RAM
- ➤ HP-41CY & RAMBOX64
- ➤ Dual X-Memory
- ➤ Service 41C/CV
- ➤ Service 41CX
- ➤ Quasi-ROM
- ➤ Clonix-D Persona




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
● NoV-64
○ USB-41

Options
○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
☑ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAM4

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed Cancel

Flash ROM Block 0 □ Join Blocks Flash ROM Block 1

ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
HEPAX-1D	1-X		1-E
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
	1-C		1-E
	1-D		1-F

ROM File selection
File name: Games-1A.rom
ROM Files
Open

HEPAX

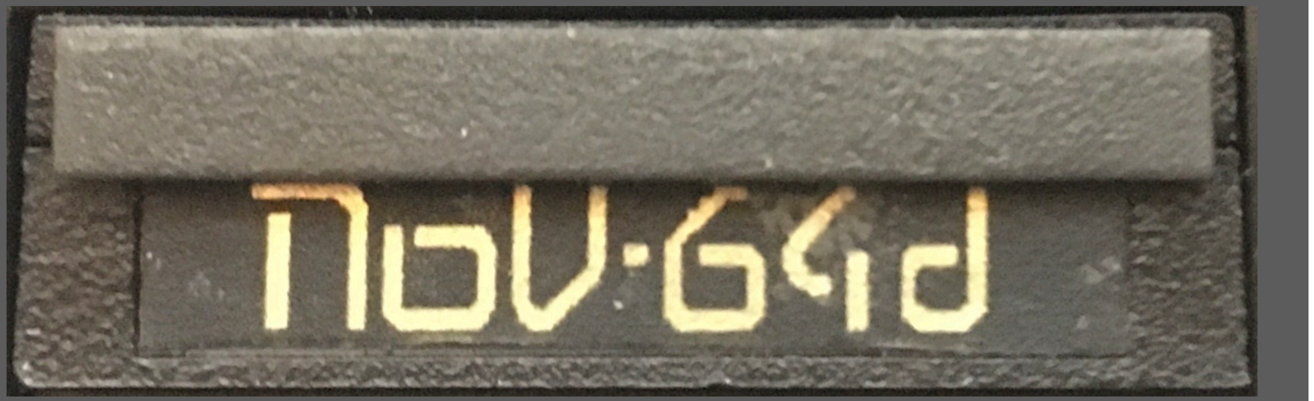
Goal: loading Advanced HEPAX ROM and optionally other ROMs into the module.

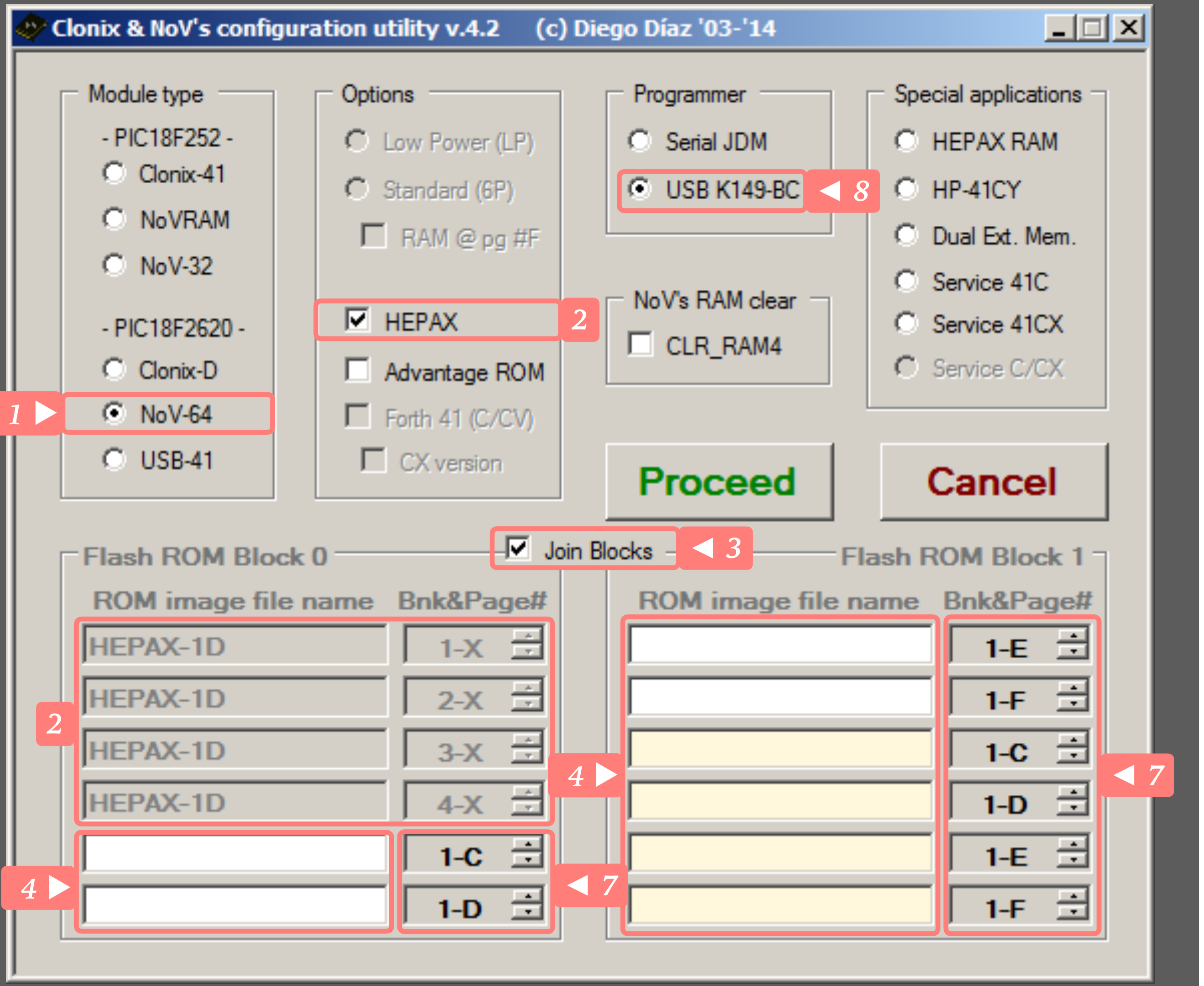
1. Select **NoV-64** option.
2. **HEPAX** is automatically selected.
3. Unselect **Join Blocks**.
   Flash ROM Block 0 (white) and Block 1 (yellow) are two separated blocks.

For each ROM file you want to map:

4. Click in one the **ROM image file name** white space to show file selection dialog.
5. Select ROM file name.
6. Click on **Open** button.
7. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

*Go to **Programming** section.*





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
● NoV-64
○ USB-41

Options
○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
☑ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAM4

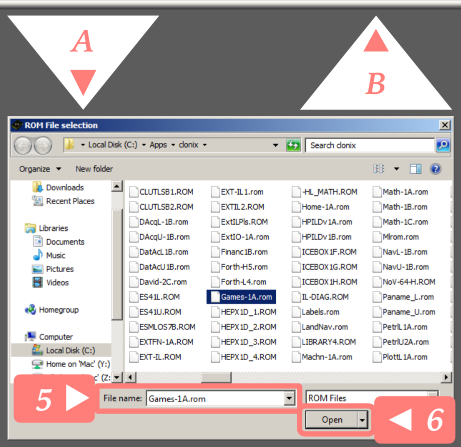
Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed

Cancel

☑ Join Blocks

Flash ROM Block 0 ROM image file name	Bnk&Page#	Flash ROM Block 1 ROM image file name	Bnk&Page#
HEPAX-1D	1-X		1-E
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
	1-C		1-E
	1-D		1-F



ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix

Search clonix

Organize ▾ New folder

Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Homegroup
Computer
Local Disk (C:)
Home on 'Mac' (Y:)

CLUTLSB1.ROM, CLUTLSB2.ROM, DAcqL-1B.rom, DAcqU-1B.rom, DatAcL1B.rom, DatAcU1B.rom, David-2C.rom, ES41L.ROM, ES41U.ROM, ESMLOS7B.ROM, EXTFN-1A.ROM, EXT-IL.ROM, EXT-IL1.rom, EXTIL2.ROM, ExtILPls.ROM, ExtIO-1A.rom, Financ1B.rom, Forth-H5.rom, Forth-L4.rom, Games-1A.rom, HEPX1D_1.ROM, HEPX1D_2.ROM, HEPX1D_3.ROM, HEPX1D_4.ROM, -HL_MATH.ROM, Home-1A.rom, HPILDv1A.rom, HPILDv1B.rom, ICEBOX1F.ROM, ICEBOX1G.ROM, ICEBOX1H.ROM, IL-DIAG.ROM, Labels.rom, LandNav.rom, LIBRARY4.ROM, Machn-1A.rom, Math-1A.rom, Math-1B.rom, Math-1C.rom, Mlrom.rom, NavL-1B.rom, NavU-1B.rom, NoV-64-H.ROM, Paname_L.rom, Paname_U.rom, PetrlL1A.rom, PetrlU2A.rom, PlottL1A.rom

File name: Games-1A.rom

ROM Files

Open

HEPAX + Merged Blocks

Goal: loading Advanced HEPAX ROM and optionally other ROMs into the module. Flash blocks are merged allowing more ROM's to be mapped.

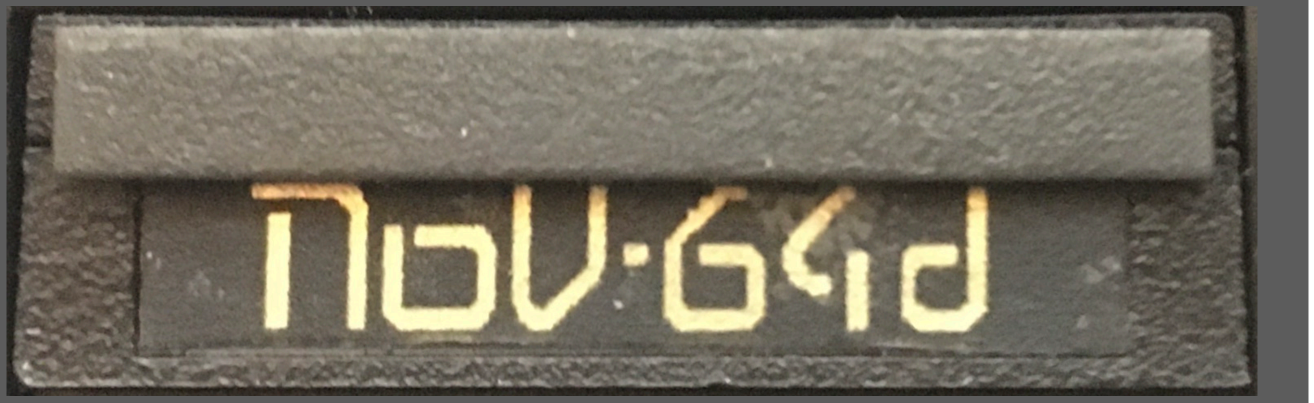
1. Select **NoV-64** option.
2. **HEPAX** is automatically selected.
3. Select **Join Blocks**.
   Flash ROM Block 0 (white) and Block 1 (yellow) are merged into a single block.

For each ROM file you want to map:

4. Click in one the **ROM image file name** white space to show file selection dialog.
5. Select ROM file name.
6. Click on **Open** button.
7. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

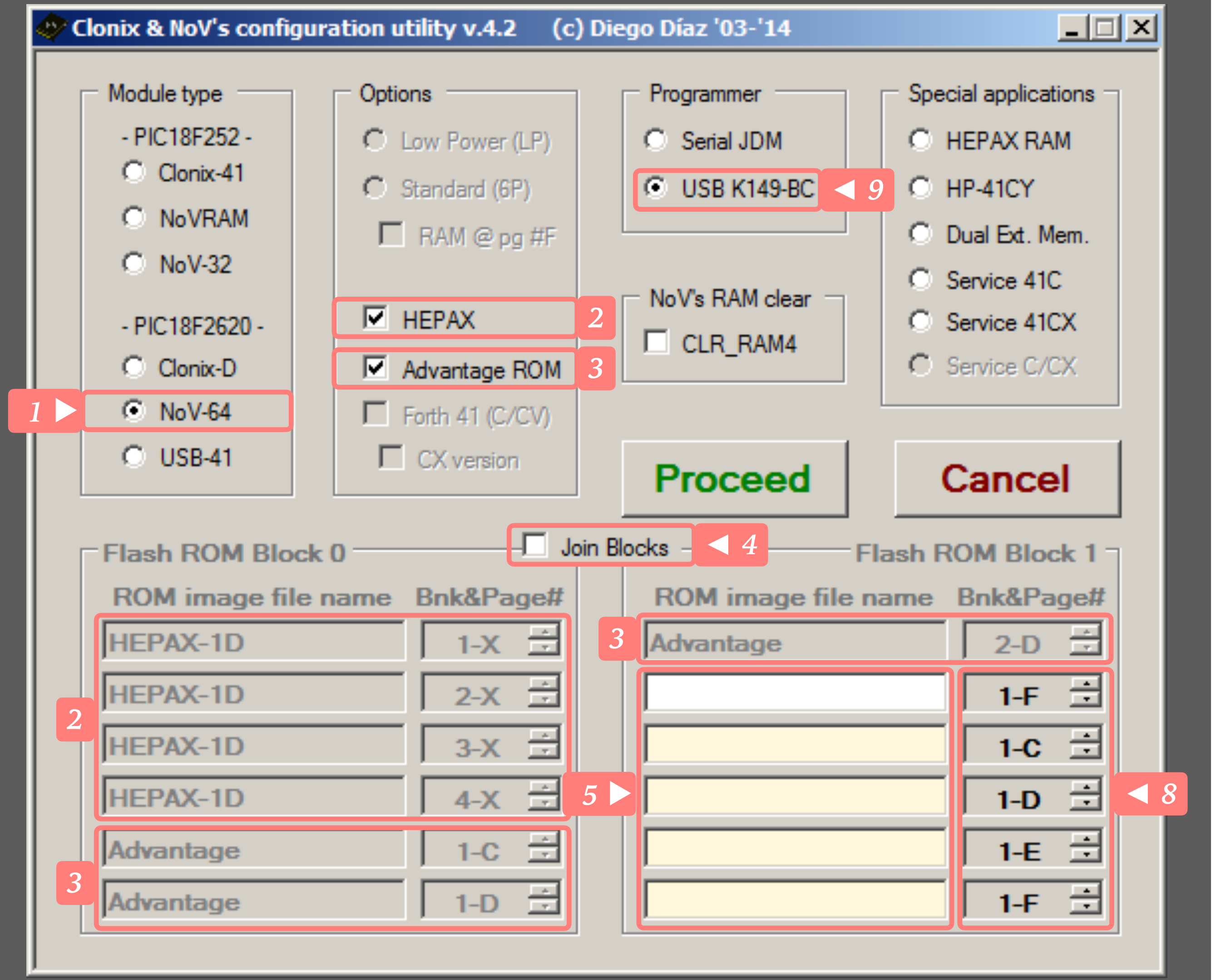
*Go to **Programming** section.*

HEPAX + Advantage



Goal: loading Advanced HEPAX ROM, HP Advantage ROM and optionally other ROMs into the module.

1. Select **NoV-64** option.
2. **HEPAX** is automatically selected.
3. Select **Advantage ROM**.
   Load ROM images at pages #C, #D & #D bank 2.
4. Optional: unselect or select **Join Blocks**.
   Flash ROM Block 0 (white) *and Block 1* (yellow) *are either two separated blocks or merged into a single block.*


Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
● NoV-64
○ USB-41

Options
○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
☑ HEPAX
☑ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAM4

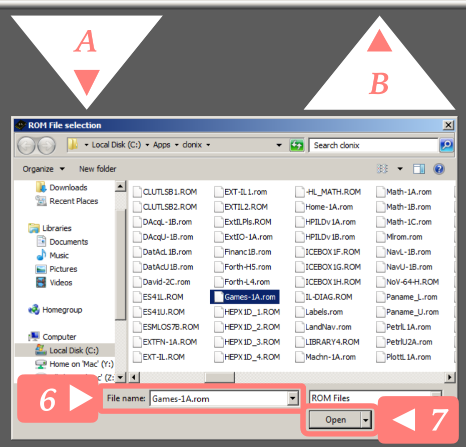
Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

□ Join Blocks

Flash ROM Block 0 ROM image file name	Bnk&Page#	Flash ROM Block 1 ROM image file name	Bnk&Page#
HEPAX-1D	1-X	Advantage	2-D
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
Advantage	1-C		1-E
Advantage	1-D		1-F

For each ROM file you want to map:

5. Click in one the **ROM image file name** white space to show file selection dialog.
6. Select ROM file name.
7. Click on **Open** button.
8. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.


ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix

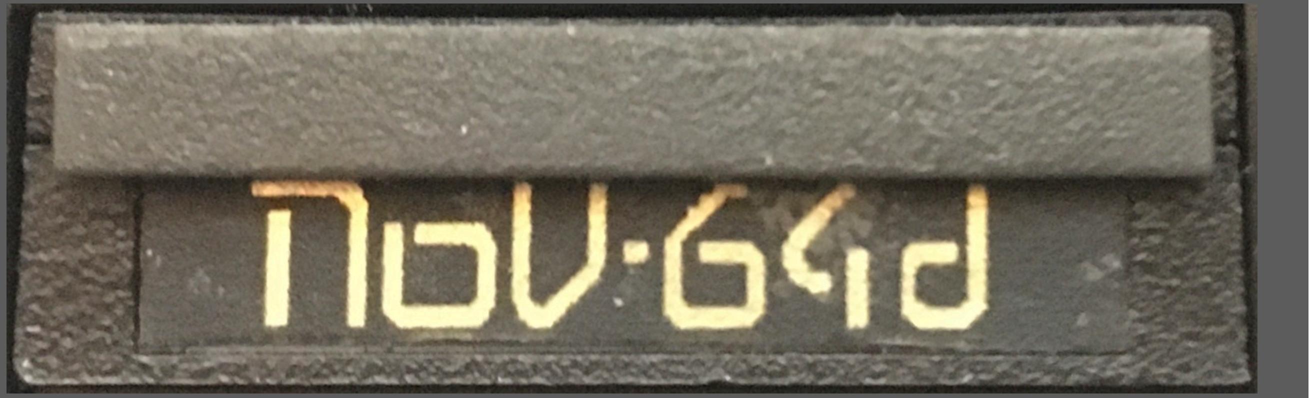
Search clonix

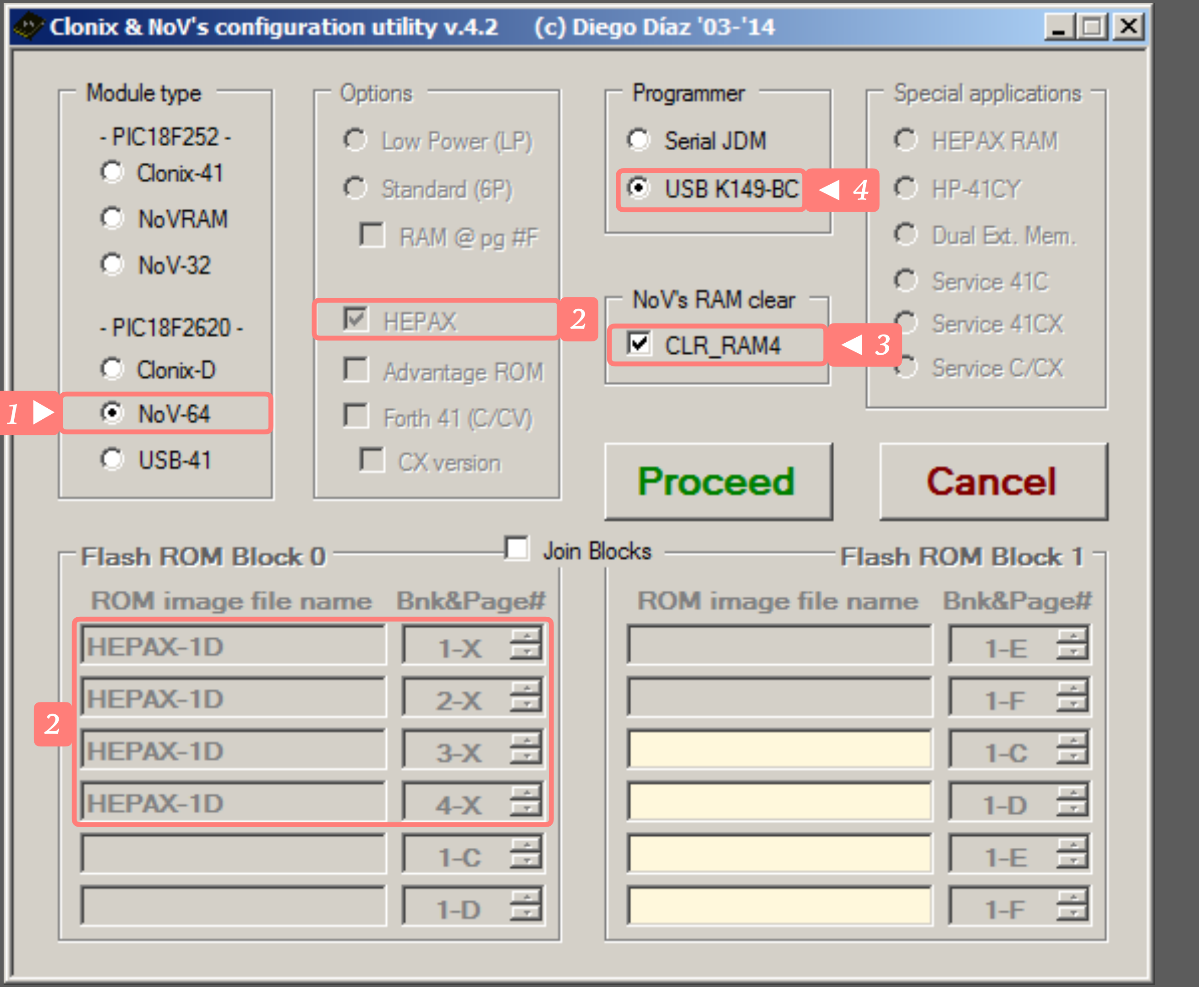
CLUTLSB1.ROM, CLUTLSB2.ROM, DAcqL-1B.rom, DAcqU-1B.rom, DatAcL1B.rom, DatAcU1B.rom, David-2C.rom, ES41L.ROM, ES41U.ROM, ESMLOS7B.ROM, EXTFN-1A.ROM, EXT-IL.ROM, EXT-IL1.rom, EXTIL2.ROM, ExtILPls.ROM, ExtIO-1A.rom, Financ1B.rom, Forth-H5.rom, Forth-L4.rom, Games-1A.rom, HEPX1D_1.ROM, HEPX1D_2.ROM, HEPX1D_3.ROM, HEPX1D_4.ROM, -HL_MATH.ROM, Home-1A.rom, HPILDv1A.rom, HPILDv1B.rom, ICEBOX1F.ROM, ICEBOX1G.ROM, ICEBOX1H.ROM, IL-DIAG.ROM, Labels.rom, LandNav.rom, LIBRARY4.ROM, Machn-1A.rom, Math-1A.rom, Math-1B.rom, Math-1C.rom, Mlrom.rom, NavL-1B.rom, NavU-1B.rom, NoV-64-H.ROM, Paname_L.rom, Paname_U.rom, PetrlL1A.rom, PetrlU2A.rom, PlottL1A.rom

