DEVCON 12
Brazil

MSX in the past
MSX in the future

2025.7.19

Sao Paulo

IoT Media Lab

Kazuhiko Nishi

A message from the birth parents to the foster parents:
We deeply, strongly, and greatly appreciate you for raising MSX for 42 years!

- The last mature 8-bit micro CPU
- Its most standard OS
- Its most user-friendly basic
- Further enhanced video LSI for game consoles
- Further enhanced sound LSI for game consoles
- Software on ROM cartridges, I/O hardware on the same cartridges
- Software also distributed on inexpensive audio tapes and 3.5inch floppies.

Origin of the micro-CPU

- Japan’s Busicon Corp. orders Intel
- Birth of 4004
- Intel sells it externally
- 4-bit evolves into 8-bit
- Birth of the 8008 Further refined and evolved into the 8080
- Bill Gates and Paul Allen focus on this CPU

- New 8080-compatible CPU Z80 created by Zilog

Mass production of computer duplicates in print.

- Intel
  - 4004
  - 4040
  - 8008
  - 8080
- Zilog
  - Z80

Masatoshi Shima

Federico Faggin

Origin of the micro-CPU language BASIC

- BASIC invented at Dartmouth College by Kemeny for education

- DEC ported BASIC to PDP10
- Bill Gates and Paul Allen use BASIC on PDP10
- Paul Allen using PDP10 macro assembler
  - Created an assembler for the Intel 8080,
  - BASIC for the ALTAIR 8800 was born

Bill and Paul BASIC in micro.

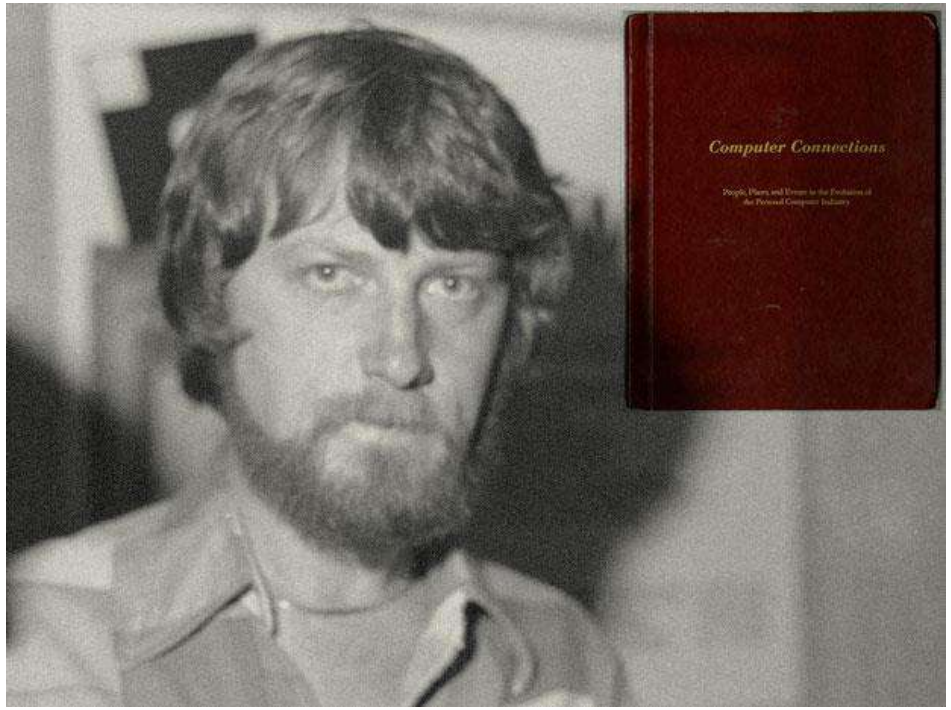
DEC PDP10

Micro CPU operating systems : origins of CP/M

- CP/M was developed on Intel MDS.

- The OS of MDS is called ISIS
- CP/M was written in PL/M, a language that runs on ISIS.
- CP/M objects were generated by the PL/M compiler,
- and written to 8" floppies,
- The floppies were then booted up when reset by the MDS.

Gary Kildall who created the CP/M

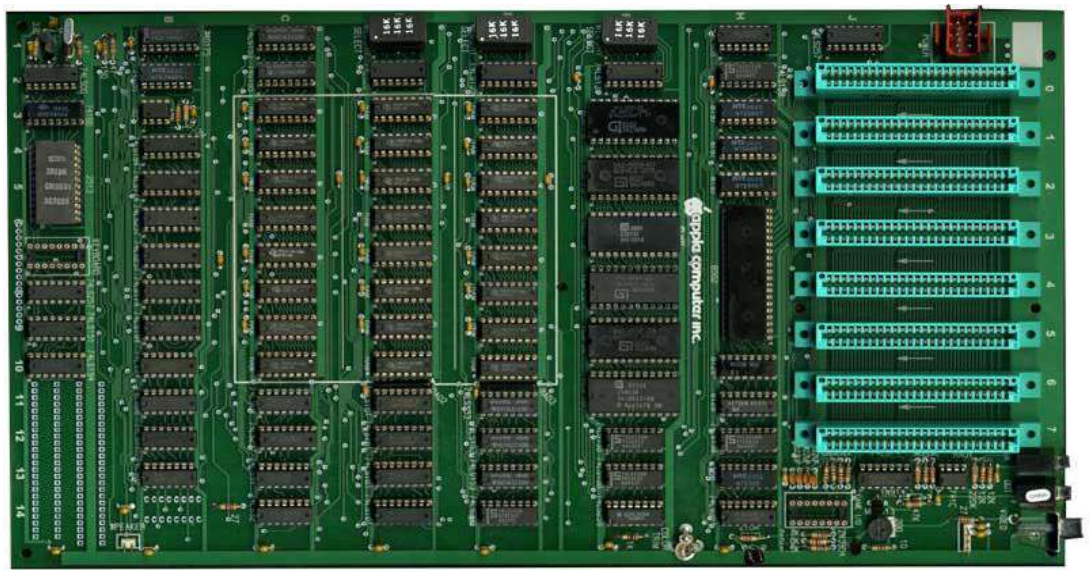


Intel MDS

Birth of the personal computer

- Apple 1
  - First computer
- Apple 2
  - Apple 1 with I/O slots
- Apple 2e
  - Expandable board
- Apple 2c
  - Portable

The main difference between Apple 1 and Apple 2 is the presence or absence of an I/O slot.



- Soon Apple 1 became Apple 2 with an I/O slot.

History of video game consoles

- Independent game machines

- Programmable games machine
  - Somewhere, containing cartridge circuitry.
  - Fairchild CHANNEL F World's first ROM cartridge
  - Cassette Vision Cartridge containing CPU and ROM

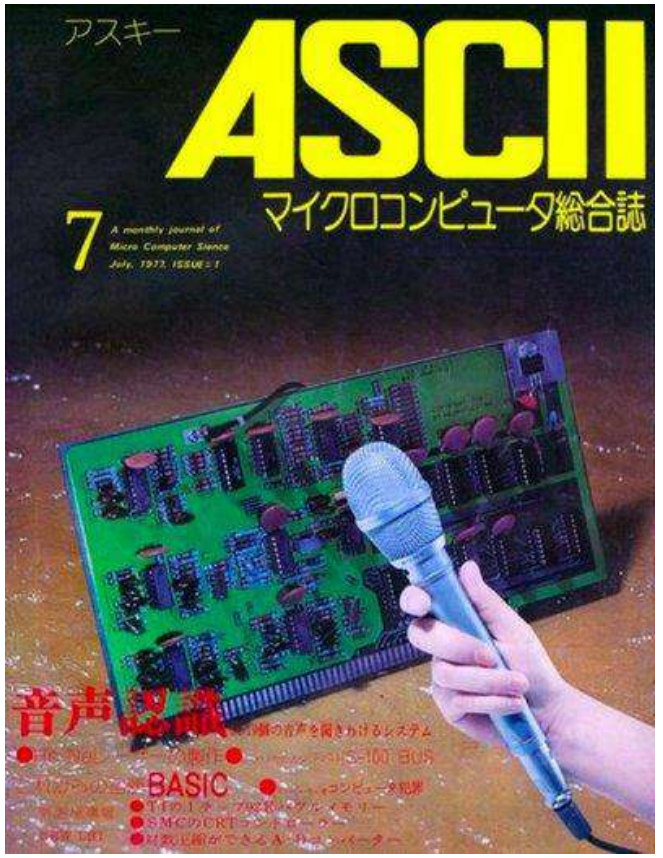
- ROM-containing took the lead
  - King of video game consoles
    - ATARI 2600
  - Gaming machine that influenced the MSX
    - Bally Astrocade Z80
    - Matel Intellivision 8910
    - Colecovision Z80,V9918

Bally astrocade

MATTEL ELECTRONICS
INTELLIVISION
Intelligent Television

COLECOVISION

July 1977 Predicts that computers are a medium



PC software distribution is key

Media expected to be CAS, FD and ROM.

Size of audio cassette case.

MSX's parents were a computer and a game console.

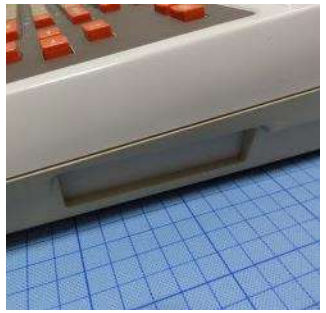
- More than a personal computer, an 8-bit computation engine module
  - Micro CPU and OS, assembler, BASIC language, C language
- ROM reader rather than a game console
  - I enjoyed playing on the computer, and found myself learning.
- Internet was not yet available at that time
- The core concepts were
  - DOS, BASIC, assembler, BASIC compiler, C compiler,
  - Macrostring (GML, MML) covered the missing parts
- When ASCII took over,
  - Aware of its role to sell Japanese semiconductors and floppies all over the world with MSX

the basis of MSX
Spectravideo SV318/328/601 and NEC PC6001

- SV318
  - CPU Z80
  - VDP 9918
  - PSG 8910
  - Keyboard QWERTY
- PC 6001
  - I/O Slot
  - ROM Cartridge
- OS , Language
  - CP/M
  - BASIC
- ATARI 2600
  - Joystick port

fox

SV FDD SV601



PC6001 I/O Slot

MSX Essential 8 Elements

- MSX logo mark
- MSX keyboard and game input port

- CPU Z80 or compatible LSI
- MSX Plug and Play (ROM and I/O slots)

- VDP 9918 or compatible LSI
- PSG 8910 or compatible LSI

- MSX BASIC or compatible software
- MSX DOS or compatible software

What is the MSX logo for?

- Software Compatibility
- Hardware compatibility
- Promote the concept of compatible computers
- Nicknames for PCs

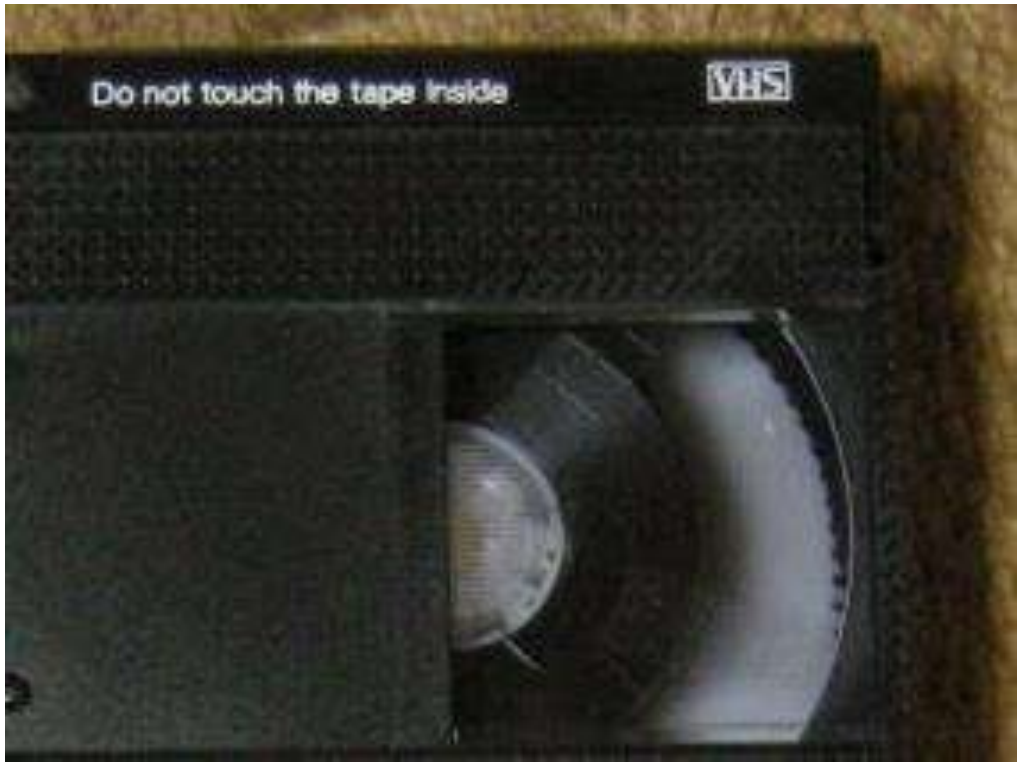
- Modeled after JVC's VHS

MSX logo mark

- 1975　JVC VHS
  Home VCR Logo System

- Designed by Kazuhiko Nish

VHS body logo and tape cassette logo



Keyboard and Game Input

- 1976 Atari Joystick

  Selection: Kazuhiko Nishi

- 1981 IBM PC Keyboard

  Design: Kazuhiko Nishi
- 1982 Similar to IBM PC Keyboard

  Design: Kazuhiko Nishi

ASCII STICK


ASCII STICK
TRIGGER
STICK
A
B
ASCII


ASCII
ASCII STICK II TURBO
FOR MSX PARSONAL COMPUTER
AS-5599-MX
SELECT 1
SELECT 2
TRIGGER
TURBO
TRIGGER A
TRIGGER B
TURBO SPEED
STICK

Possibility to choose CPU

- 8080
- Z80
- 6502
- 6800
- 9900
- 1802

Video and Audio were planned to be custom LSIs from the beginning

- For now, we'll use proven game console chips, Z80, 9918, 8910.
- We can't win without custom LSI and enhanced functionality.
  - CPU R800 , VM860 , VM8600 , Nexgen486 , Nexgen586 , AmdK6
  - Video V9938 , V9958
  - Audio A8950 ,
  - System S1985
- BASIC and DOS were added to this, following the IBM PC.
- The first image is MSX 2,
- The modified version is MSX turboR.
- I would like to complete the system by modifying these details.

Why Z80 CPU?

- Simple circuitry
  - Built-in memory refresh controller
  - Runs on a single 5V power supply
  - Sophisticated bus signals

- Software compatible
  - Same instruction set as 8080, different mnemonics

CPU

- Zilog Z80

- 16bit: IBM　8bit: MSX　the segmentation
  - If IBM goes 32-bit, MSX goes 16-bit.

Attempts at SoC MSXEngine

T7775MSX-ENGINE
CMOS-LSI with MSX 1 functions condensed into a single chip
T7937
CPU equivalent to Z80A,
VDP equivalent to TMS9918,
PSG (equivalent to AY-3-8910),
PPI (equivalent to i8255).
1.5um design rule,
Chip die size 10.5 x 8.6 mm, approx. 41,000 elements.

T9769 MSX-ENGINE 2
CPU equivalent to Z80,
PSG equivalent to AY-3-8910A,
Various other ports, interfaces, etc,
Panasonic and Sanyo Electric products.
Used in MSX2, MSX2+, and MSX turboR.
Toshiba made the most profit from MSX.