File name: Games-1A.rom

ROM Files

Go to ***Programming*** *section.*





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
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○ NoVRAM
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● NoV-64
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Options
○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
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□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
☑ CLR_RAM4

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

□ Join Blocks

Flash ROM Block 0

ROM image file name	Bnk&Page#
HEPAX-1D	1-X
HEPAX-1D	2-X
HEPAX-1D	3-X
HEPAX-1D	4-X
	1-C
	1-D

Flash ROM Block 1

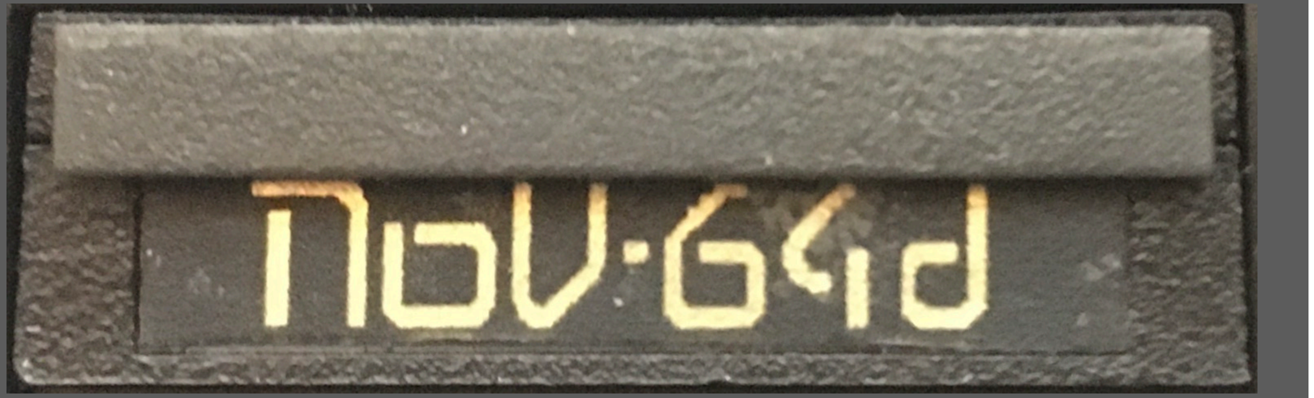
ROM image file name	Bnk&Page#
	1-E
	1-F
	1-C
	1-D
	1-E
	1-F

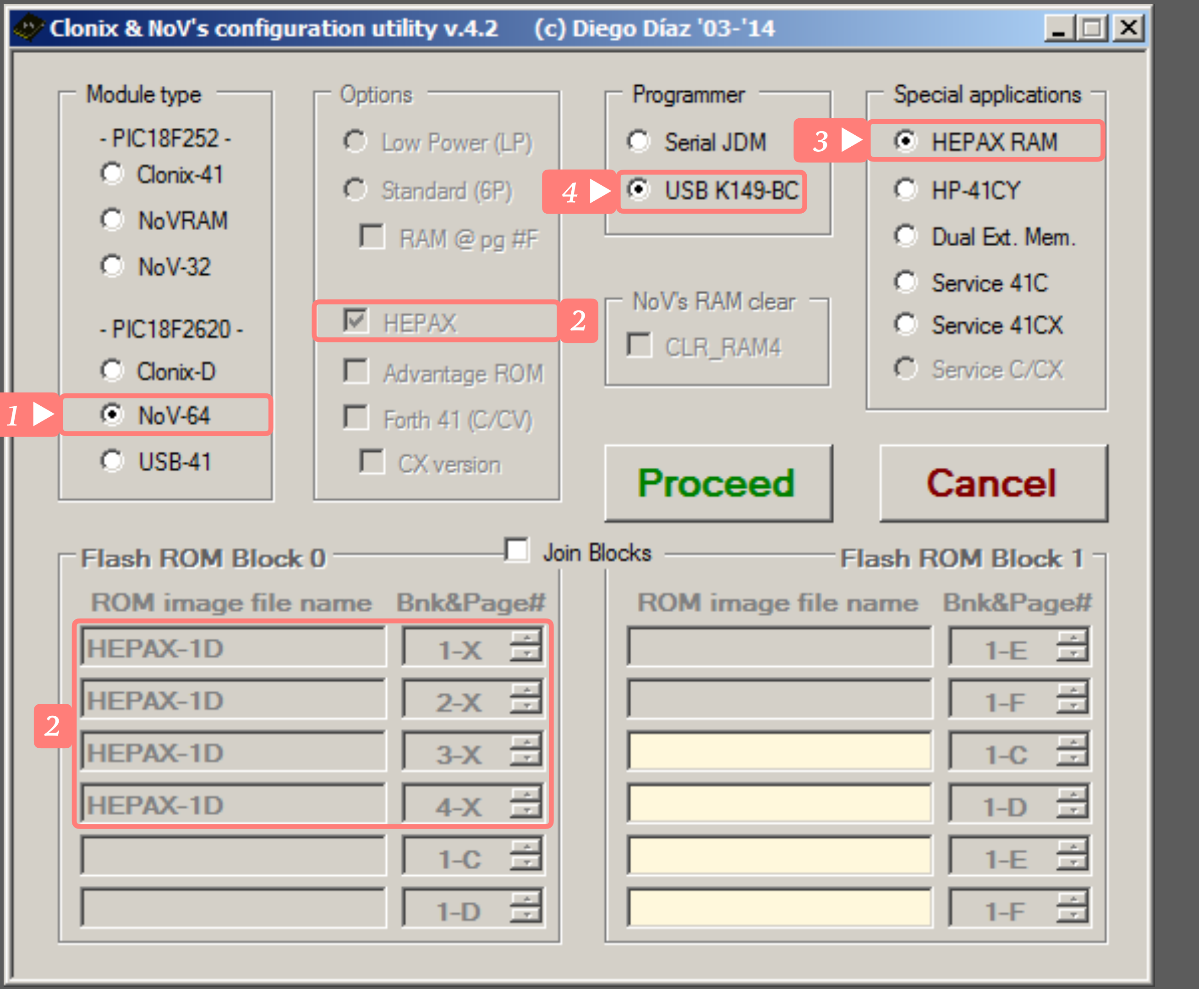
NoV's RAM Clear

Goal: loading a program into the module that clears the NoV module RAM.

1. Select **NoV-64** option.
2. **HEPAX** is automatically selected but unused.
3. Select **CLR_RAM4** to load a specialized firmware that will clear HEPAX RAM.
   *Note: this option has been proven to be unreliable, more details in **Clearing HEPAX RAM** section.*

*Go to **Programming** section.*





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
● NoV-64
○ USB-41

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○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
☑ HEPAX
□ Advantage ROM
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Programmer
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● USB K149-BC

NoV's RAM clear
□ CLR_RAM4

Special applications
● HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Flash ROM Block 0 □ Join Blocks Flash ROM Block 1

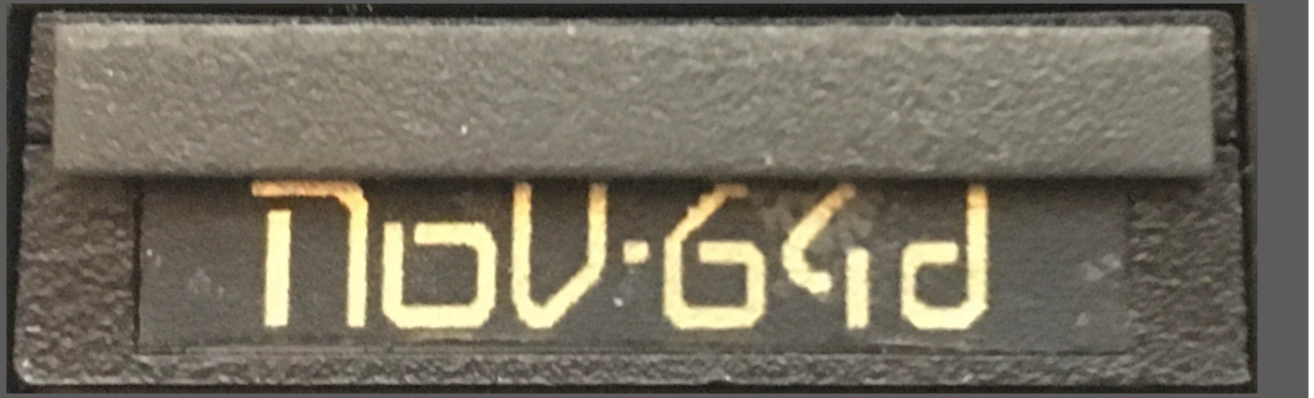
ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
HEPAX-1D	1-X		1-E
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
	1-C		1-E
	1-D		1-F

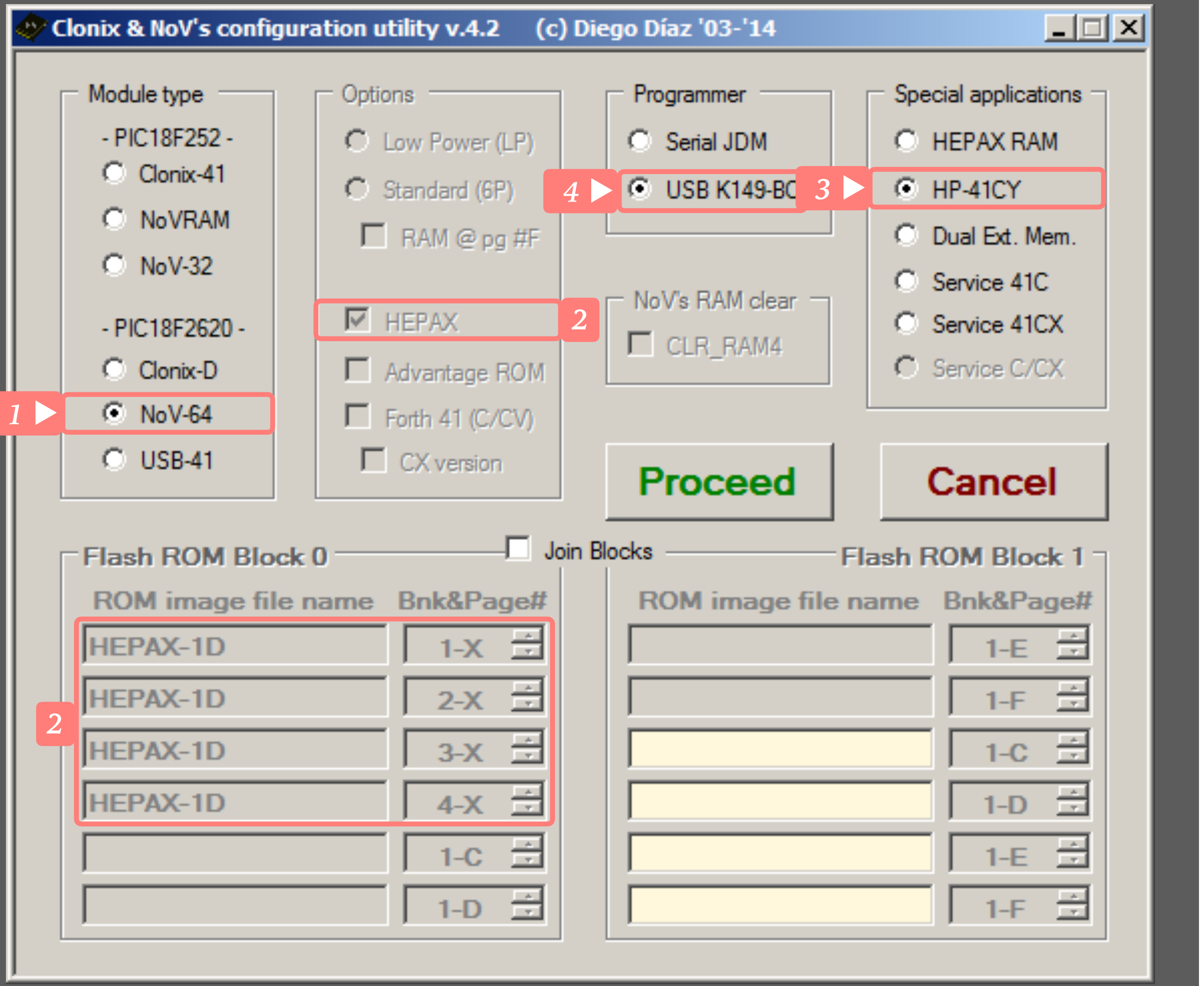
HEPAX RAM

Goal: loading a program into the module that simulate an HEPAX Double Memory module.

1. Select **NoV-64** option.
2. **HEPAX** is automatically selected but unused.
3. Select **HEPAX RAM** to configure the module as a HEPAX Double Memory unit.

*Go to **Programming** section.*





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
● NoV-64
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○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
☑ HEPAX
□ Advantage ROM
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Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAM4

Special applications
○ HEPAX RAM
● HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Flash ROM Block 0 □ Join Blocks

ROM image file name	Bnk&Page#
HEPAX-1D	1-X
HEPAX-1D	2-X
HEPAX-1D	3-X
HEPAX-1D	4-X
	1-C
	1-D

Flash ROM Block 1

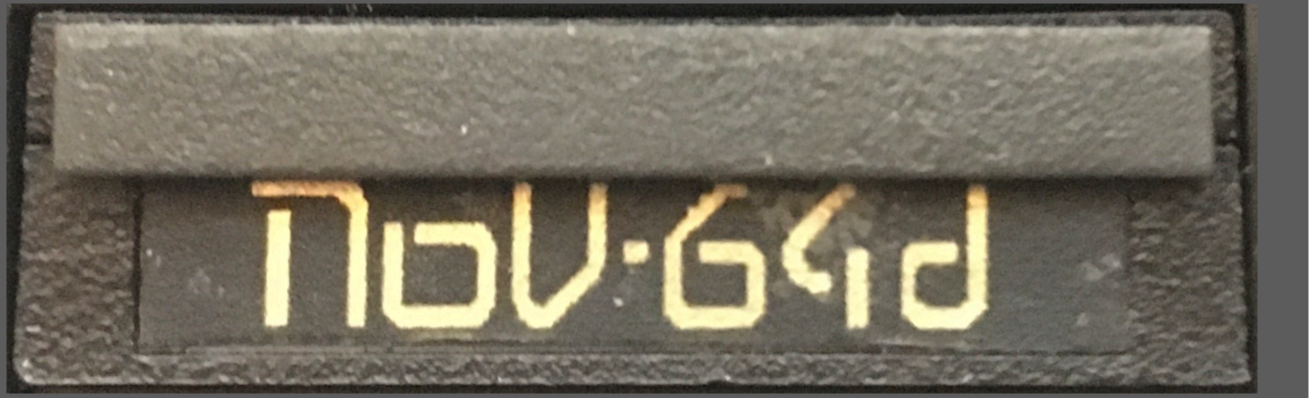
ROM image file name	Bnk&Page#
	1-E
	1-F
	1-C
	1-D
	1-E
	1-F

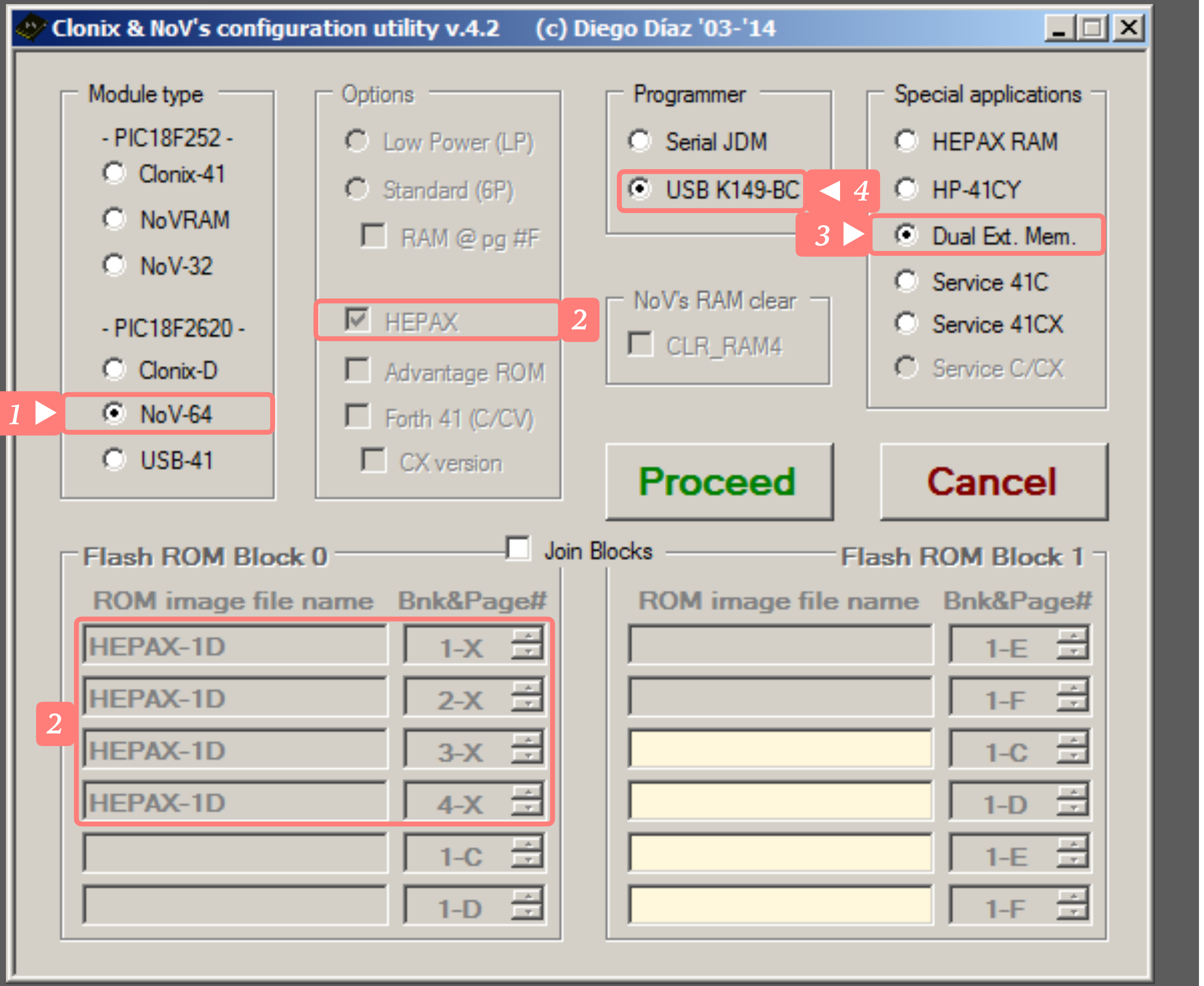
HP-41CY & RAMBOX64

Goal: loading W&W RAMBOX64 ROM into the module to simulate a RAMBOX64 unit or an HP-41CY calculator.

1. Select **NoV-64** option.
2. **HEPAX** is automatically selected but unused.
3. Select **HP-41CY** to configure the module as a W&W RAMBox64 unit.
   When inserted into a HP-41CX halfnut you get an HP-41CY replica without the turbo mode.