Faster CPU

Z80 internals from 4 to 16 bits

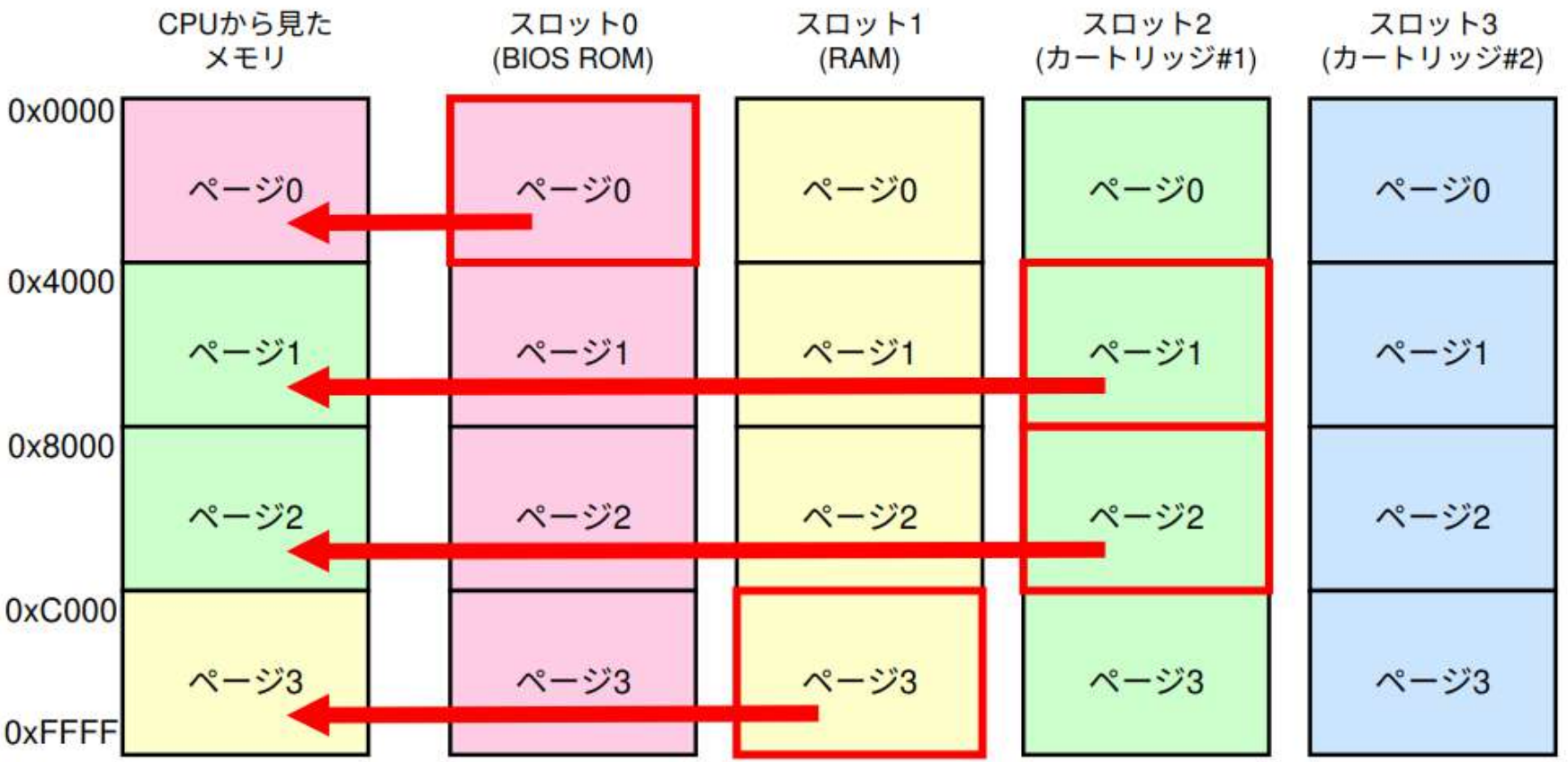
- It was made possible because I knew the people who made it.

Masatoshi Shima

Kazuya Kishioka

MSX Plug & Play

Ryozo　Yamashita



MSXROM and MSX Plug & Play

- 1964　I got the size from Philips Compact Cassette tapes.
- 1975　First ROM cartridge　Fairchild Channel F
- 1983　MSX Invent Plug and Play

I/O interface and driver software.
on the same cartridge

ROM and peripherals coexist in I/O slots

MSX SYSTEM integrates peripheral logic

Why VDP is 9918

- I liked the simplicity of 8 chips of memory with 1 chip VDP
- I wanted to separate the graphics memory from the main memory.
- I wanted to use drawing commands rather than memory operations

  Wanted to make a faster version later
- Bill Gates pointed out the missing pieces

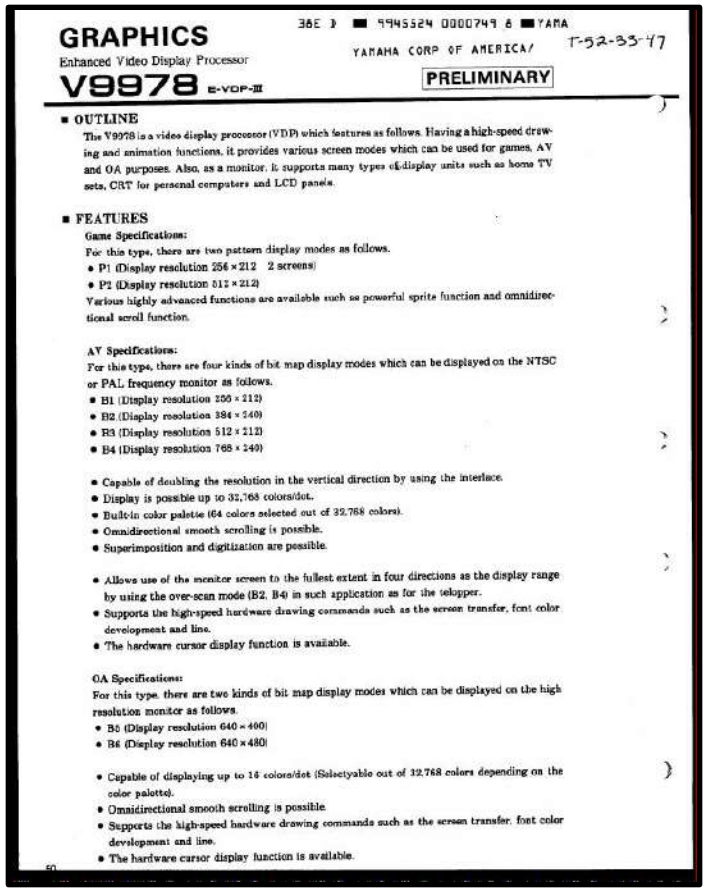
  I knew from the beginning, so I thought it was OK.

VDP

- TI　VDP 9918
- TI　99/4 Impact
- ASCII / YAMAHA　V9938
  Shigemitsu Yamaoka


週刊アスキー

Advanced features and compatibility we cannot have both at the same time



38E D 9945524 0000749 8 YAMA

T-52-33-47

GRAPHICS

Enhanced Video Display Processor

V9978 e-VDP-II

YAMAHA CORP OF AMERICA/

PRELIMINARY

■ **OUTLINE**

The V9978 is a video display processor (VDP) which features as follows. Having a high-speed drawing and animation functions, it provides various screen modes which can be used for games, AV and OA purposes. Also, as a monitor, it supports many types of display units such as home TV sets, CRT for personal computers and LCD panels.

■ **FEATURES**

Game Specifications:

For this type, there are two pattern display modes as follows.

- P1 (Display resolution 256 × 212 2 screens)
- P2 (Display resolution 512 × 212)

Various highly advanced functions are available such as powerful sprite function and omnidirectional scroll function.

AV Specifications:

For this type, there are four kinds of bit map display modes which can be displayed on the NTSC or PAL frequency monitor as follows.

- B1 (Display resolution 256 × 212)
- B2 (Display resolution 384 × 240)
- B3 (Display resolution 512 × 212)
- B4 (Display resolution 768 × 240)

- Capable of doubling the resolution in the vertical direction by using the interlace.
- Display is possible up to 32,768 colors/dot.
- Built-in color palette (64 colors selected out of 32,768 colors).
- Omnidirectional smooth scrolling is possible.
- Superimposition and digitization are possible.

- Allows use of the monitor screen to the fullest extent in four directions as the display range by using the over-scan mode (B2, B4) in such application as for the telopper.
- Supports the high-speed hardware drawing commands such as the screen transfer, font color development and line.
- The hardware cursor display function is available.

OA Specifications:

For this type, there are two kinds of bit map display modes which can be displayed on the high resolution monitor as follows.

- B5 (Display resolution 640 × 400)
- B6 (Display resolution 640 × 480)

- Capable of displaying up to 16 colors/dot (Selectyable out of 32,768 colors depending on the color palette).
- Omnidirectional smooth scrolling is possible.
- Supports the high-speed hardware drawing commands such as the screen transfer, font color development and line.
- The hardware cursor display function is available.

50

Why PSG is 8910

- GI's sound LSI is better than TI's sound LSI.
- Expectation that GI's sound LSI will be used in professional arcades

- We considered the risk of relying on TI for both video and sound.

- I will eventually use a Yamaha FM chip,

  Relatively speaking, we are going to go all out for the sound and use the MSX-Audio A8950

  I was going to go with the MSX-Audio A8950

SOUND

- GI PSG 8910

- Intellivision Impact

- MSX Audio Y8950
- MSX MUSIC
  - Takatoshi Ishii
  - Shigemitsu Yamaoka

A desire to share the success of DX-7

Reflecting on Sound

- Failed to identify SCC, TI, and YAMAHA FM
- MSX Audio chip prices were high.
- MIDI ？　Conflicts with built-in sound LSI

- I want a Yamaha synth cartridge with everything in it.
- SOFT, drivers, and everything else should be supported.

- In making such a MSX SOUND ALL

Why did it have to be BASIC?

- FORTRAN is a compiler
- BASIC is an interpreter
- Immediate execution is possible

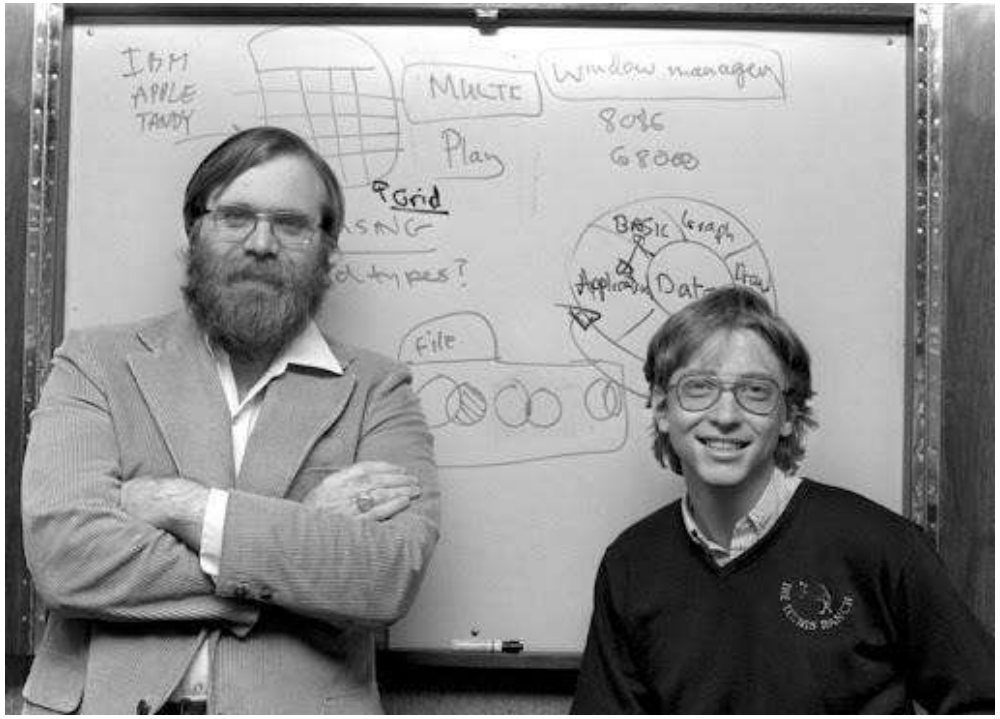
BASIC

- 1975　MITS Altair BASIC
- 1979　NEC N BASIC
- 1981　IBM PC GW BASIC

- First to sell Microsoft BASIC

BASIC MicroSoft eXtended BASIC

- Bill Gates, Paul Allen
- Hitoshi Suzuki



Also developed BASIC compiler

Why is the OS CP/M compatible?

- There was a huge amount of CP/M compatible software that wasn't games

- There was no other OS to replace it.

- In 1981, 16-bit was already MS-DOS,
- In 1983, for 8bit machines

  MS-DOS on the outside, CP/M compatible on the inside.

DOS

- 1976 Intel MDS 8080 with CP/M 1.4 8inch
- 1979 Z80 with CP/M 2.0 5.25inch
- 1981 IBM PC MS-DOS file format 5.25inch
- 1982 SONY SMC 70 with 3.5inch CP/M
- 1985 MSX-DOS 3.5 inch
- As a platform to migrate to MS DOS

The OS was developed in-house according to MS-DOS.

- Tim Patterson（Designer of SCP-DOS

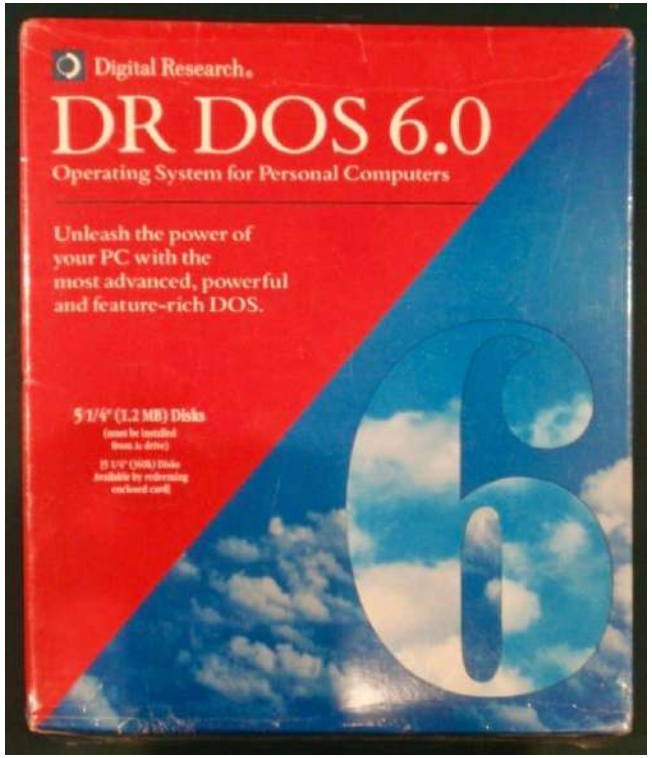
- Hitoshi Suzuki

Giving Back to Digital Research, Inc.