*Go to **Programming** section.*




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
1 ● NoV-64
○ USB-41

Options
○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
2 ☑ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC 4

NoV's RAM clear
□ CLR_RAM4

Special applications
○ HEPAX RAM
○ HP-41CY
3 ● Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed Cancel

□ Join Blocks

Flash ROM Block 0 ROM image file name	Bnk&Page#	Flash ROM Block 1 ROM image file name	Bnk&Page#
HEPAX-1D	1-X		1-E
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
	1-C		1-E
	1-D		1-F

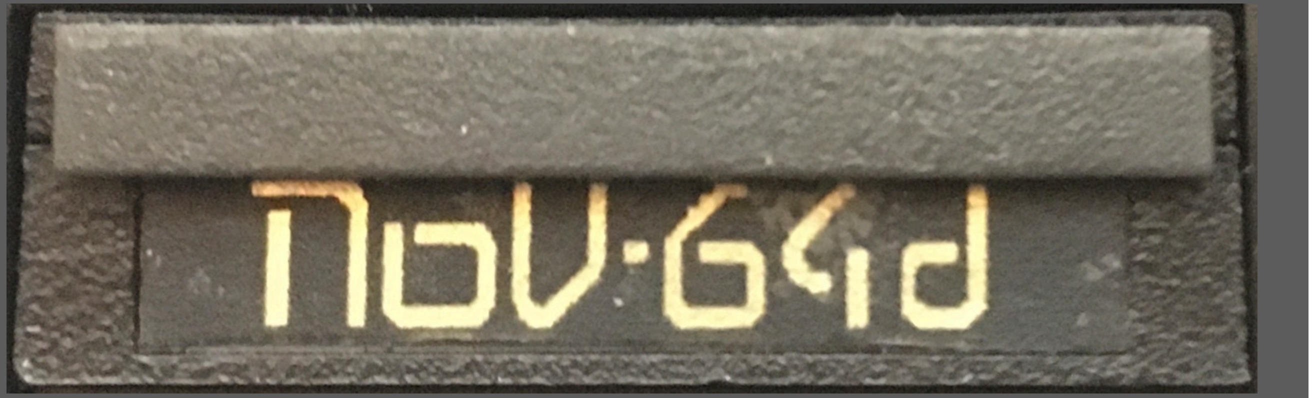
2

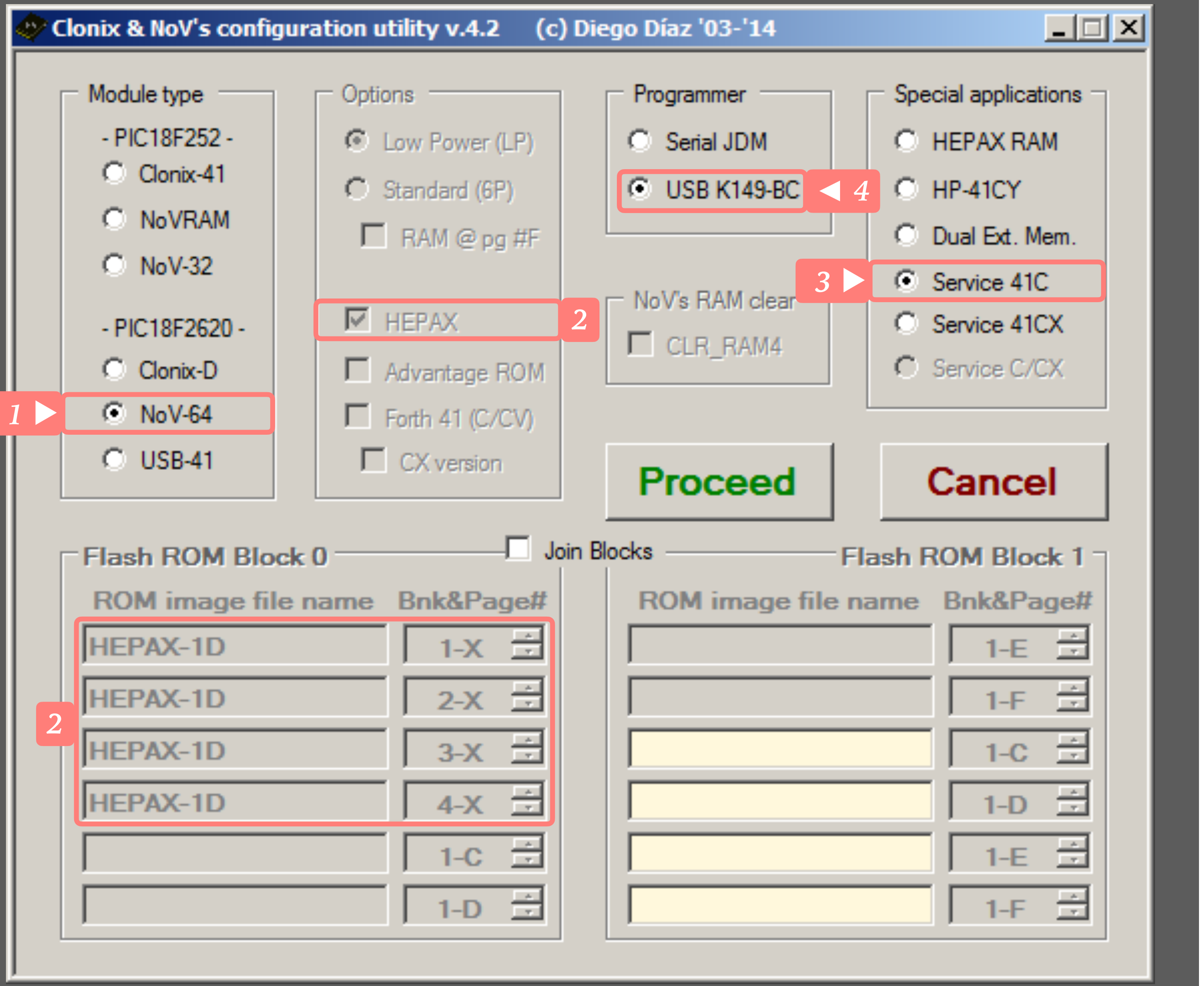
Dual X-Memory

Goal: loading a program into the module that simulate two 82181A X-Memory modules.

1. Select **NoV-64** option.
2. **HEPAX** is automatically selected but unused.
3. Select **Dual Ext. Mem.** to configure the module as a Double X-Memory module.
   This configuration add 476 of Extended-Registers RAM to the system. RAM content is lost when the module is unplugged from the calculator.

Go to ***Programming*** *section.*





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
● NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
☑ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAM4

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
● Service 41C
○ Service 41CX
○ Service C/CX

Proceed | Cancel

□ Join Blocks

Flash ROM Block 0

ROM image file name	Bnk&Page#
HEPAX-1D	1-X
HEPAX-1D	2-X
HEPAX-1D	3-X
HEPAX-1D	4-X
	1-C
	1-D

Flash ROM Block 1

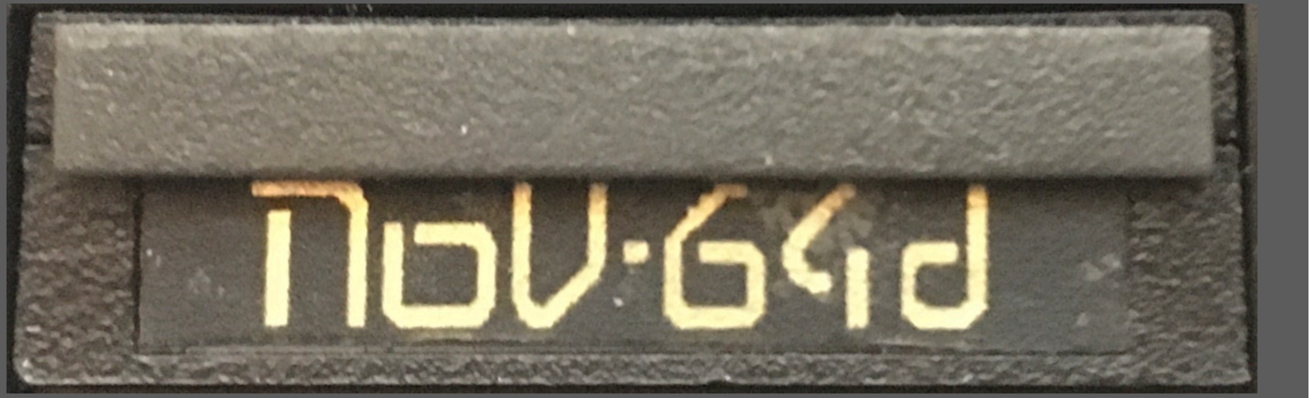
ROM image file name	Bnk&Page#
	1-E
	1-F
	1-C
	1-D
	1-E
	1-F

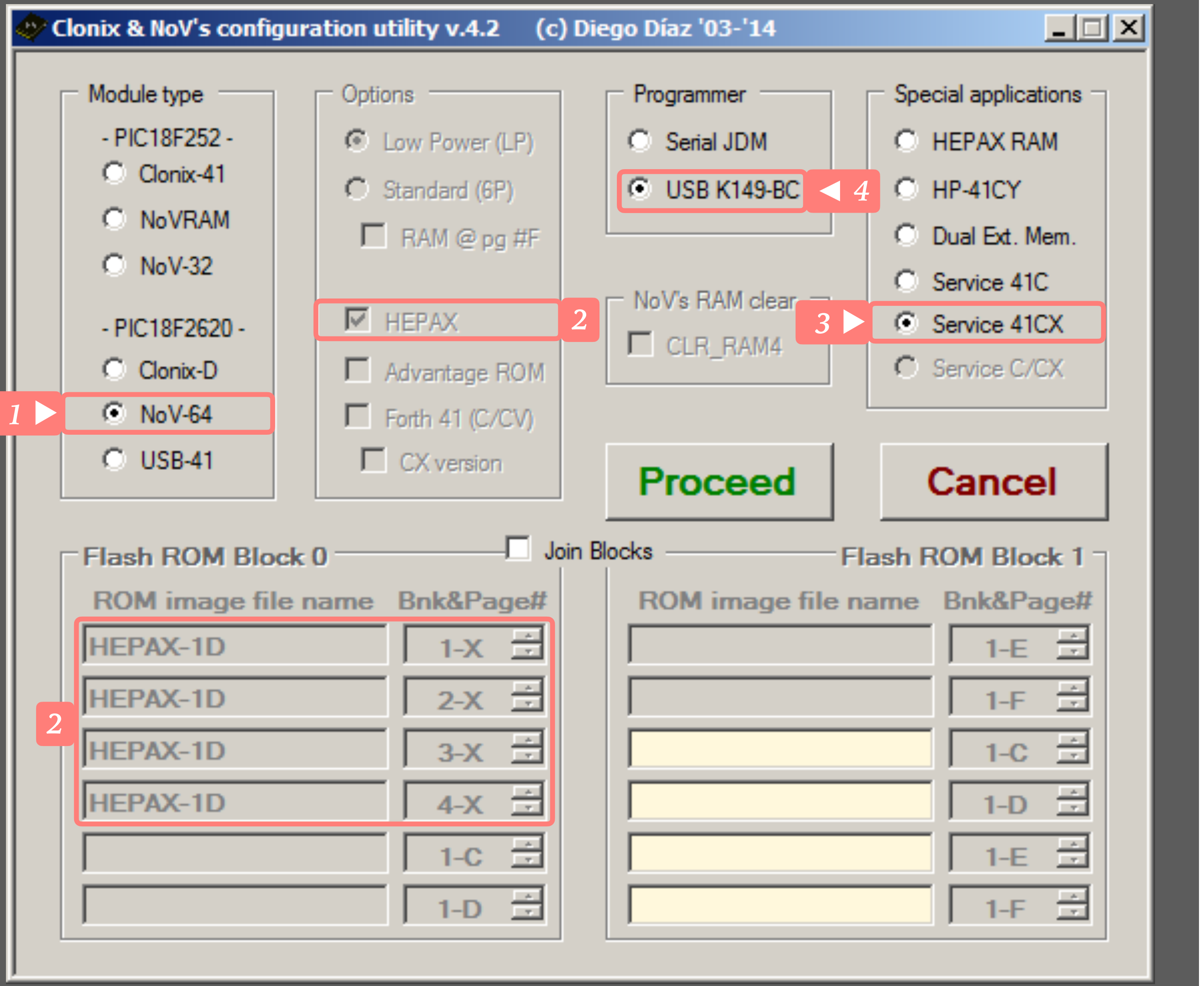
Service 41C/CV

Goal: loading HP Service ROM into the module. Support: 41C, 41CV, RAM (x1 & x4), ROM (4K & 8K) & Card Reader.

1. Select **NoV-64** option.
2. **HEPAX** is automatically selected but unused.
3. Select **Service 41C**.
   Load HP Service ROM [SM-1C] image in page #4.

*Go to **Programming** section.*




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
1 ▶ ● NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
☑ HEPAX 2
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC ◀ 4

NoV's RAM clear
□ CLR_RAM4

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
3 ▶ ● Service 41CX
○ Service C/CX

Proceed | Cancel

Flash ROM Block 0 | □ Join Blocks | Flash ROM Block 1

ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
HEPAX-1D	1-X		1-E
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
	1-C		1-E
	1-D		1-F

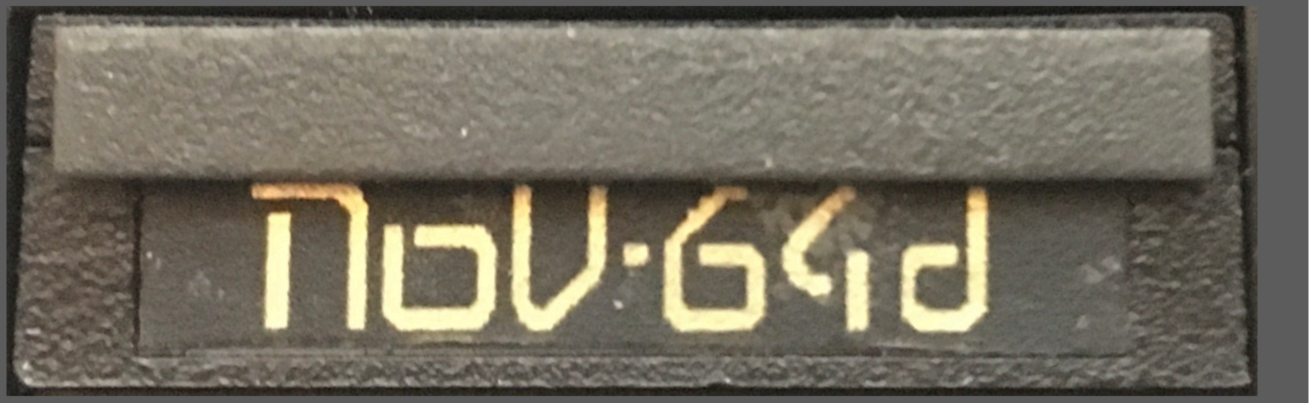
Service 41CX

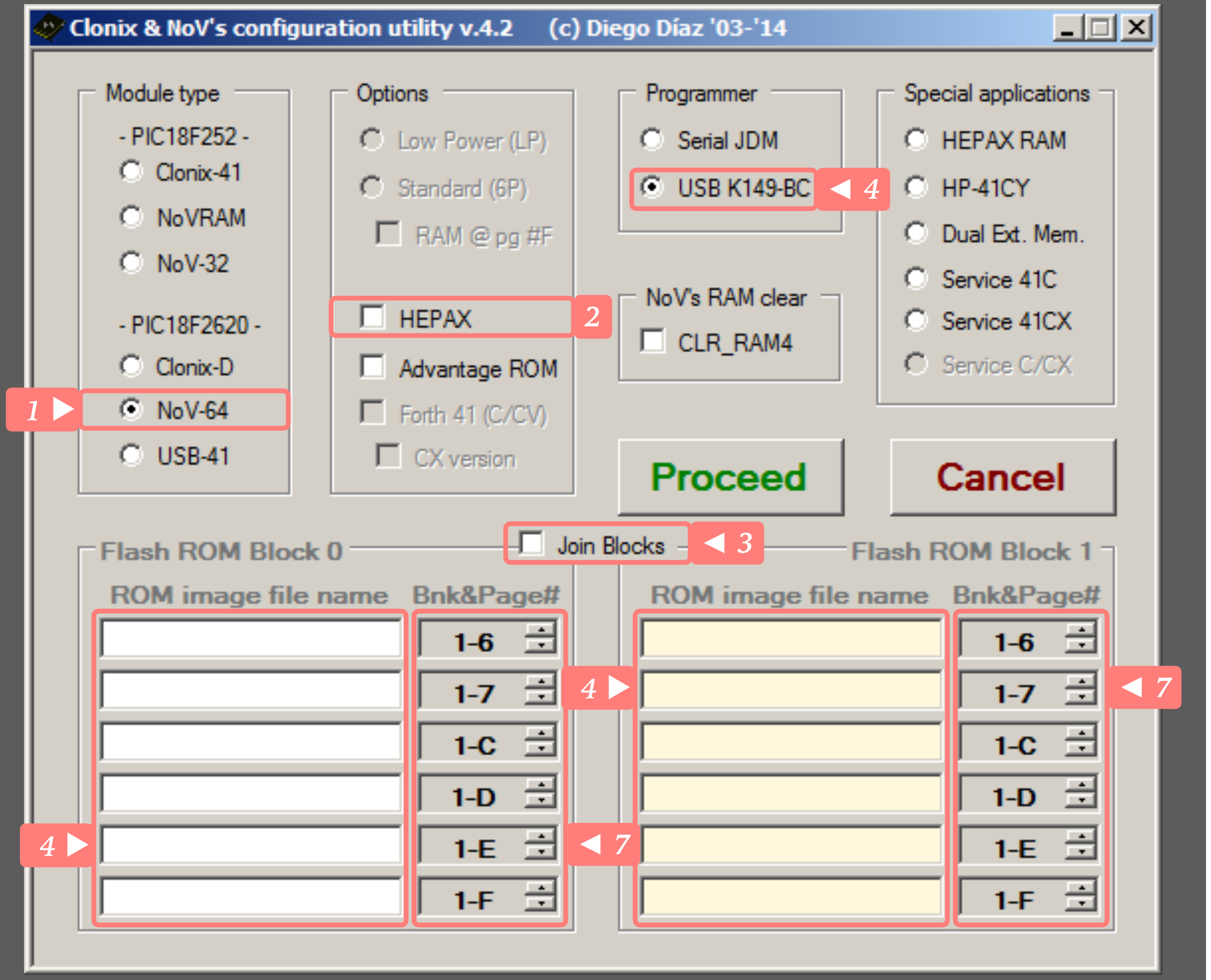
Goal: loading HP Service ROM into the module. Support: 41CV, 41CX, Time, X-Fnc, X-Mem, RAM (x1 & x4), ROM (4K to 16K).

1. Select **NoV-64** option.
2. **HEPAX** is automatically selected but unused.
3. Select **Service 41CX**.
   Load HP Service ROM [SM-2A] image in page #4.

*Go to **Programming** section.*

Quasi-ROM





Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
● NoV-64 (1)
○ USB-41

Options
○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX (2)
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

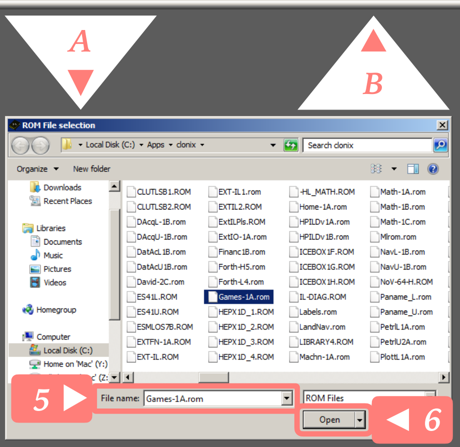
Programmer
○ Serial JDM
● USB K149-BC (4)

NoV's RAM clear
□ CLR_RAM4

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

□ Join Blocks (3)

Flash ROM Block 0 ROM image file name	Bnk&Page#	Flash ROM Block 1 ROM image file name	Bnk&Page#
	1-6		1-6
	1-7		1-7
	1-C		1-C
	1-D		1-D
	1-E		1-E
	1-F		1-F



File name: Games-1A.rom

ROM Files

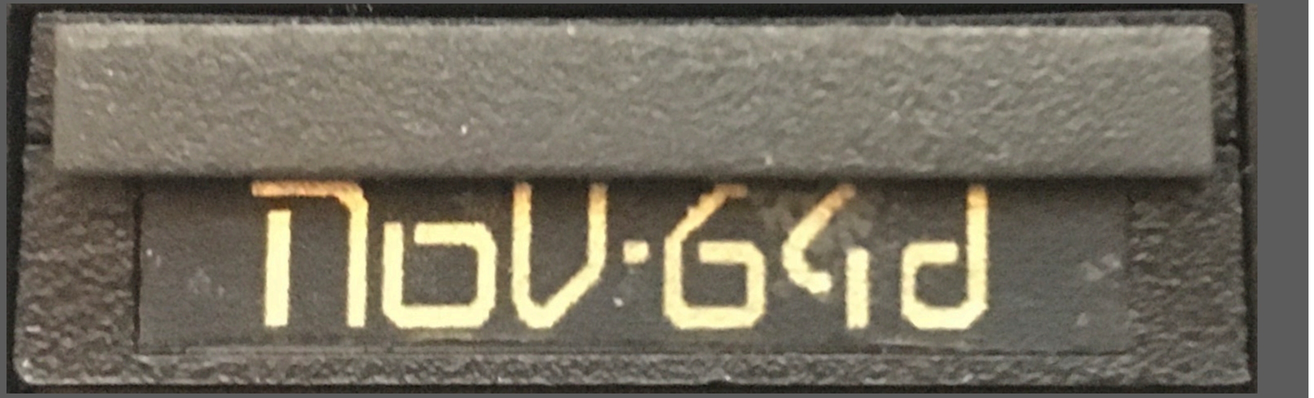
Goal: activating RAM/QROM pages #8 to #B and optionally loading ROMs into the module.