In 1988, ASCII invested in the development and

- DR-DOS was developed
- MS-DOS compatible
- Because of this

  DR was acquired by Novel in 1991



M


Panasonic
パナソニックが
連れて来たすごいヤツ。
(NEW)
A1
ゲームで楽しさ、パソコン通信でも楽しむ。
Panasonic Personal Computer
パナソニック MSX2 パソコン
FS-A1標準価格29,800円
①メにつくきれいさ、ドのつく迫力。
ゲームセンターみたいな気分で楽しめる。
このすごさは、退屈している場合じゃない。
いままでのゲームよりワナラ。128KのVRAMと64KのRAMがつくりだす高精度なグラフィックス、256色の多彩な画面。その上RGBで(つきり画面、8オクターブ3重和音のドッキリ効果音。一体全体、このリアルさ、実感はなんだ。ノ大迫力のメガROMソフトも次々登場です。
松下電器産業株式会社
②友だちつくろう、情報交換しよう。
これからは、パソコン通信で新しいカタチのコミュニケーションが広がっていく。
モデムカートリッジ(別売)をスロットに差し込めば、パソコン通信を楽しめます。電子掲示板で情報交換したり、電子メールをやりとりしたり。世界中をネットワークしていきます。
モデムカートリッジ FS-CM800
標準価格29,800円
③たのし、うれし、29,800円。
ワープロにホームコンピュータに、これからは家の中でパソコンがどんどん活躍。
パソコンが家の中にあれば、どんどん便利になる時代です。だから、この価格でこの機能。プリンターインターフェイス、ゲームポーズ機能。世界時計、ストップウオッチ、タイマー、カレンダー、電卓、伝言板と6つの機能のデスクパック内蔵。ダブルスロットでシステムアップ自在です。

S


SONY
■3.5"フロッピーディスクドライブ
■JIS第1&第2水準漢字ROM
■漢字BASIC
■MSX-JE&辞書ROM
■FM音源
●ゲーム プログラミング解説本付
●ゲーム プログラミングツール(FD)付
●BASIC解説書&文法書付
MSX 2+
HITBIT
RAM64K/V-RAM128K
MSX PERSONAL COMPUTER
HB-F1XDJ

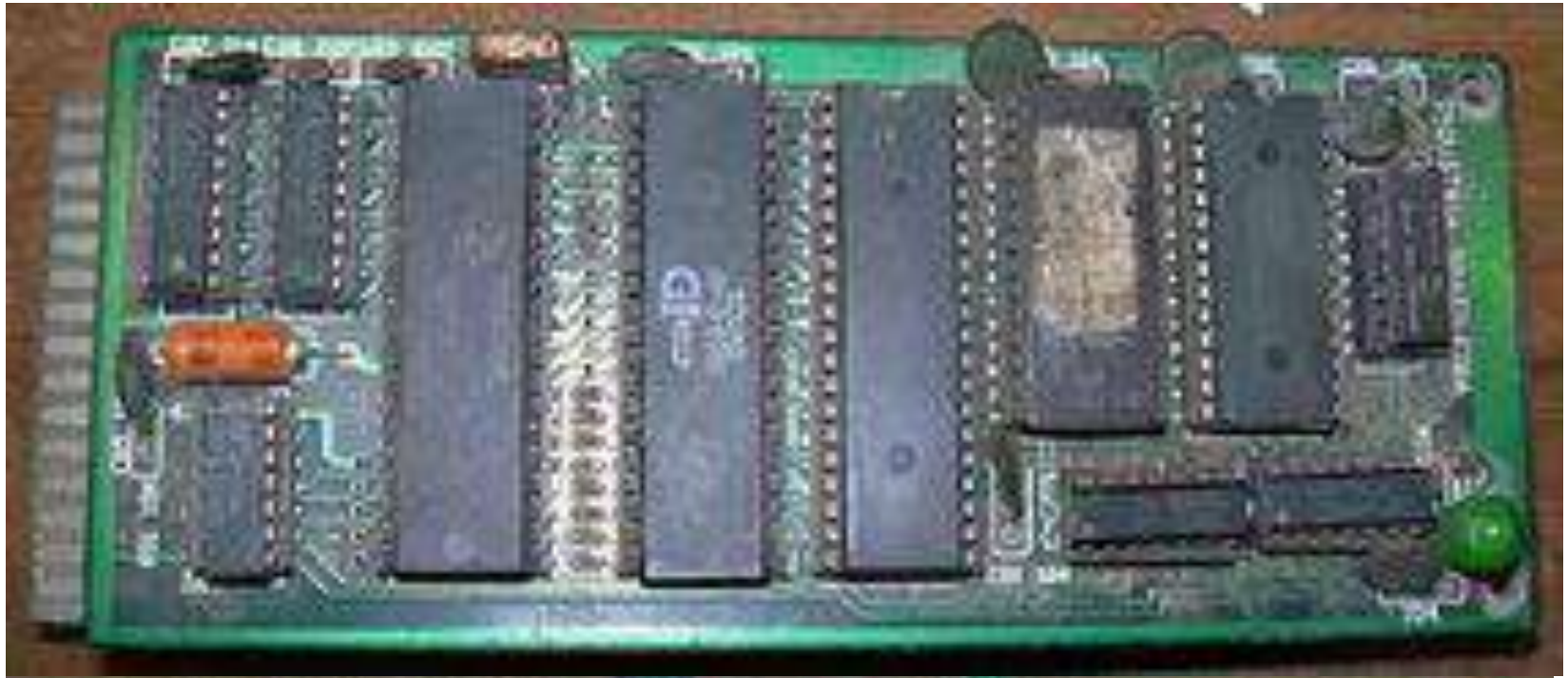
European Partner Philips

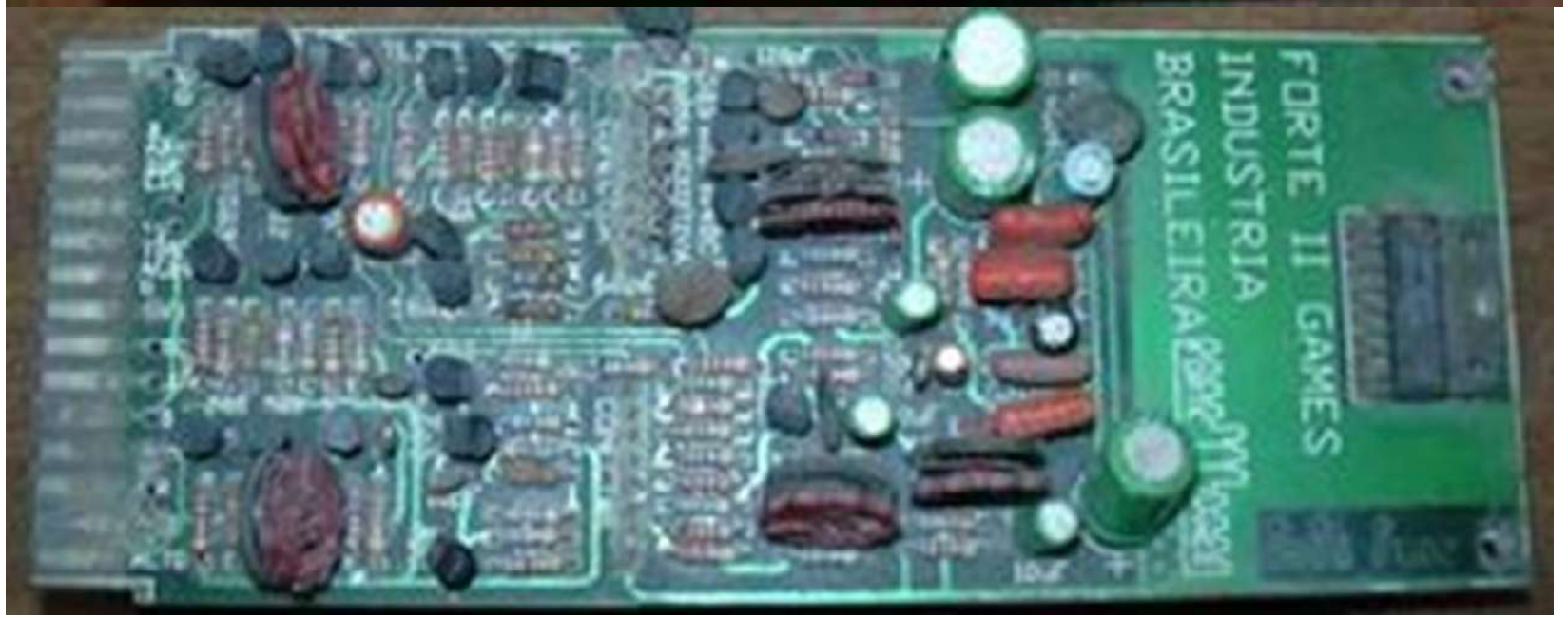
X MSX price destruction CASIO Corp.19,800yen