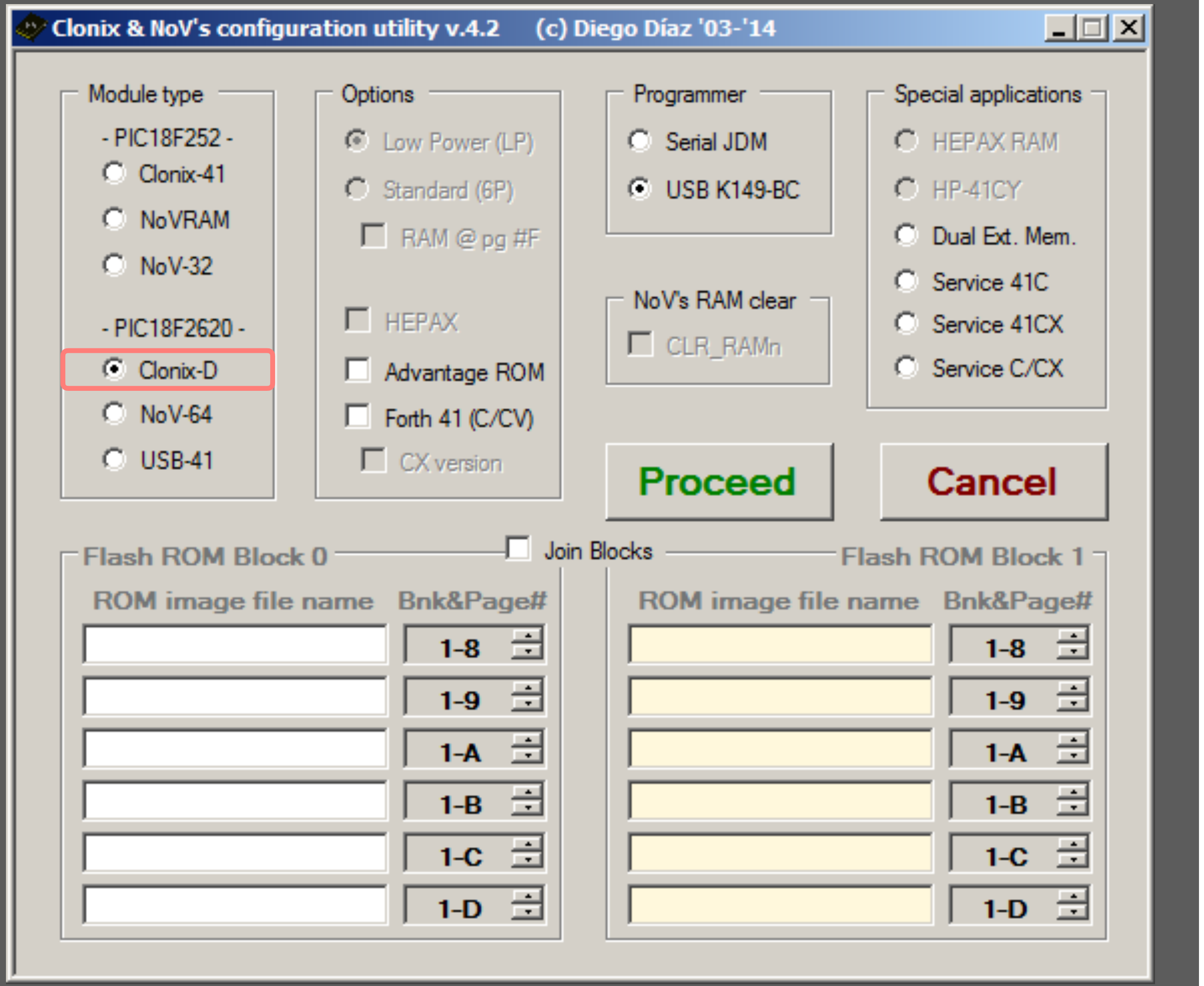
1. Select **NoV-64** option.
2. Unselect **HEPAX** option.
3. Optional: unselect or select **Join Blocks**.
   Flash ROM Block 0 ^(white)^ *and Block 1* ^(yellow)^ *are either two separated blocks or merged into a single block.*

For each ROM file you want to map:

4. Click in one the **ROM image file name** white space to show file selection dialog.
5. Select ROM file name.
6. Click on **Open** button.
7. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

*Go to **Programming** section.*




Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
● Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Flash ROM Block 0 □ Join Blocks Flash ROM Block 1

ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
	1-8		1-8
	1-9		1-9
	1-A		1-A
	1-B		1-B
	1-C		1-C
	1-D		1-D

Clonix-D Persona

NoV-64d module has the ability to behave exactly like a **Clonix-D**. If you want that persona, go to the **Clonix-D** section and configure the module without any restrictions.

NoV-64 module has the ability to behave partially like a **Clonix-D**. If you want that persona, go to the **Clonix-D** section and configure the module with these restrictions:

Join Blocks Unselected

- You can specify a maximum of 6 pages (24K) in Flash ROM Block 1
- Flash ROM Block 0 must contains the same ROM images at the same place as specified in Flash ROM Block 1. (Flash ROM Block 0 is a clone of Flash ROM Block 1)

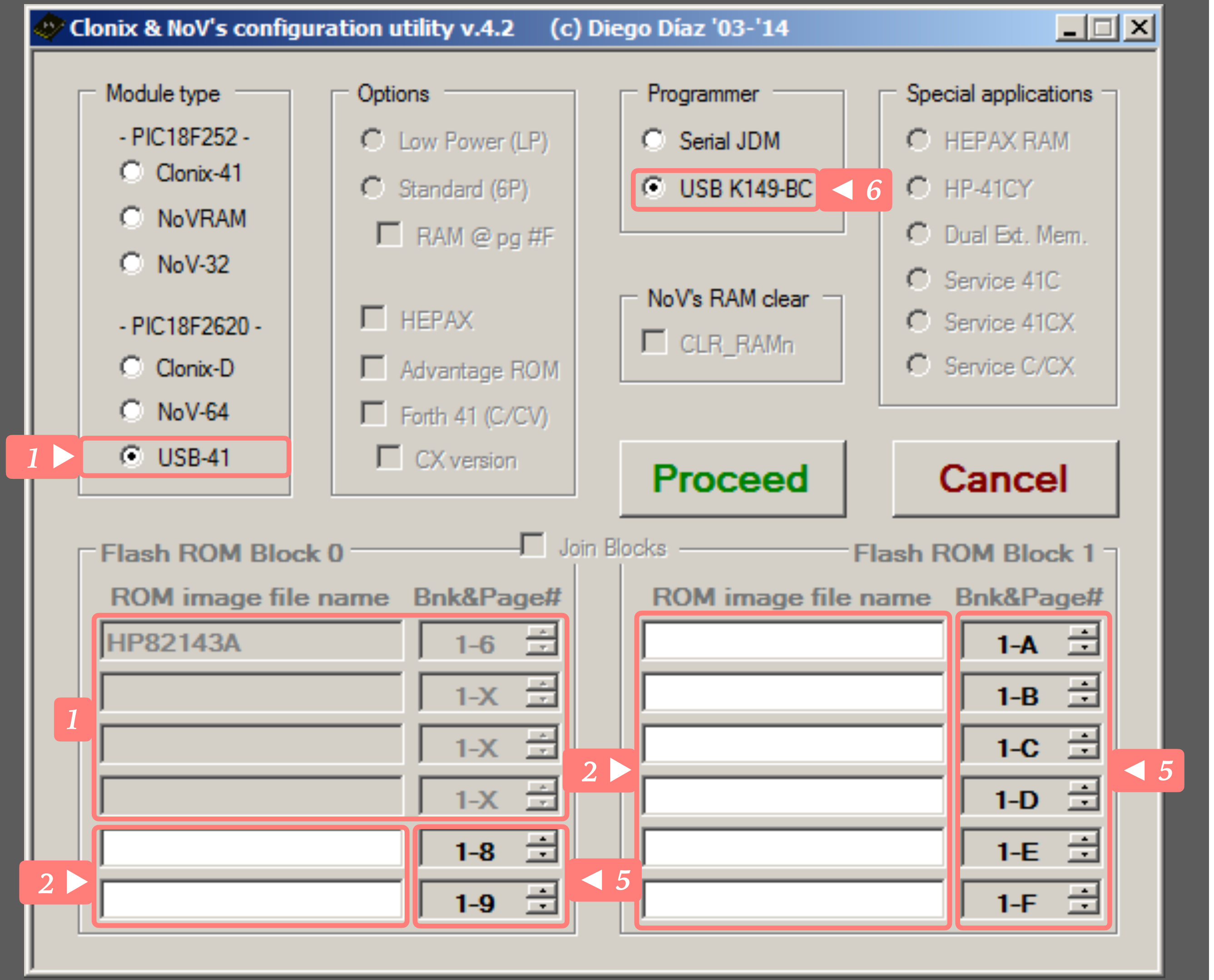
Join Blocks Selected

- You can specify a maximum of 12 pages (48K) in Flash ROM Block 0+1

Table of Content

USB-41

Configuration



Clonix & NoV's configuration utility v.4.2   (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
○ NoV-64
● USB-41

Options
○ Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

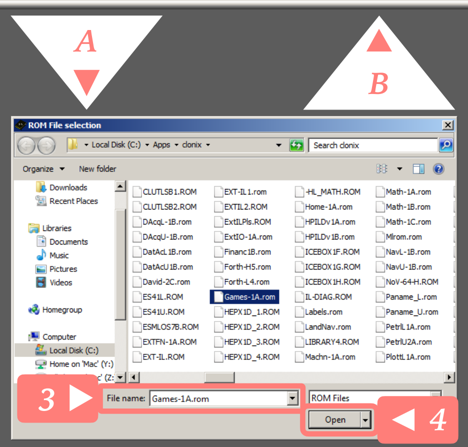
NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed   Cancel

Flash ROM Block 0   □ Join Blocks   Flash ROM Block 1

ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
HP82143A	1-6		1-A
	1-X		1-B
	1-X		1-C
	1-X		1-D
	1-8		1-E
	1-9		1-F



ROM File selection

Local Disk (C:) ▸ Apps ▸ clonix   Search clonix

Organize ▾   New folder

Downloads
Recent Places
Libraries
Documents
Music
Pictures
Videos
Homegroup
Computer
Local Disk (C:)
Home on 'Mac' (Y:)

CLUTLSB1.ROM
CLUTLSB2.ROM
DAcqL-1B.rom
DAcqU-1B.rom
DatAcL1B.rom
DatAcU1B.rom
David-2C.rom
ES41L.ROM
ES41U.ROM
ESMLOS7B.ROM
EXTFN-1A.ROM
EXT-IL.ROM
EXT-IL1.rom
EXTIL2.ROM
ExtILPls.ROM
ExtIO-1A.rom
Financ1B.rom
Forth-H5.rom
Forth-L4.rom
Games-1A.rom
HEPX1D_1.ROM
HEPX1D_2.ROM
HEPX1D_3.ROM
HEPX1D_4.ROM
-HL_MATH.ROM
Home-1A.rom
HPILDv1A.rom
HPILDv1B.rom
ICEBOX1F.ROM
ICEBOX1G.ROM
ICEBOX1H.ROM
IL-DIAG.ROM
Labels.rom
LandNav.rom
LIBRARY4.ROM
Machn-1A.rom
Math-1A.rom
Math-1B.rom
Math-1C.rom
Mlrom.rom
NavL-1B.rom
NavU-1B.rom
NoV-64-H.ROM
Paname_L.rom
Paname_U.rom
PetrlL1A.rom
PetrlU2A.rom
PlottL1A.rom

File name: Games-1A.rom   ROM Files

Open

HP-82143A

Goal: loading a modified 82143A printer ROM and optionally other ROMs into the module.

1. Select **USB-41** option.
   Load printer ROM image at page #6.

For each ROM file you want to map:

2. Click in one the **ROM image file name** white space to show file selection dialog.
3. Select ROM file name.
4. Click on **Open** button.
5. Select the **Bank [1..4] & Page [#4..#F]** you want to map you ROM image to.

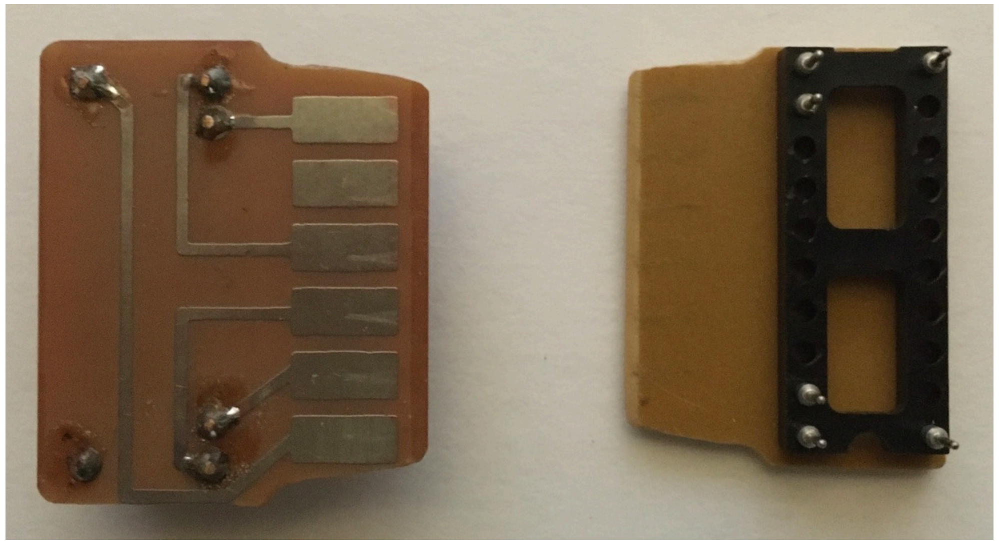
*Go to **Programming** section.*

PROGRAMMING

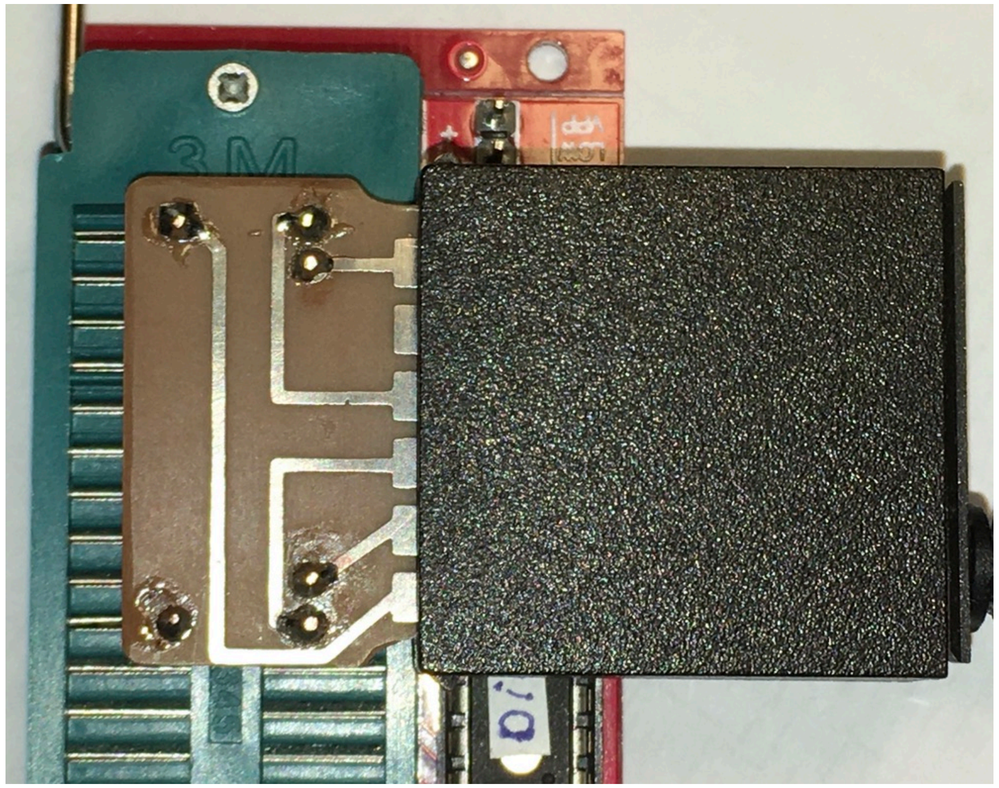
Table of Content

Hardware 1 (Before Sept. 2020)

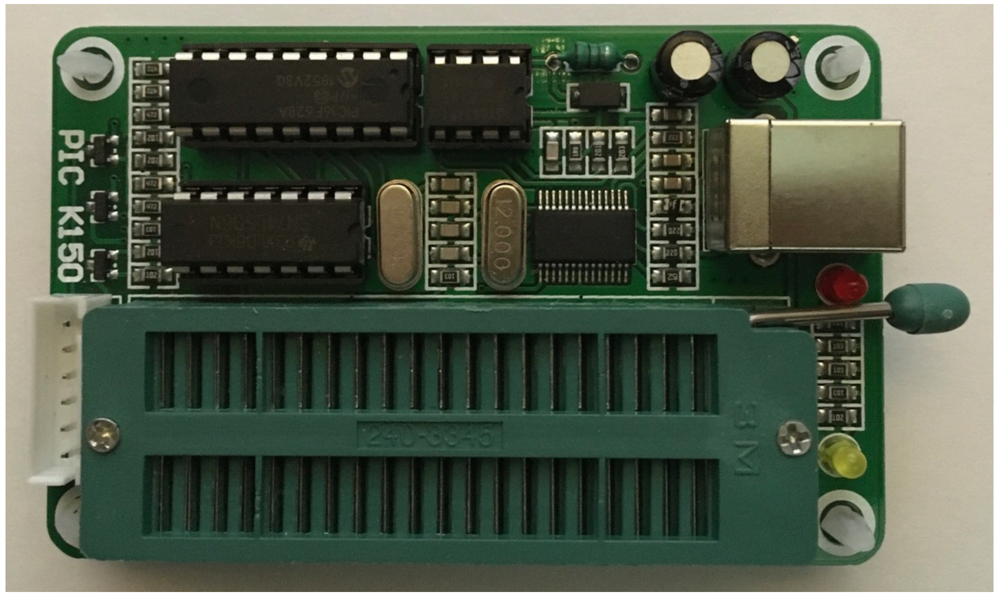
- ➤ Module Adapter



- ➤ Prog.+Adapter+Module



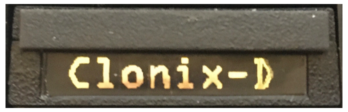
- ➤ K150 USB PIC Programmer



- ➤ K149 USB PIC Programmer

Hardware 2 (Before Sept. 2020)

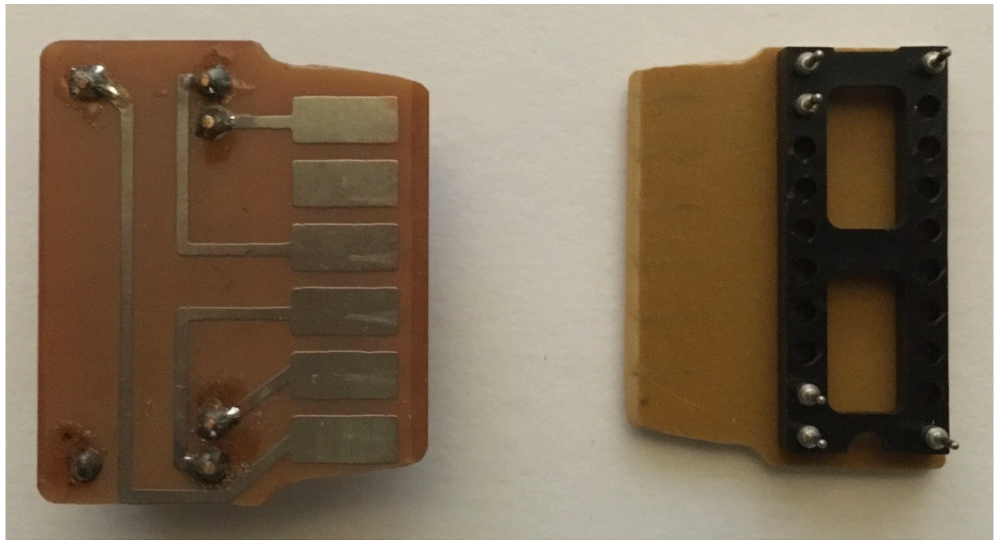
- Modules & PIC Programmer Adapter by Diego Díaz
- Clonix-D cost is 100 €



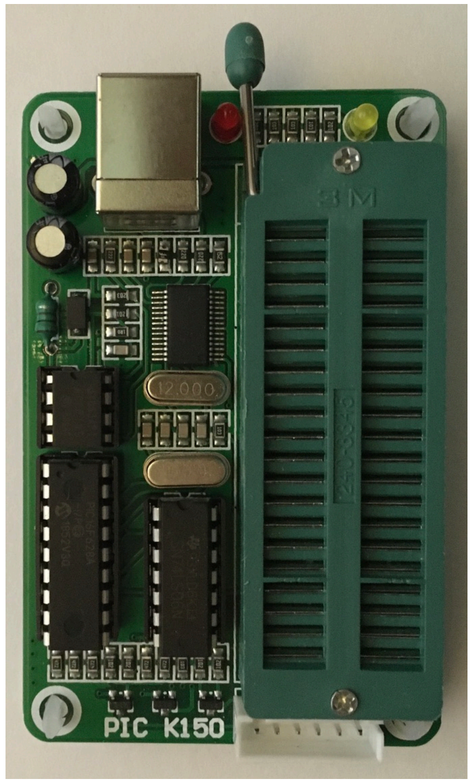
- USB-41 cost is 110 €

- NoV-64d cost is 140 €

- Adapter cost is 10 €



- K150 PIC Programmer
  + Adapter cost is 30 €

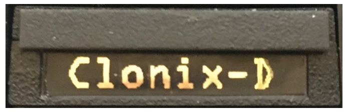


- Ordering information at *www.clonix41.org*

Minimum requirement:
K150 USB PIC programmer must have the 18A protocol firmware installed.

Hardware 3 (After Sept. 2020)

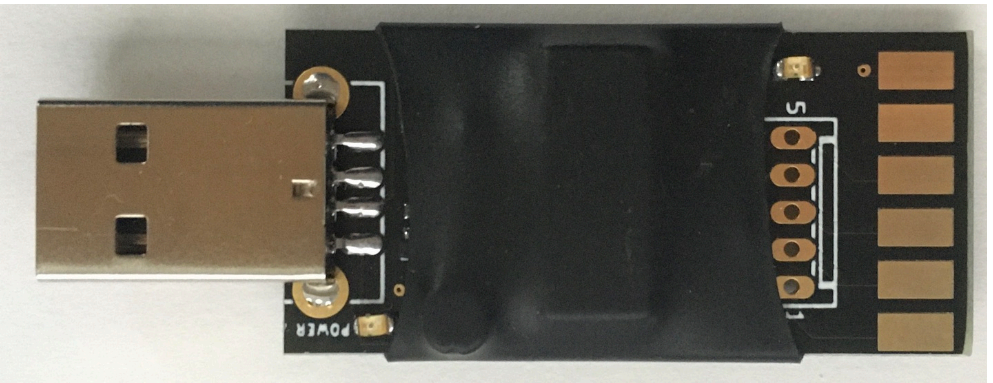
- Modules & PIC Programmer Adapter by Diego Díaz
- Clonix-D cost is 100 €



- USB-41 cost is 110 €

- NoV-64d cost is 140 €

- PICKit 2 cost is 40 €



- Ordering information at *www.clonix41.org*

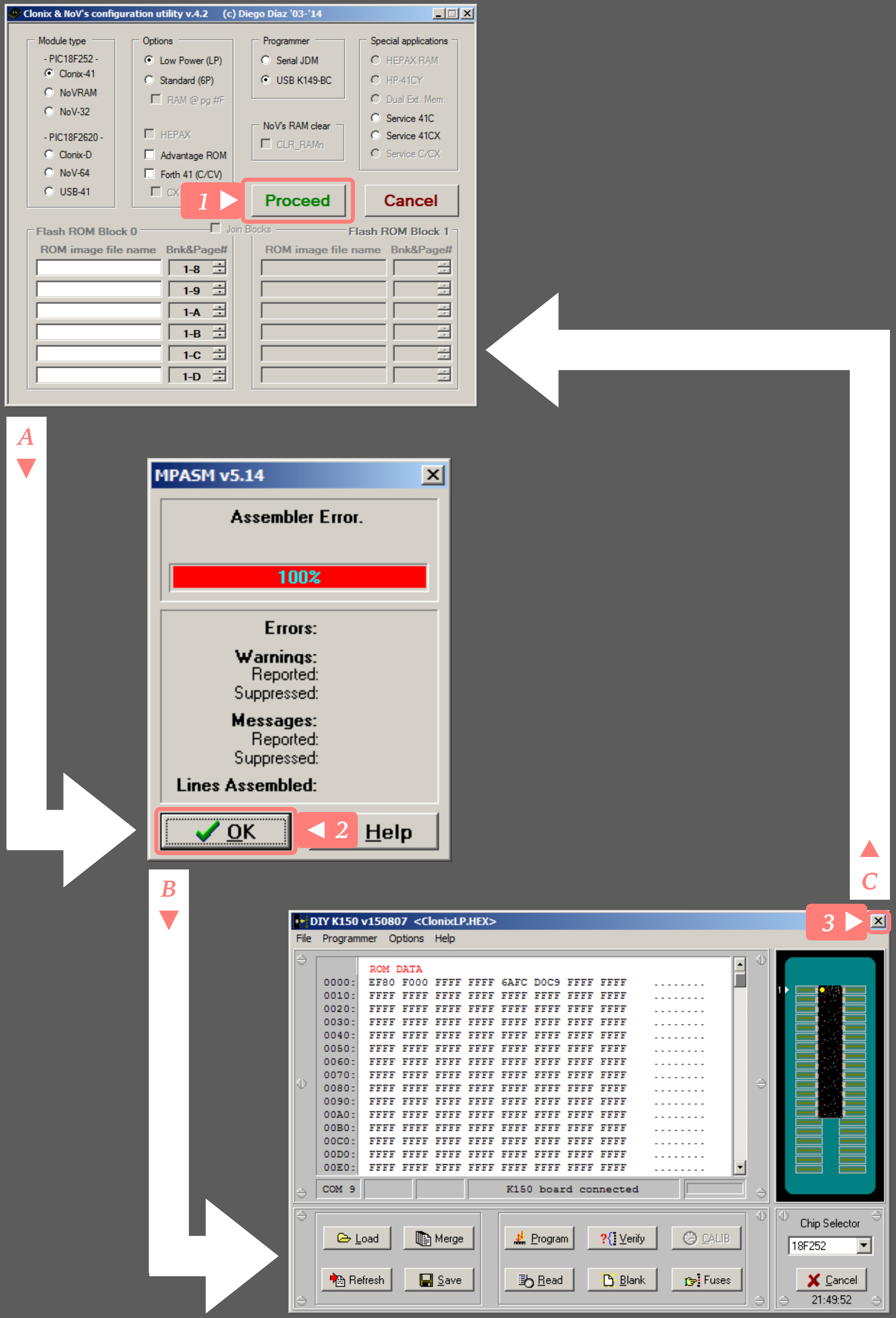
Software

- Clonix & NoV Configuration Utility v4.2
  - Windows utility written by Diego Díaz to configure Clonix and NoV modules.
  - Read Installation section for software download and installation procedures.
- MPASM (included in Clonix_CD_090315.zip)
  - Microchip Assembler for PIC microcontrollers
  - MPASM User's Guide with MPLINK and MPLIB
    ww1.microchip.com/downloads/en/devicedoc/33014g.pdf
  - MPLAB development system
    www.microchip.com/mplab/embedded-software-center
- PIC Programming Software (included in Clonix_CD_090315.zip)
  - K150 PIC Programmer Manual
    www.sigmaelectronica.net/manuals/K150.pdf
  - Micropro / MicroBurn DIY Software
    www.ozitronics.com/download/DIYpack25EP2.zip

PIC Assembly & Intel Hex Files (.asm & .hex)

Filename	Module(s)	Description
CLONIXLP	Clonix 41	Clonix 41 Low Power
CLONIX6P	Clonix 41	Clonix 41 Standard (6 pages)
CLONIX6R	Clonix 41	Clonix 41 Standard (6 pages) with 512 words RAM
CLONIX-D	Clonix-D	Clonix-D
CLONIX-P	USB-41	HP-82143A Printer Simulation
CLONIXU4	USB-41	Page Transfer Utility : ROMCOPY piggyback firmware
NOVRAM-H	NoVRAM	HEPAX Emulation - Version 1D
NOV-32-H	NoV-32	HEPAX Emulation - Version 1D
NOV-64-H	NoV-64(d)	HEPAX Emulation - Version 1D
NOV-64H4	NoV-64(d)	HEPAX Emulation - Version 4H (need Library4)
CLR_RAM1	NoVRAM	HEPAX RAM Clear
CLR_RAM2	NoV-32	HEPAX RAM Clear
CLR_RAM4	NoV-64(d)	HEPAX RAM Clear
HPX25RAM	NoVRAM & NoV-32	HEPAX RAM Emulation
HPX26RAM	NoV-64(d)	HEPAX RAM Emulation
NOV-64CY	NoV-64(d)	W&W HP-41CY & RAMBOX II Emulation
NOV-64XM	NoV-64(d) & Clonix-D	Dual X-Memory Emulation
SERVC_C	All except USB-41	Service 41C
SERVC_CX	All except USB-41	Service 41CX
SRVCC_CX	Clonix-D	Service C/CX (even/odd port select service module)

File Generation Failed



Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
● Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Flash ROM Block 0 □ Join Blocks Flash ROM Block 1

ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
	1-8		
	1-9		
	1-A		
	1-B		
	1-C		
	1-D		

MPASM v5.14

Assembler Error.

100%

Errors:
Warnings:
Reported:
Suppressed:
Messages:
Reported:
Suppressed:
Lines Assembled:

DIY K150 v150807 <ClonixLP.HEX>

```
ROM DATA
0000: EF80 F000 FFFF FFFF 6AFC D0C9 FFFF FFFF   ........
0010: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0020: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0030: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0040: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0050: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0060: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0070: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0080: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0090: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00A0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00B0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00C0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00D0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00E0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
```

COM 9 K150 board connected

Chip Selector: 18F252

21:49:52

In **Clonix & NoV Configuration Utility** ...

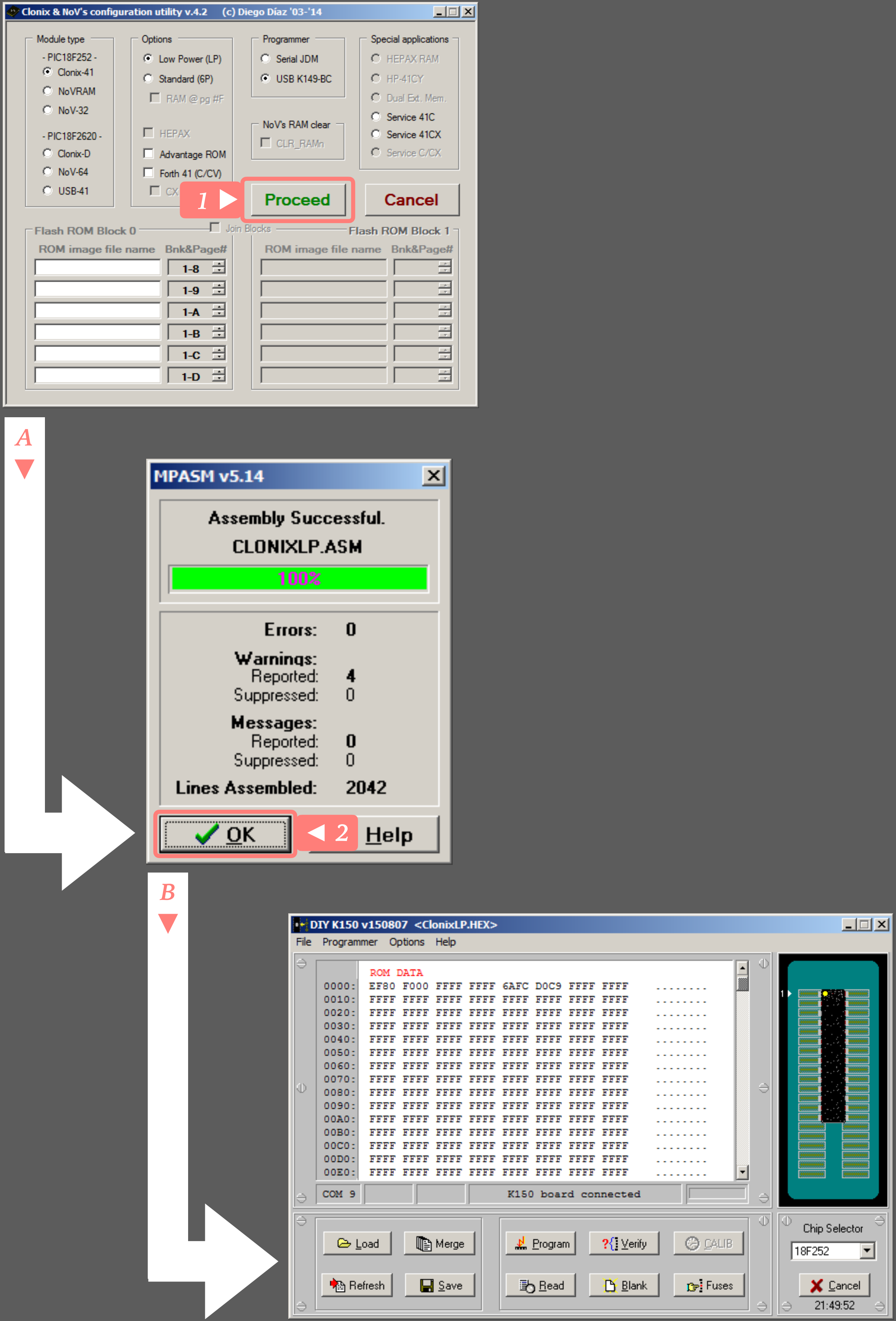
1. Press **Proceed** to start MPASM.

Assembler was unable to compile the source file, progress bar is ***red****, hex file generation was unsuccessful.*

2. Press **OK** to start **MicroBurn (DIY K150)** application.

MPASM *failed its file generation, we cannot continue further.*

3. Close **MicroBurn (DIY K150)** to go back to **Clonix & NoV Configuration Utility** application and validate your configuration.



Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
● Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Flash ROM Block 0: ROM image file name	Bnk&Page#
	1-8
	1-9
	1-A
	1-B
	1-C
	1-D

□ Join Blocks

Flash ROM Block 1: ROM image file name, Bnk&Page#

MPASM v5.14

Assembly Successful.
CLONIXLP.ASM
100%

Errors:	0
Warnings:	
Reported:	4
Suppressed:	0
Messages:	
Reported:	0
Suppressed:	0
Lines Assembled:	2042

DIY K150 v150807 <ClonixLP.HEX>

```
ROM DATA
0000: EF80 F000 FFFF FFFF 6AFC D0C9 FFFF FFFF    ........
0010: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0020: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0030: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0040: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0050: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0060: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0070: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0080: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0090: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00A0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00B0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00C0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00D0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00E0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
```

COM 9 | K150 board connected

Chip Selector: 18F252

21:49:52

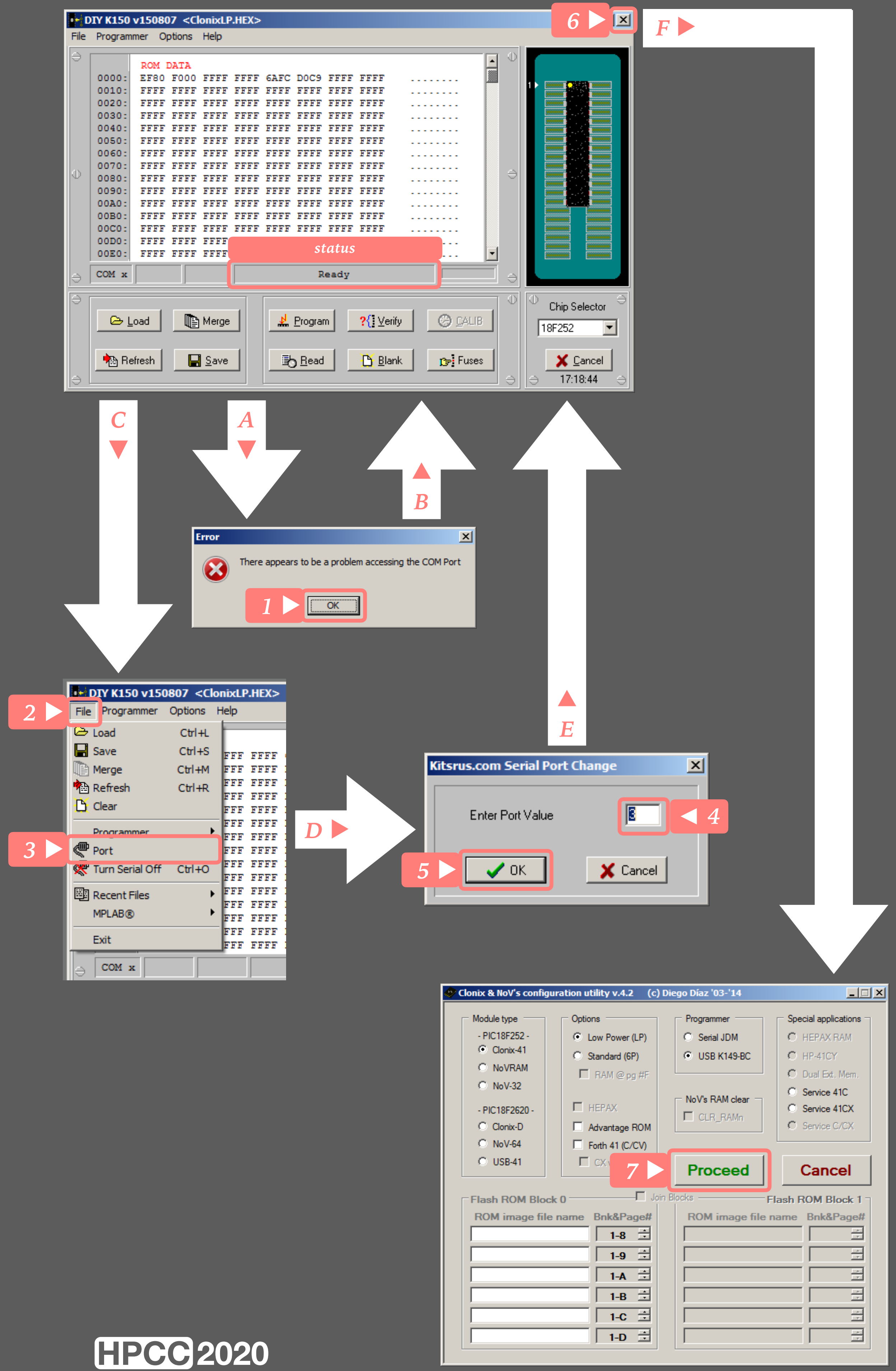
File Generation Successful

In **Clonix & NoV Configuration Utility** ...

1. Press **Proceed** to start MPASM.

Assembler was able to compile the source file, progress bar is ***green****, hex file generation was successful.*

2. Press **OK** to start **MicroBurn (DIY K150)** application.



There appears to be a problem accessing the COM Port

Enter Port Value 3

Programmer Not Found

In **MicroBurn (DIY K150)** ...

Upon application start, a communication error dialog box is telling us that the application is not able to communicate with the PIC programmer.

1. Press **OK** to acknowledge the error.

Verify that your RS-232 or USB PIC programmer is correctly connected. Verify that serial communication port number is valid.

2. Select menu **File.**

3. Select sub-menu **Port.**

*In the **Serial Port Change** dialog box:*

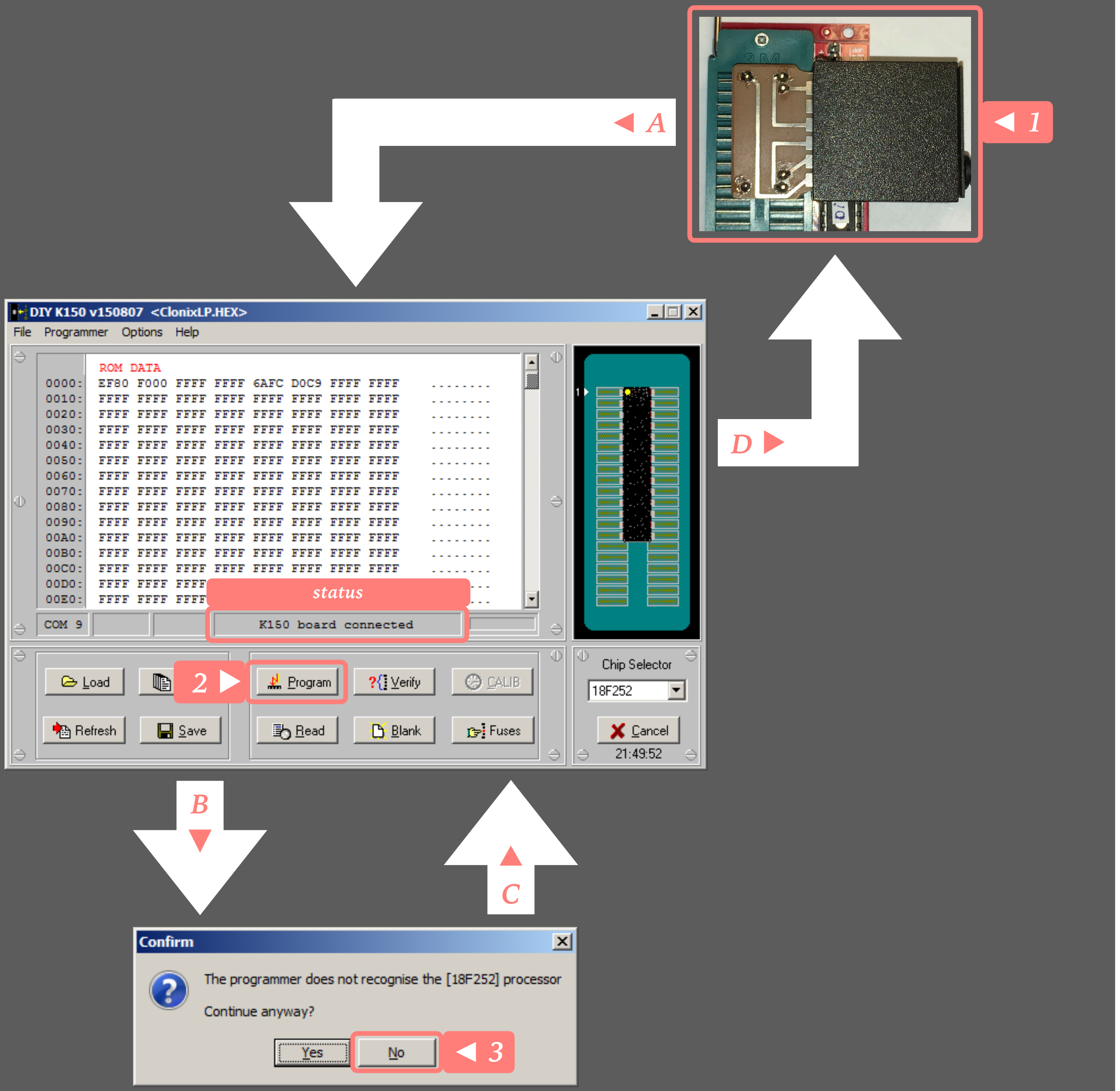
4. Enter PIC Programmer COM Port

5. Press **OK** to accept and close the dialog box.

If connection is established you should see K150 board connected displayed in the status field.

6. Close **MicroBurn (DIY K150)** to go back to **Clonix & NoV Configuration Utility**

7. Press **Proceed** again.



DIY K150 v150807 <ClonixLP.HEX>

```
ROM DATA
0000: EF80 F000 FFFF FFFF 6AFC D0C9 FFFF FFFF   ........
0010: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0020: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0030: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0040: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0050: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0060: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0070: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0080: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0090: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00A0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00B0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00C0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00D0: FFFF FFFF FFFF
00E0: FFFF FFFF FFFF
COM 9          K150 board connected
```

Chip Selector: 18F252

21:49:52

Confirm

The programmer does not recognise the [18F252] processor

Continue anyway?

File Upload Failed 1

1. Verify that your module is correctly inserted in the adapter.

In **MicroBurn (DIY K150)** ...