gradiente
MSX
MSX
gradiente
STOP
ESC
TAB
CONTROL
SHIFT
CAPS LOCK
SHIFT


16 CORES
HOME COMPUTER
HOTBIT
MSX
EPCOM
GRÁTIS!
2 fitas com programas:
• Curso de BASIC em 9 lições
• Introdução ao teclado do HOTBIT
1 capa plástica para o micro
80 KBYTES DE RAM, SENDO 16 KBYTES ESPECÍFICOS PARA O VÍDEO
32 KBYTES DE ROM PARA O INTERPRETADOR BASIC
16 CORES EM ALTA RESOLUÇÃO
TECLADO COM ACENTUAÇÃO EM LÍNGUA PORTUGUESA
PRODUZIDO NA ZONA FRANCA DE MANAUS
SHARP


Talent
MSX 2 Turbo
COMPUTADOR
PERSONAL TPC-310




FORTE II GAMES
INDUSTRIA
BRASILEIRA

introspection point 1：
Did not pursue the game seriously

Did not accept ROM-only MSX

Withdrawal and Ignore

Should have done more research.

- SEGA　They seemed angry at the time.　SG , SC ignored
- SORD　Trauma with Softbank　M5 ignored
- Coleco　Talking about the U.S. Withdrawal from the U.S.
- C64,16,128　Unexplainable multi-product offensive from own FAB
  Withdrawal from the U.S.
- Spectrum　Sinclair's Architecture？？？　ignored

- **From now on, we will make efforts in the field of "RETRO games"**

We should have worked on porting the Z80 and VDP 9918 games to MSX

- Bally Astrocade
- Coleco Vision
- Spectravideo SV-318 / SV-328

- SEGA SG / SC / GG
- SORD M5
- My Vision

We should do it now

Game Development Environment and One-Time ROMs

- One-time ROM for small-volume ROM production
- Maintenance of ROM coding of games made with BASIC and BASIC compiler.

introspection point 2:
Both V9990 and V9958 should have been equipped for MSX3 realization

- V9990＋V9958 ＝ Price within 2 times of V9938
- I didn't have the courage to convince Yamaha to bargain.
- **In realization of MSX 3 and 3+, we should try again**

deeply regrettable point ：

phantom MSX3

- V9990 + V9958
- Y8950　Complete MSX Audio Sound all
- R800　For even faster version
  - FPU,
  - Cache and
  - MSX memory management

I'll try to do something with

introspection point 3

Failed to adopt CDROM as software media

- YAMAHA Custom FDC + YAMAHA CD-ROM Drive
- I didn't have the courage to create a custom CD-ROM driver LSI.
- YAMAHA had the technology.

- It was hard to watch the competition among the CD-ROM game consoles.
  - SONY PS1、2、3
  - SEGA Saturn
  - NEC PCEduo、PCFX
  - Nintendo Wii

introspection point 4

There was no global strategy

- We should have worked a little more with Philips.
- USA withdrew because of Commodore
- UK withdrew because of Sinclair
- failed to support Russia and Ukraine, we'll try after war ended
- Ignored China, India, Africa Wanted to just sow seeds

Summary of Reflections

What didn't work was good

- ASCII withdrew in 1995.
- I didn’t do the game as a business
- I didn’t do MSX with CDROM
- Development of MSX3 was halted.
- **The users kept the MSX behind them.**
- **Many people were inspired to program by the MSX.**
- If I had done it I might have made a big mistake
- **A satisfactory new plan can be made now in the new era!**

MSX in the future

IoT PlY DiY NxT xSC

(Presentation made in DEVCON11, Odawara)

Why MSX again?

- Return of gratitude to the person who bought the product.
- **everybody want to connect to the Internet and do things.**
- **Summarize and recover from failures due to misjudgment of the development process**
  - 8 bits of non-competition with IBM
    - Linux on 16, 32, and 64.
  - Comparison with NES
    - Games on the Internet
  - Decent International Development
    - EU , Brazil , Arab firmly
  - Development of decent educational materials
    - As DIY and open source

Future positioning

- Does not conflict with Windows PCs
- Does not conflict with Android phones
- Does not compete with smart TVs or high-end game consoles

Products that can coexist with these = Creation of attractions for people to buy.

Retro computing is called
To view Retro as an era of development, not just as old,
Consistency and serial compatibility in the evolution of the architecture is necessary.
We need to build such a system to create a "teaching machine" that can be used in the modern age.

Redefining the future areas and objectives of MSX

- MSX's 40th year back
  - Keep up with the changing times
  - Seeking new ways to use the computer
  - Reflecting on avoiding games, I'm back to playing retro games.
  - Animation and synthesizers are also properly
  - Re-engage with things we couldn't do or had given up on

• MSXIoT	Internet of Things	connect to the Internet
• MSXPLAYer	PLAYer	Emulator running on multiple OS
• MSXDIY	Do It Yourself	Homebrew and games with ever more perfection.
• MSXNxT	Next Generation MSX	New MSX from now on
• MSXxSC	Experimental Super Computing	Learn, build, and use supercomputers and AI

- MSXIOT A World of Sensors and Controllers
- MSXPLAYer How to deal with the legal execution of games on emulators
- MSXDIY The World of Homebrew and Repair Expansion
- MSXNxT Next Generation Development
- MSXxSC Realization of research supercomputer and artificial intelligence software execution environment

Elemental technologies for its next development

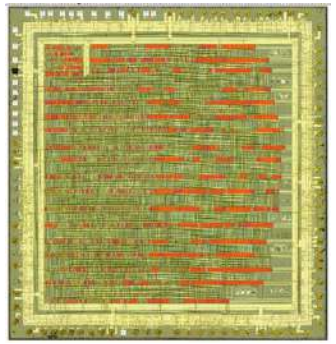
- Further enhance the three basic techniques
  - Emulator technology Mainly CPU and software
  - Technology to be executed by translators
  - FPGA Technology Mainly Hardware
  - Challenge to SoC Systematization technology To make money and make SoC cheaper

- MSXNxT / MSX3 , MSX3+
- MSXxSC / HPC / Amd・Arm Dynamic Resource Management with TaoX
- MSXxSC / Ai/ Amd・Nvidia A , V , H , B

Challenge on this and catch up.

R80　CPU

- High-speed version of Z80
- Focus on Compatibility
- Hope 100MHz
- Macrocell also should be considered for SoC