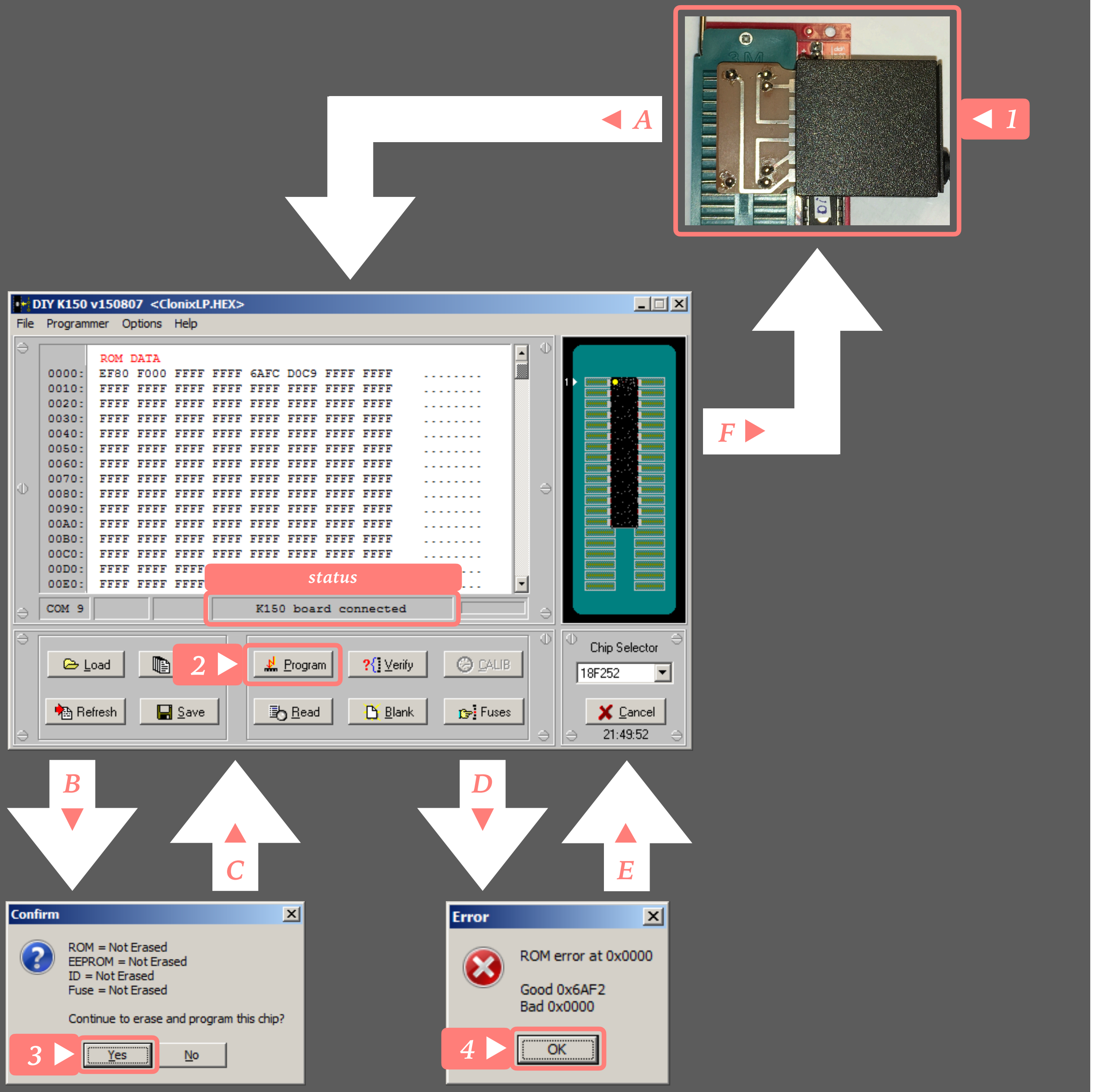
2. Press **Program** to start programming.

A confirm dialog box is telling us that the module is not recognized.

3. Press **No** in the **Confirm** dialog box.

Go back to step 1 until successful.

File Upload Failed 2



```
ROM DATA
0000:  EF80 F000 FFFF FFFF 6AFC D0C9 FFFF FFFF    ........
0010:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0020:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0030:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0040:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0050:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0060:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0070:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0080:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
0090:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00A0:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00B0:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00C0:  FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF    ........
00D0:  FFFF FFFF FFFF
00E0:  FFFF FFFF FFFF
COM 9        K150 board connected
```

ROM = Not Erased
EEPROM = Not Erased
ID = Not Erased
Fuse = Not Erased

Continue to erase and program this chip?

ROM error at 0x0000

Good 0x6AF2
Bad 0x0000

1. Verify that your module is correctly inserted in the adapter.

In **MicroBurn (DIY K150)** ...

2. Press **Program** to start programming.

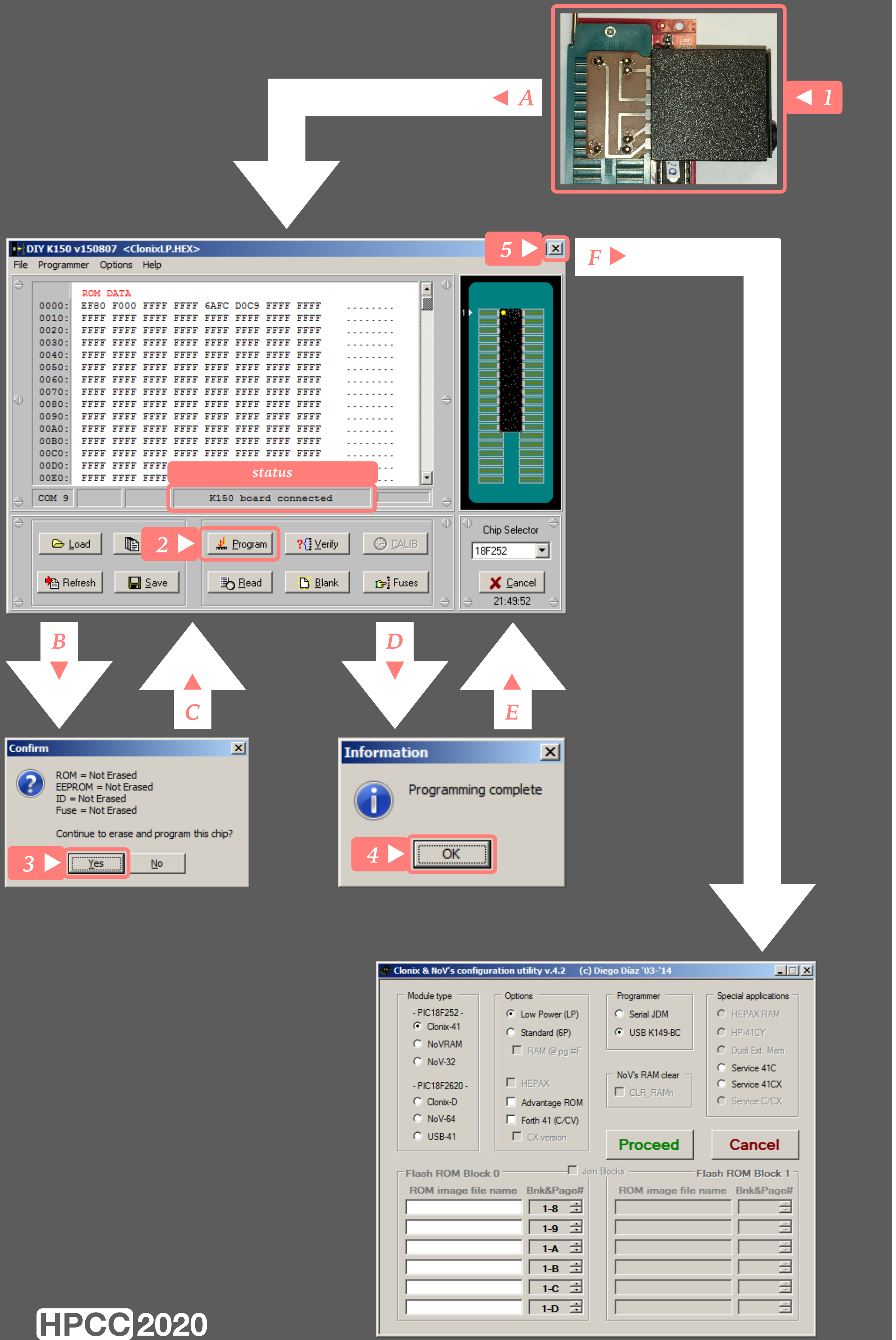
A confirm dialog box is telling us that the module is recognized.

3. Press **Yes** in the **Confirm** dialog box.

Several status are displayed in the status field during hex file uploading. Here, module programming failed.

4. Press **OK** in the **Error** dialog box.

Go back to step 1 until successful.



DIY K150 v150807 <ClonixLP.HEX>

```
     ROM DATA
0000: EF80 F000 FFFF FFFF 6AFC D0C9 FFFF FFFF   ........
0010: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0020: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0030: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0040: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0050: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0060: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0070: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0080: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
0090: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00A0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00B0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00C0: FFFF FFFF FFFF FFFF FFFF FFFF FFFF FFFF   ........
00D0: FFFF FFFF FFFF
00E0: FFFF FFFF FFFF
COM 9          K150 board connected
```

Chip Selector: 18F252

21:49:52

Confirm

ROM = Not Erased
EEPROM = Not Erased
ID = Not Erased
Fuse = Not Erased

Continue to erase and program this chip?

Information

Programming complete

Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
● Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
○ NoV-64
○ USB-41

Options
● Low Power (LP)
○ Standard (6P)
□ RAM @ pg #F
□ HEPAX
□ Advantage ROM
□ Forth 41 (C/CV)
□ CX version

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
□ CLR_RAMn

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Flash ROM Block 0 □ Join Blocks Flash ROM Block 1

ROM image file name	Bnk&Page#	ROM image file name	Bnk&Page#
	1-8		
	1-9		
	1-A		
	1-B		
	1-C		
	1-D		

File Upload Successful

1. Verify that your module is correctly inserted in the adapter.

In **MicroBurn (DIY K150)** ...

2. Press **Program** to start programming.

A confirm dialog box is telling us that the module is recognized.

3. Press **Yes** in the **Confirm** dialog box.

Several status are displayed in the status field during hex file uploading. Module programming worked.

4. Press **OK** in the **Information** dialog box.

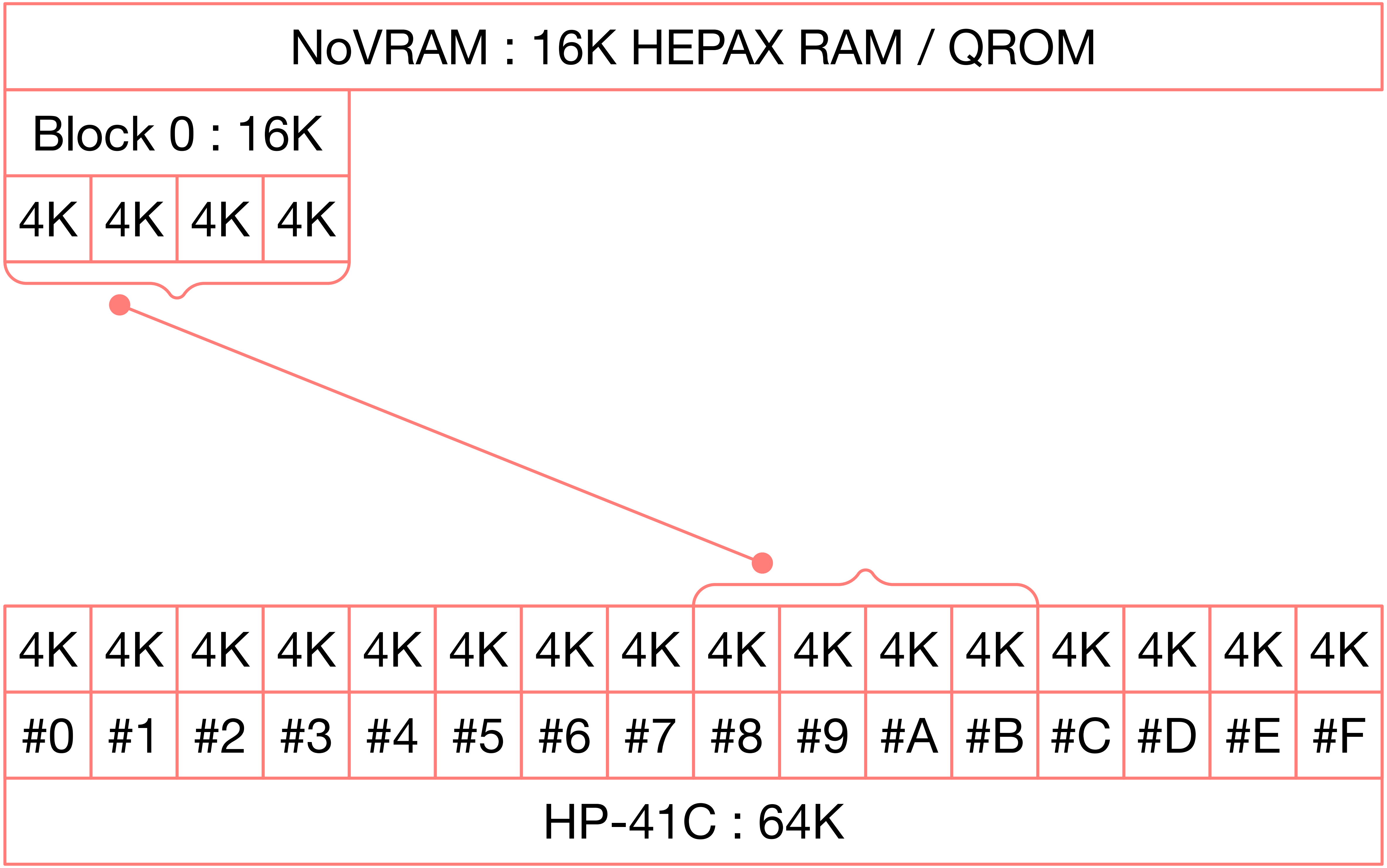
Remove your module from the adapter.

5. Close **MicroBurn (DIY K150)** application to go back to **Clonix & NoV Configuration Utility** application.

NOV RUNTIME CONFIGURATION

Table of Content

16K RAM Mapping



NoVRAM : 16K HEPAX RAM / QROM

Block 0 : 16K

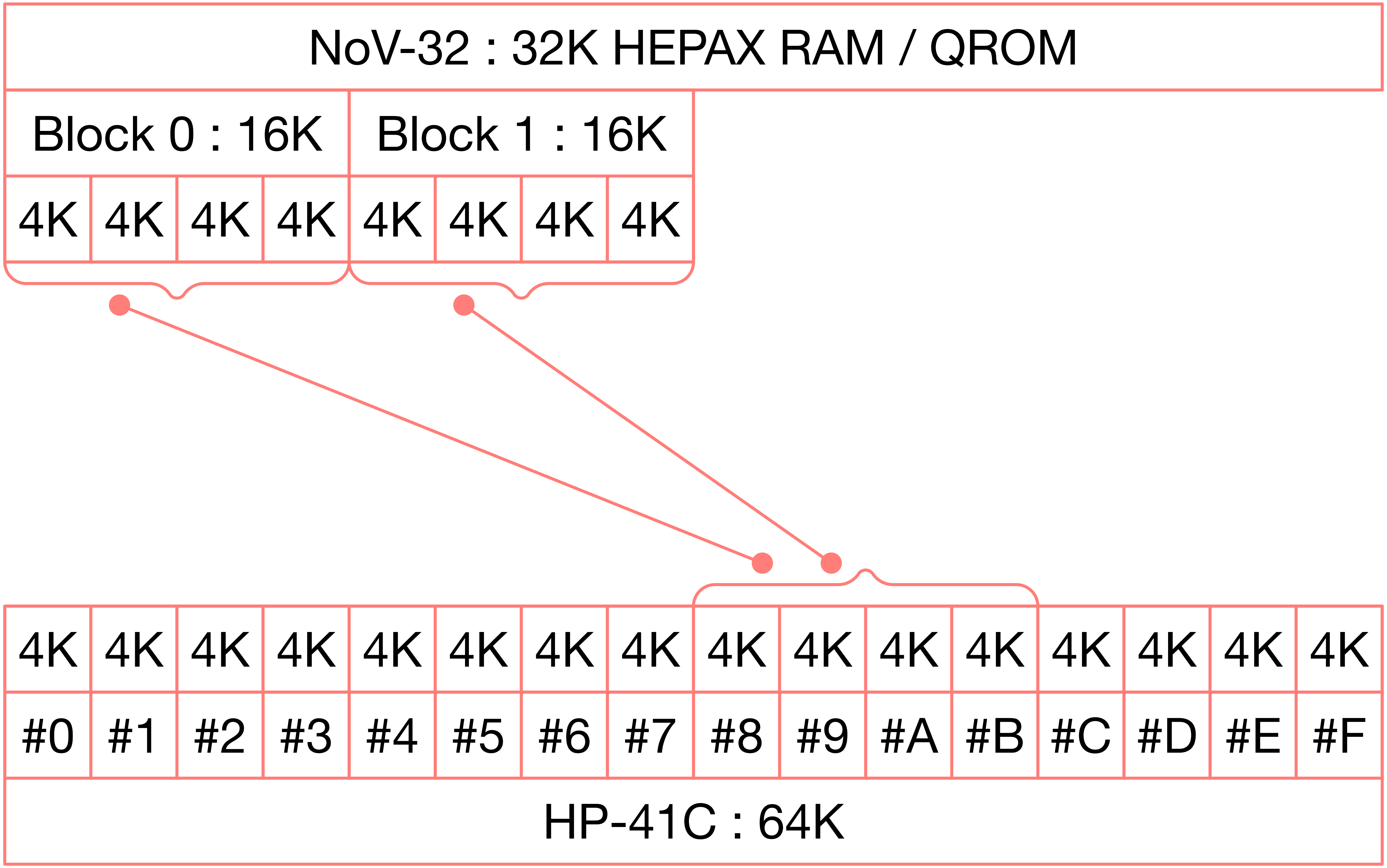
4K 4K 4K 4K

4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K

#0 #1 #2 #3 #4 #5 #6 #7 #8 #9 #A #B #C #D #E #F

HP-41C : 64K

32K RAM Mapping



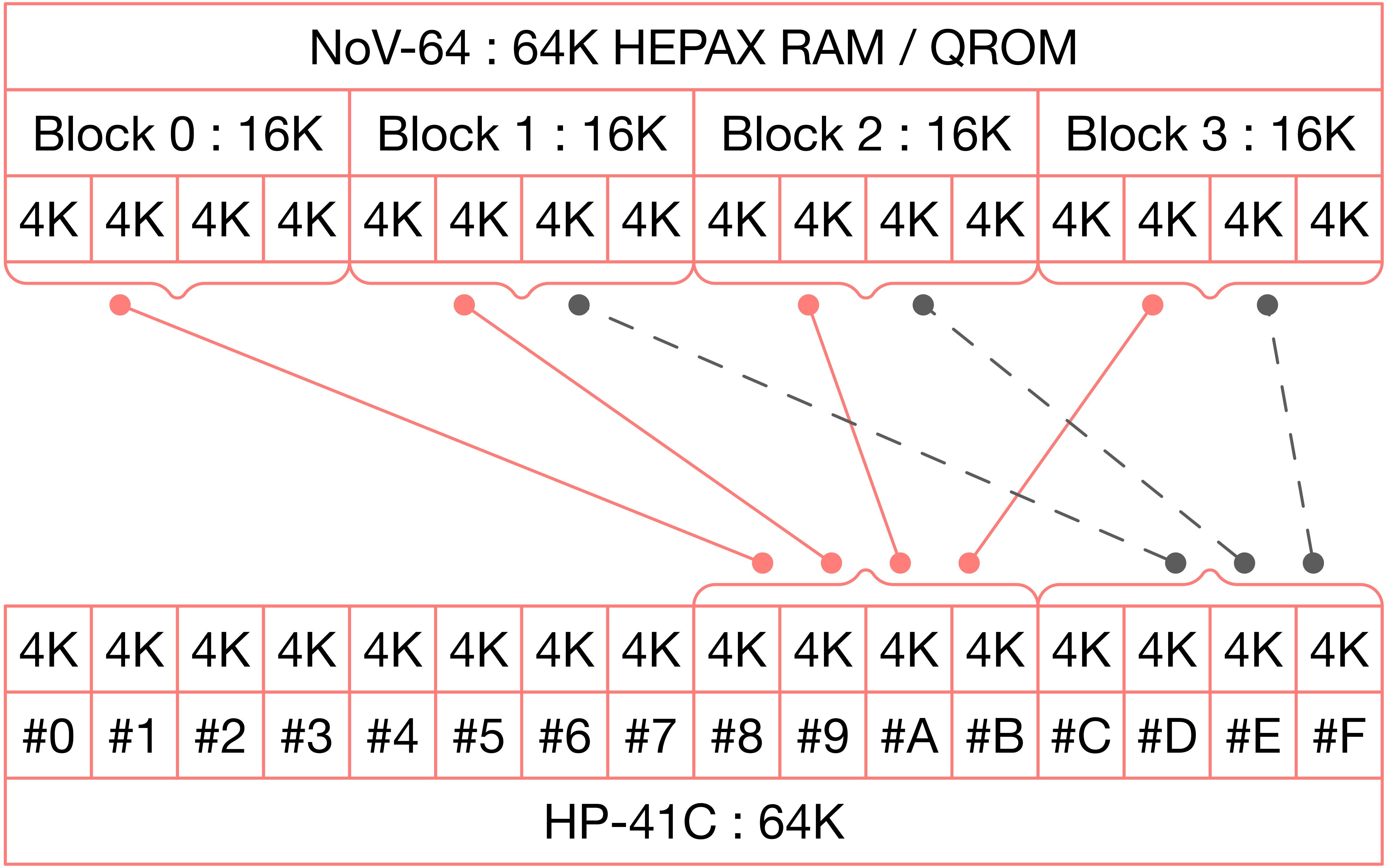
NoV-32 : 32K HEPAX RAM / QROM

Block 0 : 16K				Block 1 : 16K			
4K	4K	4K	4K	4K	4K	4K	4K

4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K
#0	#1	#2	#3	#4	#5	#6	#7	#8	#9	#A	#B	#C	#D	#E	#F

HP-41C : 64K

64K RAM Mapping



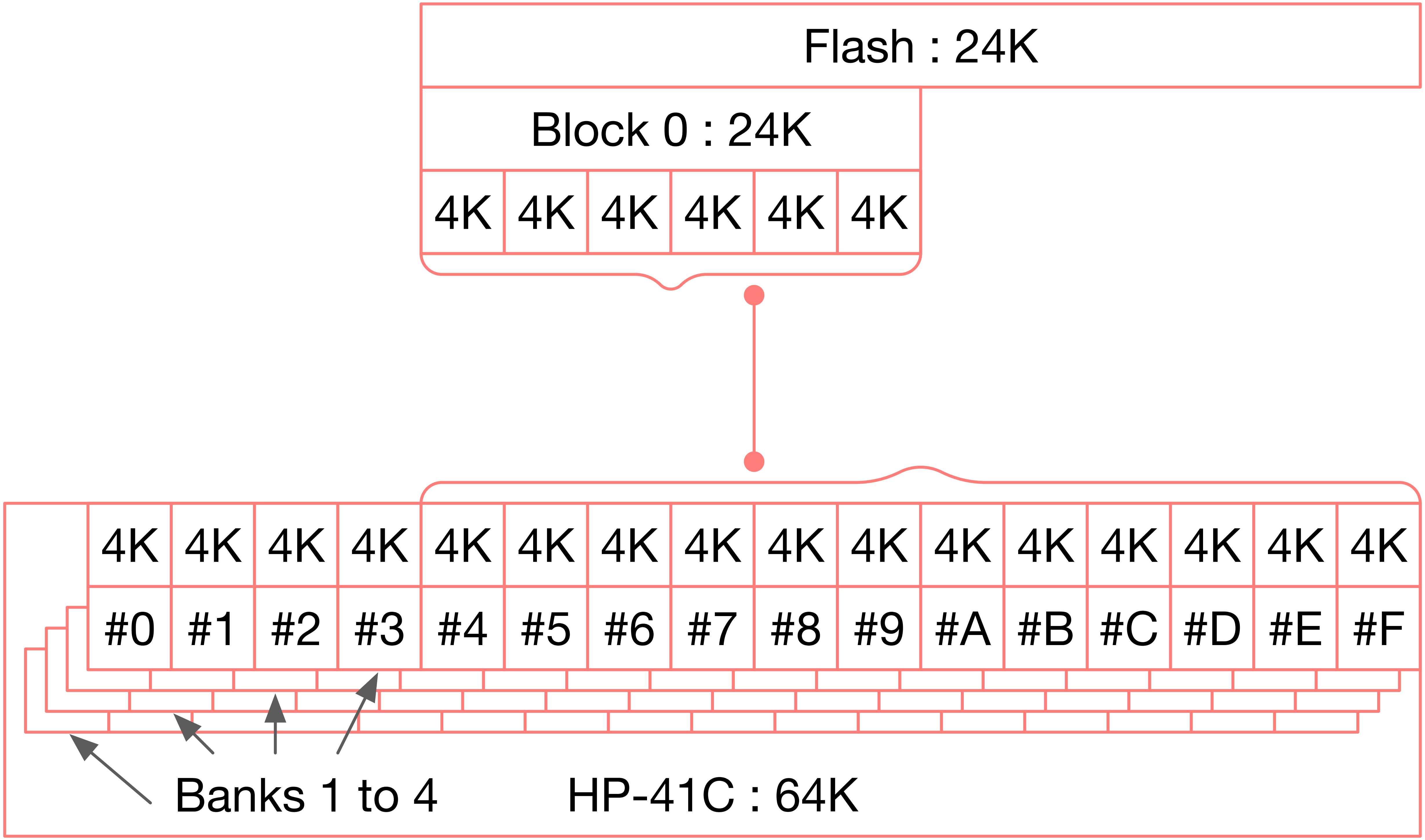
NoV-64 : 64K HEPAX RAM / QROM

Block 0 : 16K				Block 1 : 16K				Block 2 : 16K				Block 3 : 16K			
4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K

4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K
#0	#1	#2	#3	#4	#5	#6	#7	#8	#9	#A	#B	#C	#D	#E	#F

HP-41C : 64K

24K FLash Mapping



Flash : 24K

Block 0 : 24K

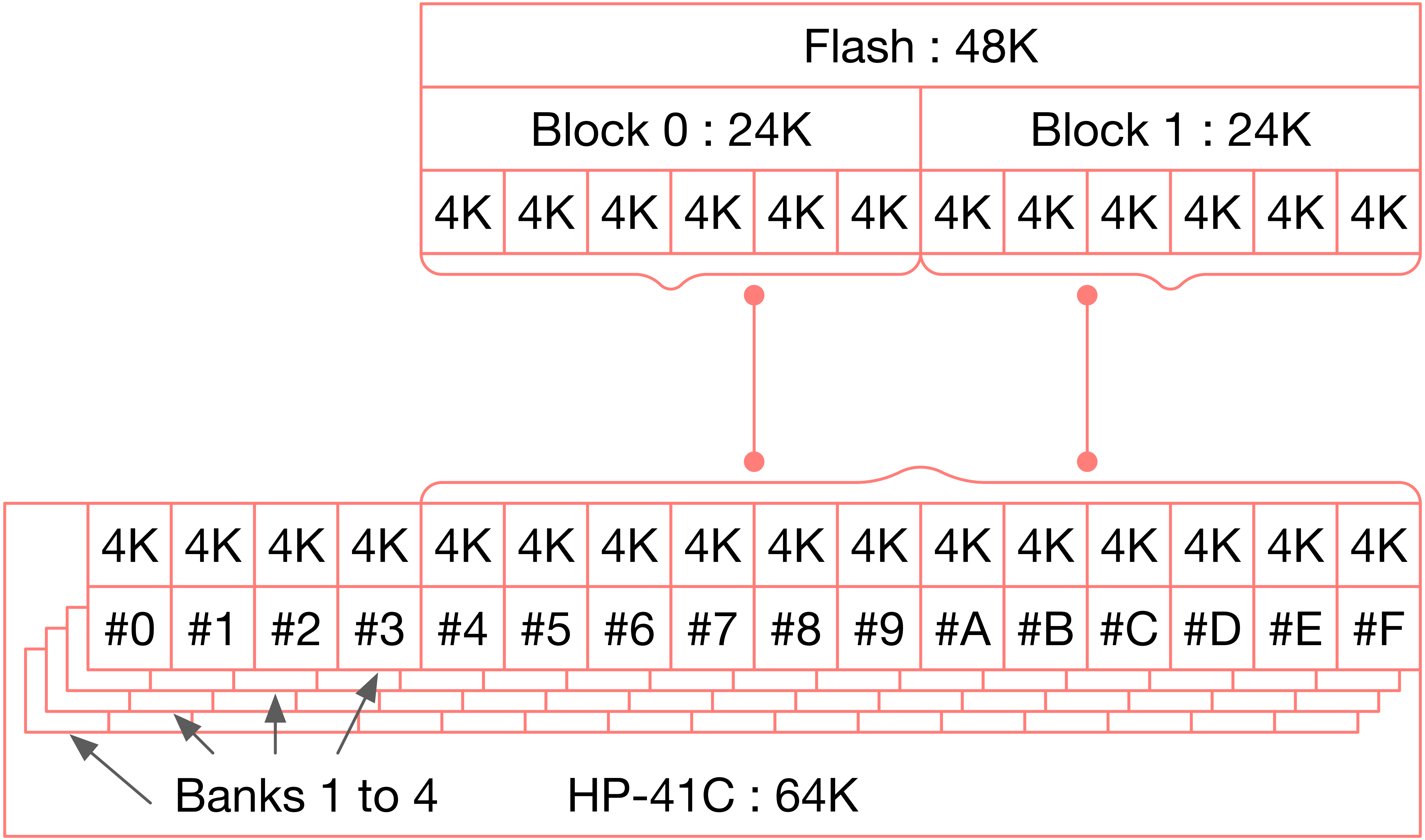
4K 4K 4K 4K 4K 4K

4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K
#0	#1	#2	#3	#4	#5	#6	#7	#8	#9	#A	#B	#C	#D	#E	#F

Banks 1 to 4

HP-41C : 64K

48K FLash Mapping



Flash : 48K

Block 0 : 24K						Block 1 : 24K					
4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K

4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K	4K
#0	#1	#2	#3	#4	#5	#6	#7	#8	#9	#A	#B	#C	#D	#E	#F

Banks 1 to 4

HP-41C : 64K

Control Word

- NoV-32 & NoV-64(d) modules has the ability to change their configuration at runtime.
- The configuration space (aka Control Word) is located at address 4100.
- Next slides provide the details of what the configuration value means.
- Assuming the module is configured in HEPAX mode, the procedure to change the configuration is …
  - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**

    You should see: ***ADR: _ _ _ _***
  - Enter **4100**

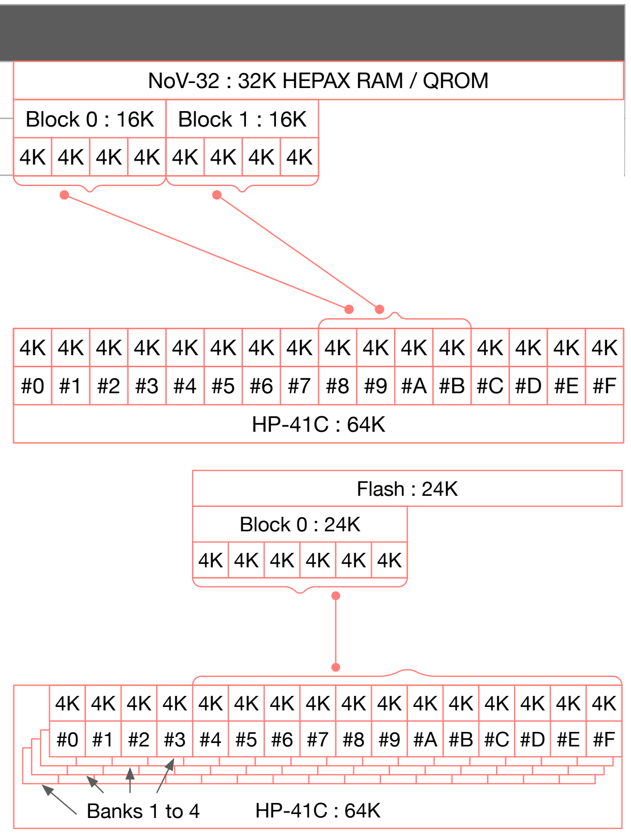
    You should see: ***ADR: 4100*** *then* ***4100 CCC _ _ _*** *(CCC is the current configuration value).*
  - Enter the new configuration value: **NNN**

    You should see: ***4100 CCC NNN*** *then next address location* ***4101 ??? _ _ _***
  - **[←]**

    You should see: ***ADR: _ _ _ _***
  - **[←]** to go back to normal mode.
  - The new configuration is now active for the RAM part, but a power cycle is needed for the Flash configuration to become active (if modified).

Control Word : NoV-32

9	8	7	6	5	4	3	2	1	0	Hex	Description
0	0	0	0	0	0	0	0	0	0	#000	RAM Block 0 mapped to pages #8 to #B in bank 1, 16K HEPAX RAM
0	0	0	0	0	0	0	0	0	1	#001	RAM Block 1 mapped to pages #8 to #B in bank 1, 16K HEPAX RAM



NoV-32 : 32K HEPAX RAM / QROM

Block 0 : 16K | Block 1 : 16K

4K 4K 4K 4K 4K 4K 4K 4K

4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K

#0 #1 #2 #3 #4 #5 #6 #7 #8 #9 #A #B #C #D #E #F

HP-41C : 64K

Flash : 24K

Block 0 : 24K

4K 4K 4K 4K 4K 4K

4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K 4K

#0 #1 #2 #3 #4 #5 #6 #7 #8 #9 #A #B #C #D #E #F

Banks 1 to 4

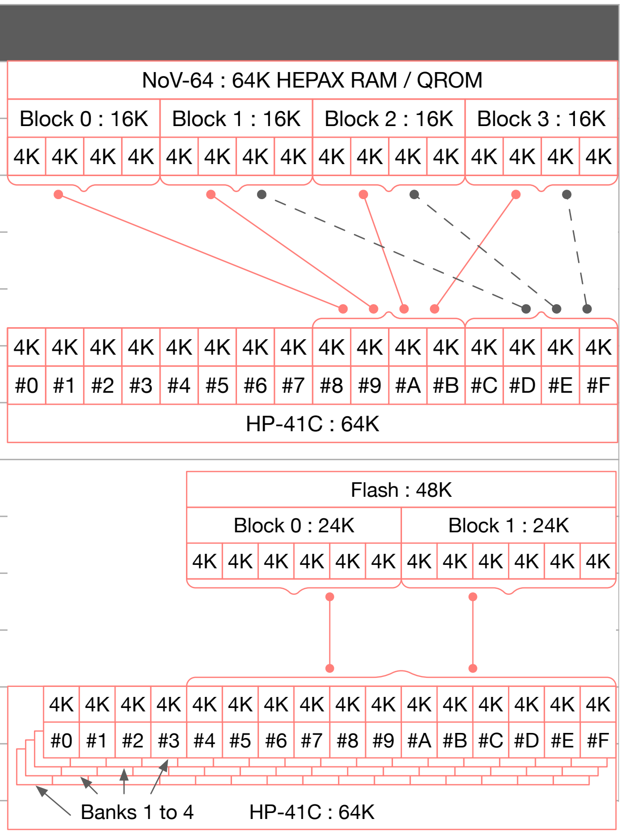
HP-41C : 64K

0	0	0	0	0	0	0	0	0	0	#000	Value at module insertion

9	8	7	6	5	4	3	2	1	0		Examples
1	1	1	1	1	1	1	1	1	0	#000	16K HEPAX RAM [block 0, pages #8..#B, bank 1]
1	0	1	0	1	0	1	0	0	1	#001	16K HEPAX RAM [block 1, pages #8..#B, bank 1]

Control Word : NoV-64(d)

9	8	7	6	5	4	3	2	1	0	Hex	Description
						0	0	0	0	#xx0	1st 16K HEPAX RAM mapped [block 0, pages #8..#B, bank 1]
						0	0	0	1	#xx1	1st 16K HEPAX RAM mapped [block 1, pages #8..#B, bank 1]
						0	0	1	0	#xx2	1st 16K HEPAX RAM mapped [block 2, pages #8..#B, bank 1]
						0	0	1	1	#xx3	1st 16K HEPAX RAM mapped [block 3, pages #8..#B, bank 1]
		0	0	0	0					#x0x	2nd 16K HEPAX RAM unmapped
0	0	0	0	0	1					#01x	2nd 16K HEPAX RAM mapped [block 1, pages #C..#F, bank 1] (Flash must be unmapped)
0	0	0	0	1	0					#02x	2nd 16K HEPAX RAM mapped [block 2, pages #C..#F, bank 1] (Flash must be unmapped)
0	0	0	0	1	1					#03x	2nd 16K HEPAX RAM mapped [block 3, pages #C..#F, bank 1] (Flash must be unmapped)
0	0									#0xx	16K Flash unmapped
0	1	0	0	0	0					#10x	16K Flash mapped [block 0, any unused pages/bank] (2nd 16K HEPAX RAM must be unmapped)
1	0	0	0	0	0					#20x	16K Flash mapped [block 1, any unused pages/bank] (2nd 16K HEPAX RAM must be unmapped)
1	1	0	0	P	P	0	0	B	B	#3PB	Copy RAM page PP (0..3) in block BB (0..3) to Flash page 5 in block 1
1	1	1	1	1	1	1	1	1	1	#3FF	Erase Flash page 5 in block 1



0	1	0	0	0	0	0	0	0	0	#100	Value at module insertion

9	8	7	6	5	4	3	2	1	0		Examples
0	0	0	0	0	0	0	0	0	0	#000	No Flash, 16K HEPAX RAM [block 0, pages #8..#B, bank 1]
0	0	0	0	0	0	0	0	0	1	#001	No Flash, 16K HEPAX RAM [block 1, pages #8..#B, bank 1]
0	0	0	0	0	0	0	0	1	0	#002	No Flash, 16K HEPAX RAM [block 2, pages #8..#B, bank 1]
0	0	0	0	0	0	0	0	1	1	#003	No Flash, 16K HEPAX RAM [block 3, pages #8..#B, bank 1]
0	0	0	0	1	0	0	0	0	0	#020	No Flash, 32K HEPAX RAM [block 2, pages #C..#F, bank 1] & [block 0, pages #8..#B, bank 1]
0	0	0	0	1	1	0	0	0	1	#031	No Flash, 32K HEPAX RAM [block 3, pages #C..#F, bank 1] & [block 1, pages #8..#B, bank 1]
0	1	0	0	0	0	0	0	1	0	#102	16K Flash [block 0], 16K HEPAX RAM [block 2, pages #8..#B, bank 1]
1	0	0	0	0	0	0	0	1	1	#203	16K Flash [block 1], 16K HEPAX RAM [block 3, pages #8..#B, bank 1]

Crash Recovery Function

- The goal of this feature is to put the module in safe/recovery mode.
  - Great to get out of a dead lock situation when you have a polling point bug in your mcode.
  - When a corrupted 4K RAM/QRAM page is creating a calculator lockup.
  - Works on all NoV modules. (NoVRAM, NoV-32, NoV-64 & NoV-64d)
- When this mode is activated:
  - HEPAX RAM/QROM read is disabled.
    Port catalog [HEPAX 002] no longer shows these pages.
  - HEPAX RAM/QROM write is enabled.
    Allowing you to clear or to overwrite the content of pages #8 to #B.
  - HEPAX ROM is mapped to page #C.
    Temporary overwriting Flash mapping for that page.
  - Control Word 4100 configuration is unchanged
- Manual Activation:
  - In OFF mode, hold [ENTER] key down and press [ON] key twice in quick succession.
  - Not working when inside a 41CL.
- Automatic Activation:
  - CRF is automatically enabled after a memory lost. (Including the 41CL)
- Validation:
  - #1: XEQ "HEPAX" then 002 to execute a port catalog.
    You should see that ports #8 to #B are empty and that HEPAX ROM is mapped to port #C.
  - #2: XEQ "HEPDIR" to list HEPAX RAM content.
    If successful, "H:NO FILESYS" should be displayed on the screen.
- Deactivation:
  - Do a power cycle: *[ON][ON]*

ROM Shadowing & QROM Protection : NoV-64(d)

- RAM & ROM Shadowing
  - When a physical module is inserted and a page conflict arise with the NoV configuration, the firmware give precedence to the physical module and temporary unmapped the page from the NoV module.
  - *Warning: if the physical module page address is in conflict with a HEPAX RAM page, you should manage the issue otherwise you may lose some files or the entire HEPAX filesystem.*
- QROM Protection
  - The NoV module fully support HEPAX RAM write protection.
  - Usage: X must contain the page number to be protected (8..15) then you execute RAMTOG to activate or deactivate write protection.
  - *Warning: never activate write protection on a HEPAX RAM filesystem page.*

NoV Notes

- NoV configured as Clonix:
  - Control word not available.
- NoV configured as NoV:
  - Control word value manage module memory mapping & behavior.
  - Control word value is lost when module is unplugged.
- NoV-64 configured as Clonix-D:
  - Odd/even port sensing not working.
  - Blocks unmerged: 24K usable. *(Flash ROM Block 0 must match Flash ROM Block 1.)*
  - Blocks merged: 48K usable.
- NoV-64d configured as Clonix-D:
  - Odd/even port sensing working.
  - Blocks unmerged: 2 x 24K usable.
  - Blocks merged: 48K usable.

Table of Content

- ➤ HEPAX vs NoV Modules
- ➤ Clearing with Config. Utility
- ➤ Manual Clearing

HEPAX RAM CLEARING

HEPAX vs NoV Modules

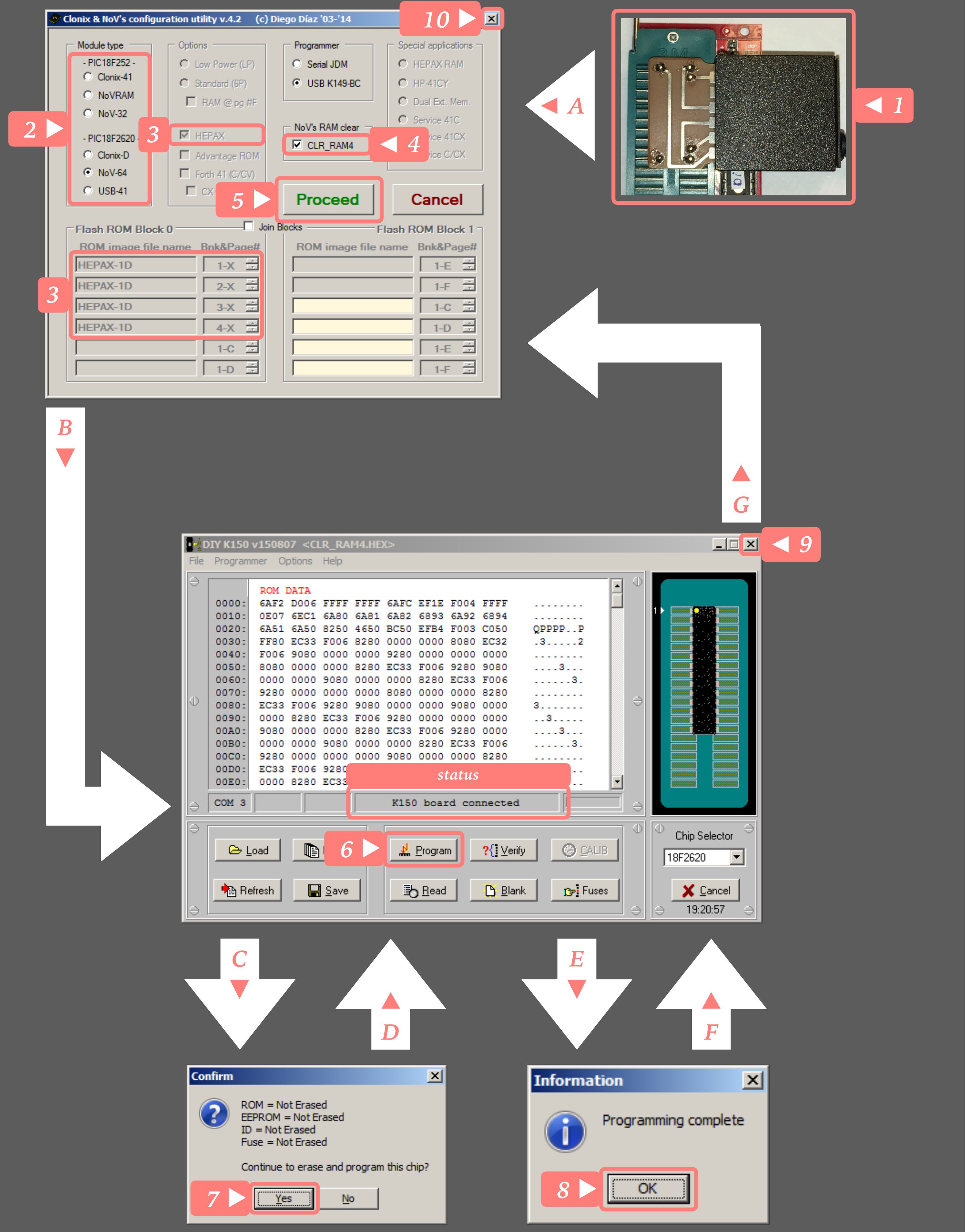
- The RAM type used in the original HEPAX module was SRAM, so to clear its content, you simply had to remove the module from the calculator, wait a bit, reinsert it back and it was cleared.
- The RAM type used in the NoV modules is FRAM, the benefit of this technology is that it keep its content even when unplugged. The downside of it, is that the above procedure no longer works.
- The next slides shows how to clear NoV HEPAX RAM, they assume that your module is configured as HEPAX.