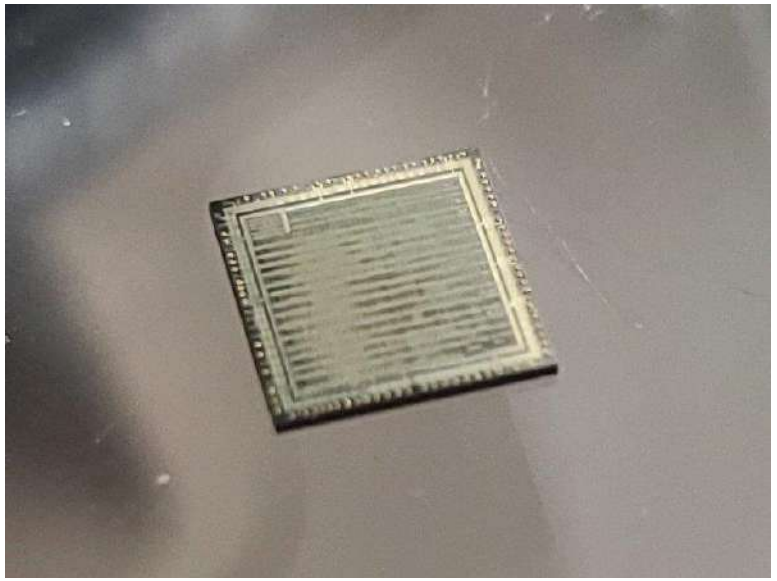


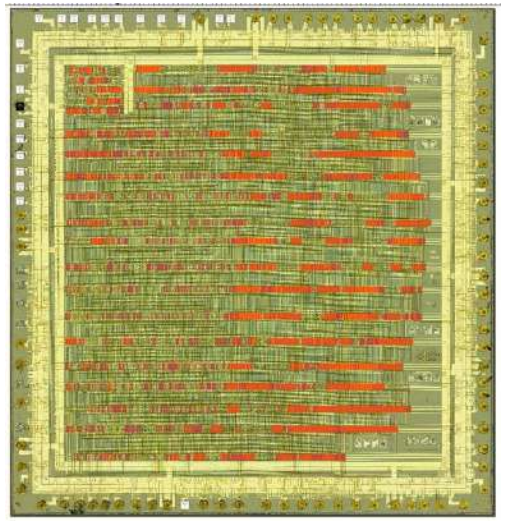
R900　CPU

- Ikabiku-san reads R800
- And then became public

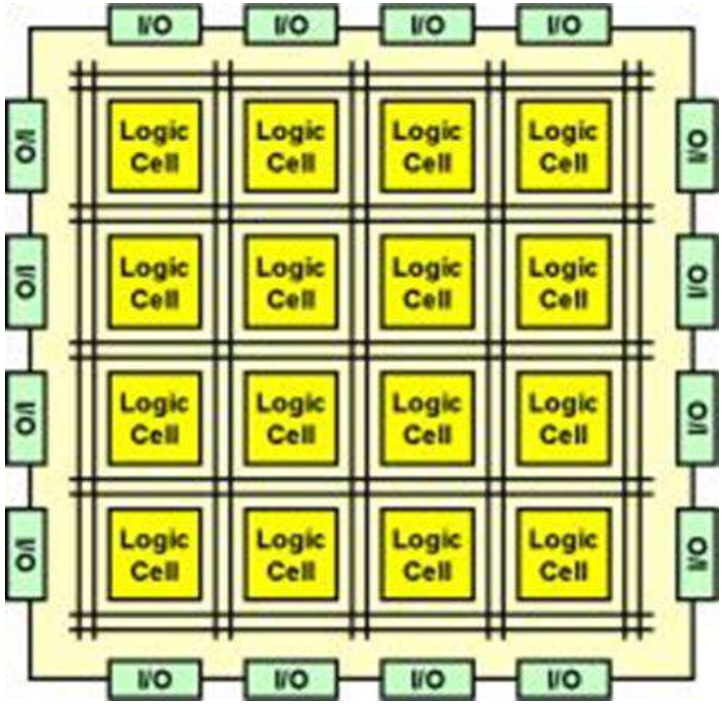
- Spacemoai-san and HRA!.Ⓜ️🅂️Ⓧ️-san designed

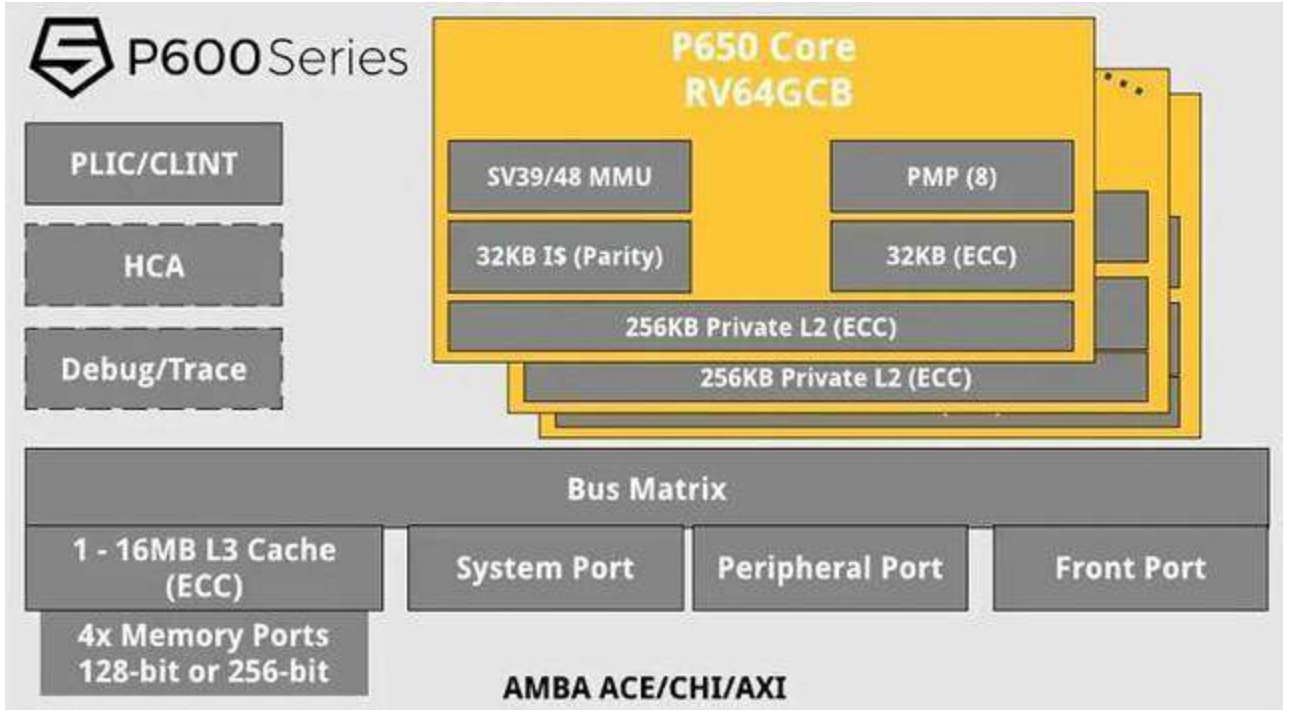
- Library creation for FPGA





R1800(32bit)CPU + RISC V(32/64bit)