CLEARING WITH CONFIGURATION UTILITY

This method is here for completeness sake, it has been proven to be unreliable, please use manual clearing for better results.

Table of Content

- Configuration
- Clearing



Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type: - PIC18F252 - ○ Clonix-41 ○ NoVRAM ○ NoV-32; - PIC18F2620 - ○ Clonix-D ● NoV-64 ○ USB-41

Options: ○ Low Power (LP) ○ Standard (6P) □ RAM @ pg #F ☑ HEPAX □ Advantage ROM □ Forth 41 (C/CV) □ CX

Programmer: ○ Serial JDM ● USB K149-BC

NoV's RAM clear: ☑ CLR_RAM4

Special applications: ○ HEPAX RAM ○ HP-41CY ○ Dual Ext. Mem. ○ Service 41C

□ Join Blocks

Flash ROM Block 0: ROM image file name	Bnk&Page#	Flash ROM Block 1: ROM image file name	Bnk&Page#
HEPAX-1D	1-X		1-E
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
	1-C		1-E
	1-D		1-F

DIY K150 v150807 <CLR_RAM4.HEX>

```
ROM DATA
0000: 6AF2 D006 FFFF FFFF 6AFC EF1E F004 FFFF   ........
0010: 0E07 6EC1 6A80 6A81 6A82 6893 6A92 6894   ........
0020: 6A51 6A50 8250 4650 BC50 EFB4 F003 C050   QPPPP..P
0030: FF80 EC33 F006 8280 0000 0000 8080 EC32   .3.....2
0040: F006 9080 0000 0000 9280 0000 0000 0000   ........
0050: 8080 0000 0000 8280 EC33 F006 9280 9080   ....3...
0060: 0000 0000 9080 0000 0000 8280 EC33 F006   ......3.
0070: 9280 0000 0000 0000 8080 0000 0000 8280   ........
0080: EC33 F006 9280 9080 0000 0000 9080 0000   3.......
0090: 0000 8280 EC33 F006 9280 0000 0000 0000   ..3.....
00A0: 9080 0000 0000 8280 EC33 F006 9280 0000   ....3...
00B0: 0000 0000 9080 0000 0000 8280 EC33 F006   ......3.
00C0: 9280 0000 0000 0000 9080 0000 0000 8280   ........
00D0: EC33 F006 9280
00E0: 0000 8280 EC33
```

COM 3 | K150 board connected

Chip Selector: 18F2620

19:20:57

Confirm

ROM = Not Erased
EEPROM = Not Erased
ID = Not Erased
Fuse = Not Erased

Continue to erase and program this chip?

Information

Programming complete

Configuration

Goal: loading clear HEPAX RAM firmware into NoV module.

1. Verify that your module is correctly inserted in the adapter.

In **Clonix & NoV Configuration Utility**:

2. Select the **NoV** module that match you're module.

3. **HEPAX** is automatically selected but unused.

4. Select **CLR_RAMx** to load a specialized firmware that will clear HEPAX RAM.

5. Press **Proceed** to start MPASM.

In **MicroBurn (DIY K150)**:

6. Press **Program** to start programming.

A confirm dialog box is telling us that the module is recognized.

7. Press **Yes** in the **Confirm** dialog box.

Several status are displayed in the status field during hex file uploading. A information dialog box is telling us that the module had been successfully programmed.

8. Press **OK** in the **Information** dialog box.

Remove your module from the adapter

9. Close **MicroBurn (DIY K150)** application to go back to **Clonix & NoV Configuration Utility** application.

10.Close **Clonix & NoV Configuration Utility**.

Clearing

- Make sure the calculator is off.
- Insert you're NoV module into any port.
- Do **NOT** press the **[ON]** button.
- Wait for about 25 seconds for the erasing procedure to complete.
- **CLR OK** message will be displayed if clearing has been successful.
- **NO CLR** message will be displayed if clearing has failed.

If you consistently get ***NO CLR*** *message then use one of the other clear methods.*

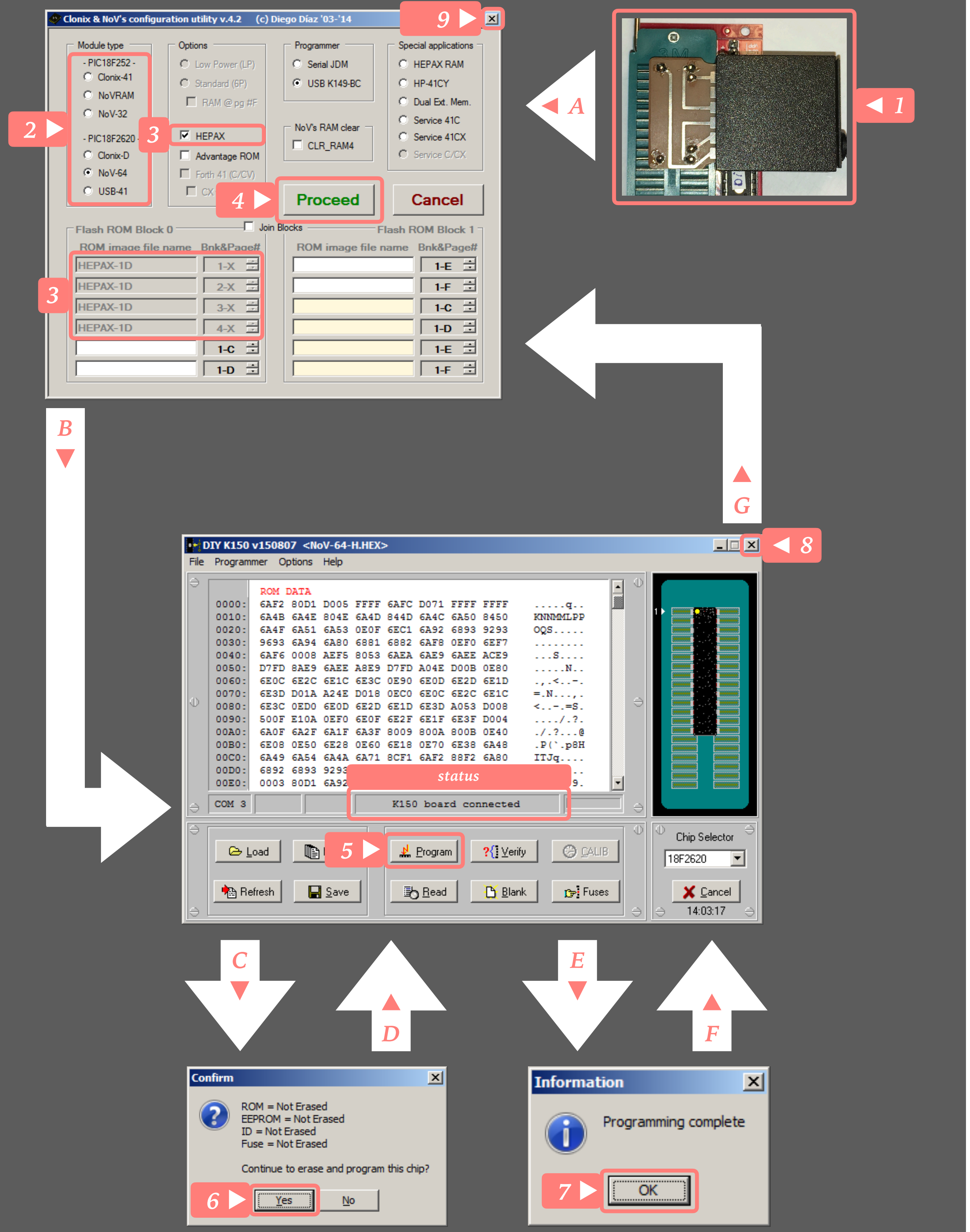
Table of Content

- ➤ Configuration
- ➤ FOCAL Program
- ➤ Clearing : NoVRAM & NoV-32
- ➤ Clearing : NoV-64(d) [16K]
- ➤ Clearing : NoV-64(d) [32K]

MANUAL CLEARING

Works in normal mode and in crash recovery mode

Configuration



Clonix & NoV's configuration utility v.4.2 (c) Diego Díaz '03-'14

Module type
- PIC18F252 -
○ Clonix-41
○ NoVRAM
○ NoV-32
- PIC18F2620 -
○ Clonix-D
● NoV-64
○ USB-41

Options
○ Low Power (LP)
○ Standard (6P)
☐ RAM @ pg #F
☑ HEPAX
☐ Advantage ROM
☐ Forth 41 (C/CV)
☐ CX

Programmer
○ Serial JDM
● USB K149-BC

NoV's RAM clear
☐ CLR_RAM4

Special applications
○ HEPAX RAM
○ HP-41CY
○ Dual Ext. Mem.
○ Service 41C
○ Service 41CX
○ Service C/CX

Proceed | Cancel

☐ Join Blocks

Flash ROM Block 0 ROM image file name	Bnk&Page#	Flash ROM Block 1 ROM image file name	Bnk&Page#
HEPAX-1D	1-X		1-E
HEPAX-1D	2-X		1-F
HEPAX-1D	3-X		1-C
HEPAX-1D	4-X		1-D
	1-C		1-E
	1-D		1-F

DIY K150 v150807 <NoV-64-H.HEX>

File Programmer Options Help

```
       ROM DATA
0000:  6AF2 80D1 D005 FFFF 6AFC D071 FFFF FFFF    .....q..
0010:  6A4B 6A4E 804E 6A4D 844D 6A4C 6A50 8450    KNNMMLPP
0020:  6A4F 6A51 6A53 0E0F 6EC1 6A92 6893 9293    OQS.....
0030:  9693 6A94 6A80 6881 6882 6AF8 0EF0 6EF7    ........
0040:  6AF6 0008 AEF5 8053 6AEA 6AE9 6AEE ACE9    ...S....
0050:  D7FD 8AE9 6AEE A8E9 D7FD A04E D00B 0E80    ......N..
0060:  6E0C 6E2C 6E1C 6E3C 0E90 6E0D 6E2D 6E1D    .,.<..-.
0070:  6E3D D01A A24E D018 0EC0 6E0C 6E2C 6E1C    =.N...,.
0080:  6E3C 0ED0 6E0D 6E2D 6E1D 6E3D A053 D008    <..-.=S.
0090:  500F E10A 0EF0 6E0F 6E2F 6E1F 6E3F D004    ..../.?.
00A0:  6A0F 6A2F 6A1F 6A3F 8009 800A 800B 0E40    ./.?...@
00B0:  6E08 0E50 6E28 0E60 6E18 0E70 6E38 6A48    .P(`.p8H
00C0:  6A49 6A54 6A4A 6A71 8CF1 6AF2 88F2 6A80    ITJq....
00D0:  6892 6893 9293                                   ..
00E0:  0003 80D1 6A92                                   9.
```

COM 3 | K150 board connected

Load | Program | Verify | CALIB
Refresh | Save | Read | Blank | Fuses

Chip Selector
18F2620
Cancel
14:03:17

Confirm

ROM = Not Erased
EEPROM = Not Erased
ID = Not Erased
Fuse = Not Erased

Continue to erase and program this chip?

Yes | No

Information

Programming complete

OK

Goal: loading default HEPAX firmware into NoV module.

1. Verify that your module is correctly inserted in the adapter.

In **Clonix & NoV Configuration Utility**:

2. Select the **NoV** module that match you're module.
3. **HEPAX** is automatically selected.
4. Press **Proceed** to start MPASM.

In **MicroBurn (DIY K150)**:

5. Press **Program** to start programming.

A confirm dialog box is telling us that the module is recognized.

6. Press **Yes** in the **Confirm** dialog box.

Several status are displayed in the status field during hex file uploading. A information dialog box is telling us that the module had been successfully programmed.

7. Press **OK** in the **Information** dialog box.

Remove your module from the adapter

8. Close **MicroBurn (DIY K150)** application to go back to **Clonix & NoV Configuration Utility** application.
9. Close **Clonix & NoV Configuration Utility**.

FOCAL Program

Program	Description
LBL "HCLR16"	HEPAX Clear RAM 16K configuration.
8.011	Clear page 8 to 11 inclusively.
GTO 00	Goto clear common code.
LBL "HCLR32"	HEPAX Clear RAM 32K configuration.
8.015	Clear page 8 to 15 inclusively.
LBL 00	Clear common code.
"OK"	CLRAM confirmation.
LBL 01	Clear loop.
VIEW X	Show which page is being cleared.
CLRAM	Clear page specified in X.
ISG X	Have we finish clearing ?
GTO 01	No, go clear another page.
SF 11	Set autoexec flag.
OFF	Rebuild HEPAX pages tags (press ON to complete execution).
HEPDIR	Rebuild HEPAX pages links.
END	Program end. → X should have 2610 (16K cfg) or 5222 (32K cfg)

Clearing : NoVRAM & NoV-32

- Clearing a **NoVRAM** module (16K):
  - XEQ "HCLR16"
    you should see "H:DIR EMPTY"
    and have 2610 free HEPAX reg. in X.

- Clearing a **NoV-32** module (16K):
  - Clearing HEPAX RAM Block 0:
    - If CRF needed, do the CRF procedure below.
    - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**
    - **4100** then 000 then **[←]** and **[←]**
      new configuration is now active.
    - XEQ "HCLR16"
      you should see "H:DIR EMPTY"
      and have 2610 free HEPAX reg. in X.
  - Clearing HEPAX RAM Block 1:
    - If CRF needed, do the CRF procedure below.
    - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**
    - **4100** then 001 then **[←]** and **[←]**
      new configuration is now active.
    - XEQ "HCLR16"
      you should see "H:DIR EMPTY"
      and have 2610 free HEPAX reg. in X.

CRF Activation: Power off, hold [ENTER] key down and press [ON] key twice in quick succession
CRF Validation: XEQ "HEPDIR" should display "H:NO FILESYS", if not, redo the CRF Activation.

Clearing : NoV-64(d) [16K HEPAX RAM Mapped]

- Clearing HEPAX RAM Block 0:
  - If CRF needed, do the CRF procedure below.
  - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**
  - **4100** then 000 then [←] and [←]
    new configuration is now active
  - **XEQ "HCLR16"**
    you should see "H:DIR EMPTY"
    and have 2610 free HEPAX reg. in X.
- Clearing HEPAX RAM Block 1:
  - If CRF needed, do the CRF procedure below.
  - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**
  - **4100** then 001 then [←] and [←]
    new configuration is now active
  - **XEQ "HCLR16"**
    you should see "H:DIR EMPTY"
    and have 2610 free HEPAX reg. in X.
- Clearing HEPAX RAM Block 2:
  - If CRF needed, do the CRF procedure below.
  - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**
  - **4100** then 002 then [←] and [←]
    new configuration is now active
  - **XEQ "HCLR16"**
    you should see "H:DIR EMPTY"
    and have 2610 free HEPAX reg. in X.
- Clearing HEPAX RAM Block 3:
  - If CRF needed, do the CRF procedure below.
  - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**
  - **4100** then 003 then [←] and [←]
    new configuration is now active
  - **XEQ "HCLR16"**
    you should see "H:DIR EMPTY"
    and have 2610 free HEPAX reg. in X.

CRF Activation: Power off, hold [ENTER] key down and press [ON] key twice in quick succession
CRF Validation: XEQ "HEPDIR" should display "H:NO FILESYS", if not, redo the CRF Activation.

Clearing : NoV-64(d) [32K HEPAX RAM Mapped]

- There are multiple configuration possible here:
  - Config Pair #X (Double Block 0 & Double Block 1).
  - Config Pair #1 (DB0: 010 & DB1: 032).
  - Config Pair #2 (DB0: 020 & DB1: 031).
  - Config Pair #3 (DB0: 030 & DB1: 021).
- Clearing HEPAX RAM Config Pair #X (Double Block 0):
  - If CRF needed, do the CRF procedure below.
  - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**
  - **4100** then 010 or 020 or 030 then [←] and [←]
    new configuration is now active.
  - XEQ "HCLR32"
    you should see "H:DIR EMPTY"
    and have 5222 free HEPAX reg. in X.
- Clearing HEPAX RAM Config Pair #X (Double Block 1):
  - If CRF needed, do the CRF procedure below.
  - **[XEQ] [ALPHA] HEXEDIT [ALPHA]**
  - **4100** then 032 or 031 or 021 then [←] and [←]
    new configuration is now active.
  - XEQ "HCLR32"
    you should see "H:DIR EMPTY"
    and have 5222 free HEPAX reg. in X.

CRF Activation: Power off, hold [ENTER] key down and press [ON] key twice in quick succession
CRF Validation: XEQ "HEPDIR" should display "H:NO FILESYS", if not, redo the CRF Activation.

Table of Content

- ➤ Review
- ➤ Questions & Answers
- ➤ Index

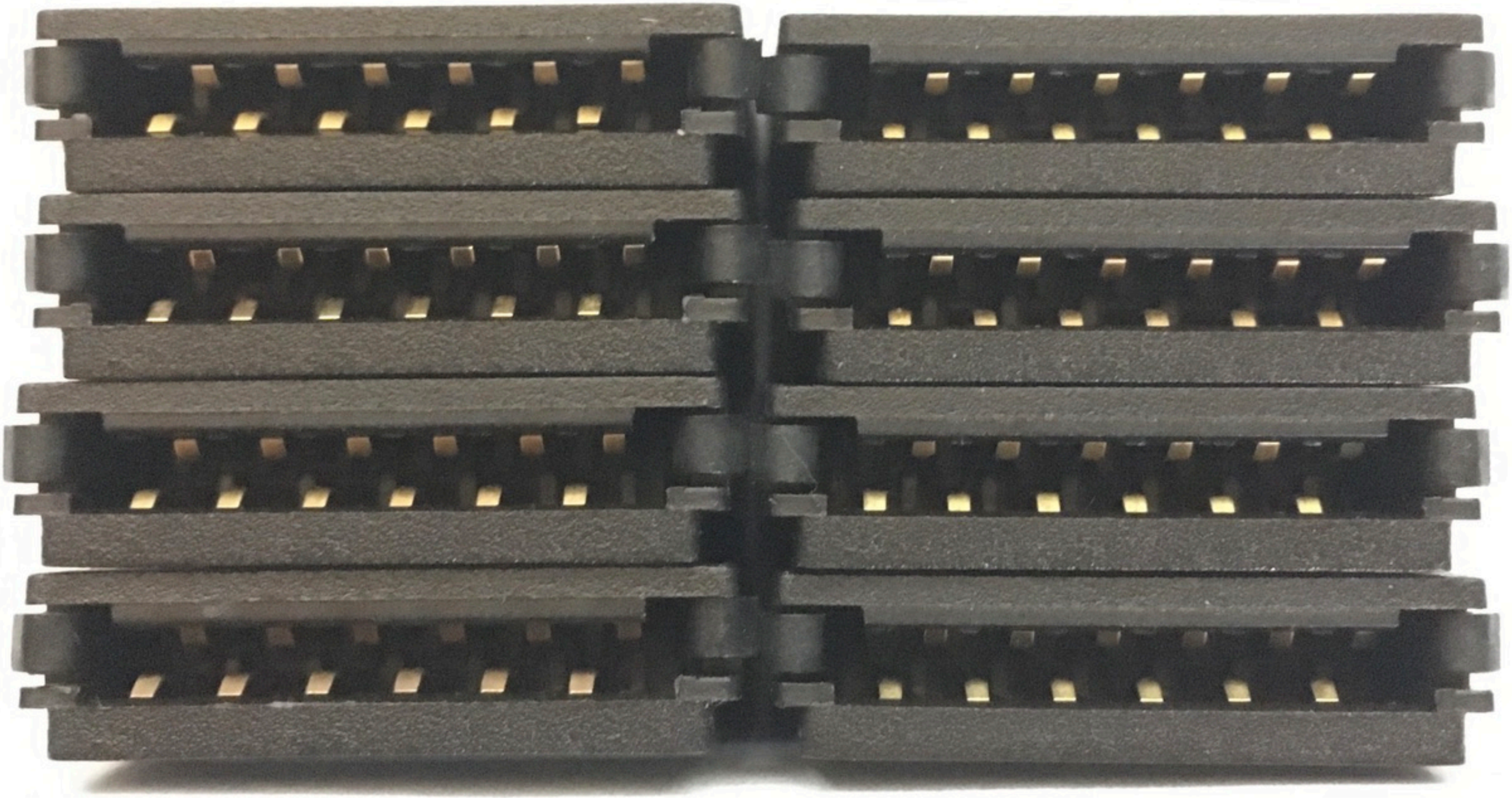
CLOSING TOPICS

Review

- In this presentation we have …
  - Reviewed some key informations about the HP-41C system.
  - Discovered Diego Díaz modules.
  - Covered every options of three modules.
  - Gone through the programming process.
  - Configured NoV HEPAX emulation.
  - Cleared NoV HEPAX RAM content.

Questions & Answers

Index



DIEGO'S HP-41 MODULES

HPCC 2020

2020-09-12

By Sylvain Côté