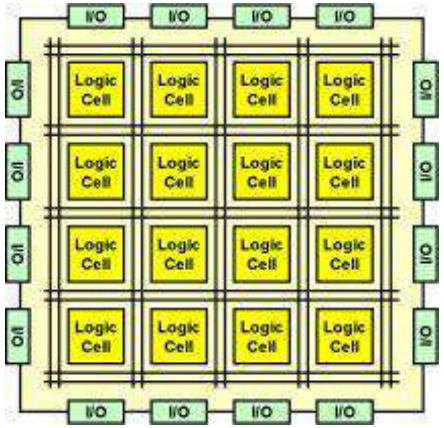




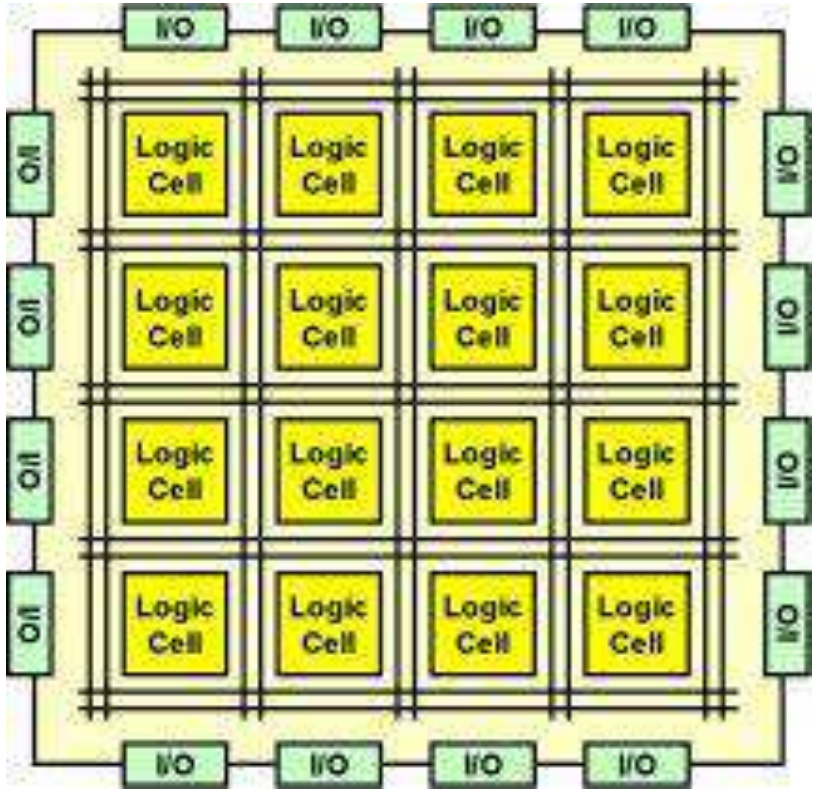
Spacemoai-san is designing and HRA!.Ⓜ️Ⓢ️Ⓧ️-san is scheduled to collaborate with

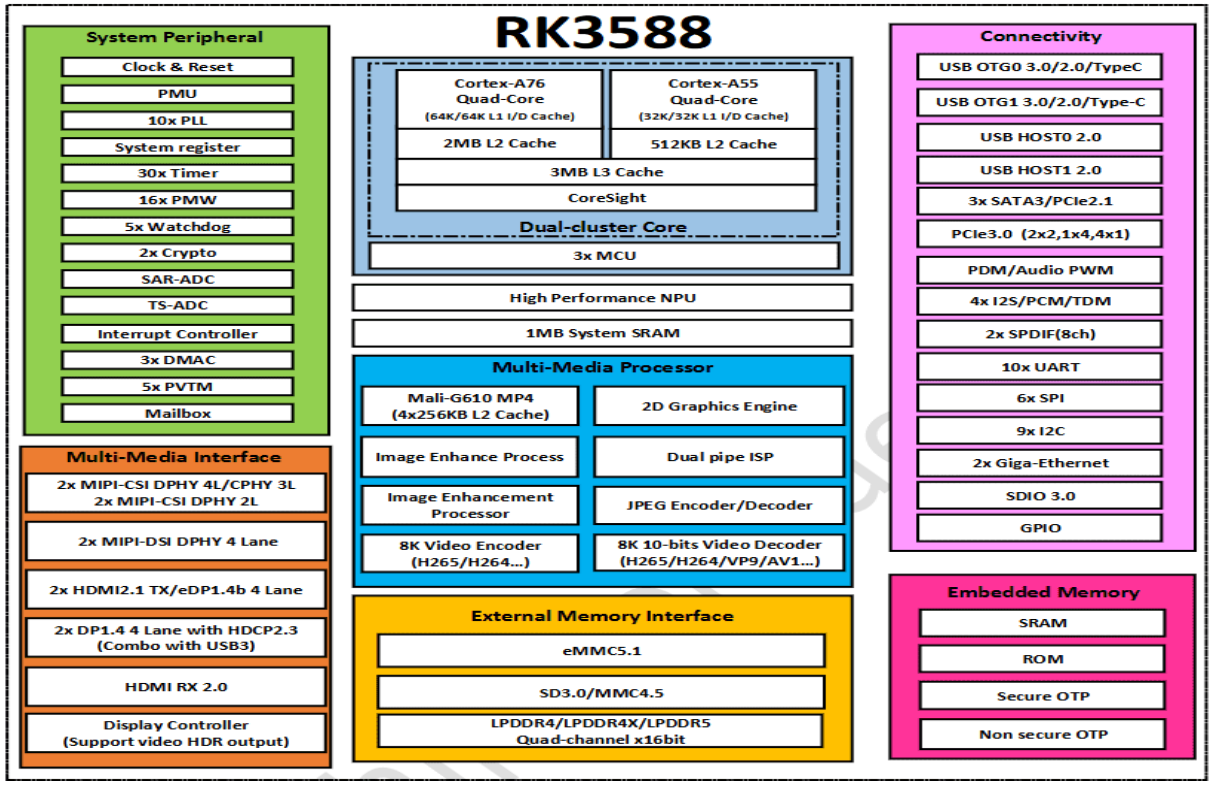
V9968, V9978+P4

- Combination of FPGA and Espressif P4

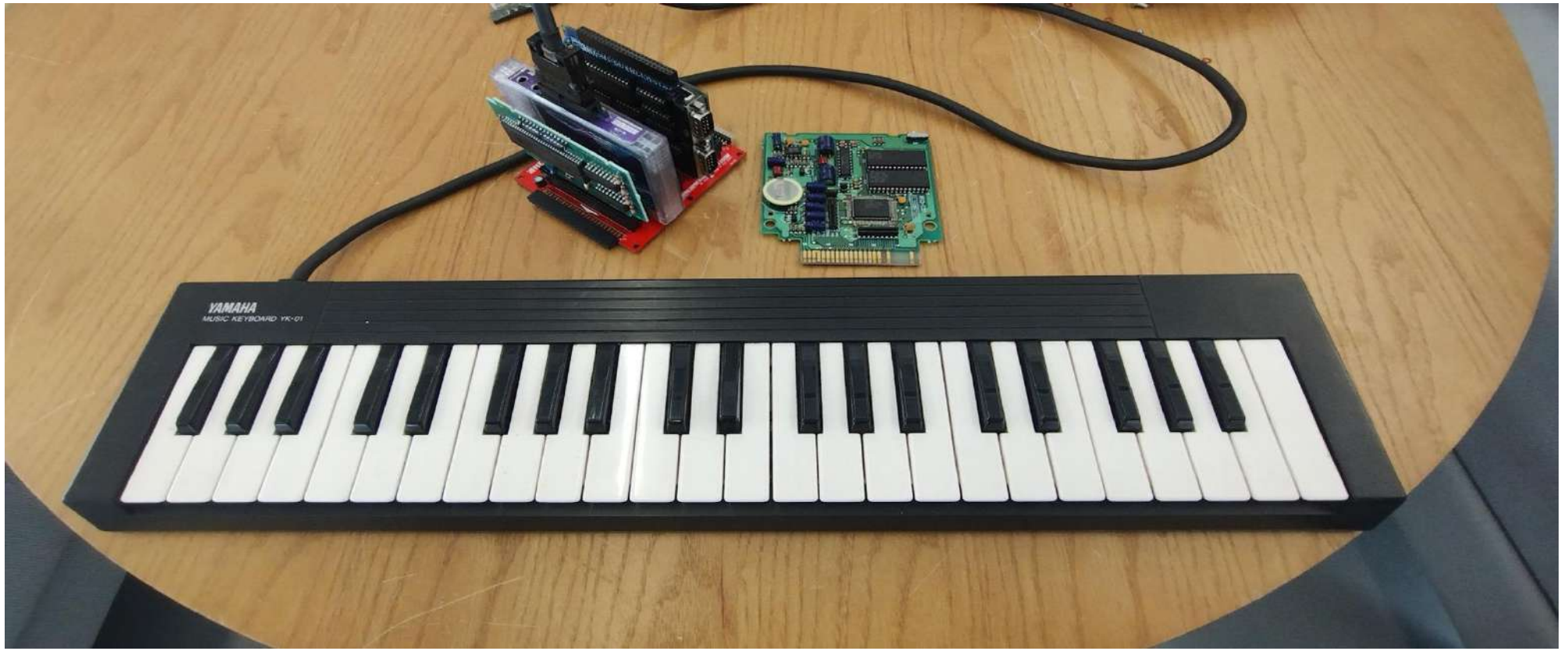


FPGA9988 and RK3588





Sound every feature,　FPGA　A8960 SoundAll

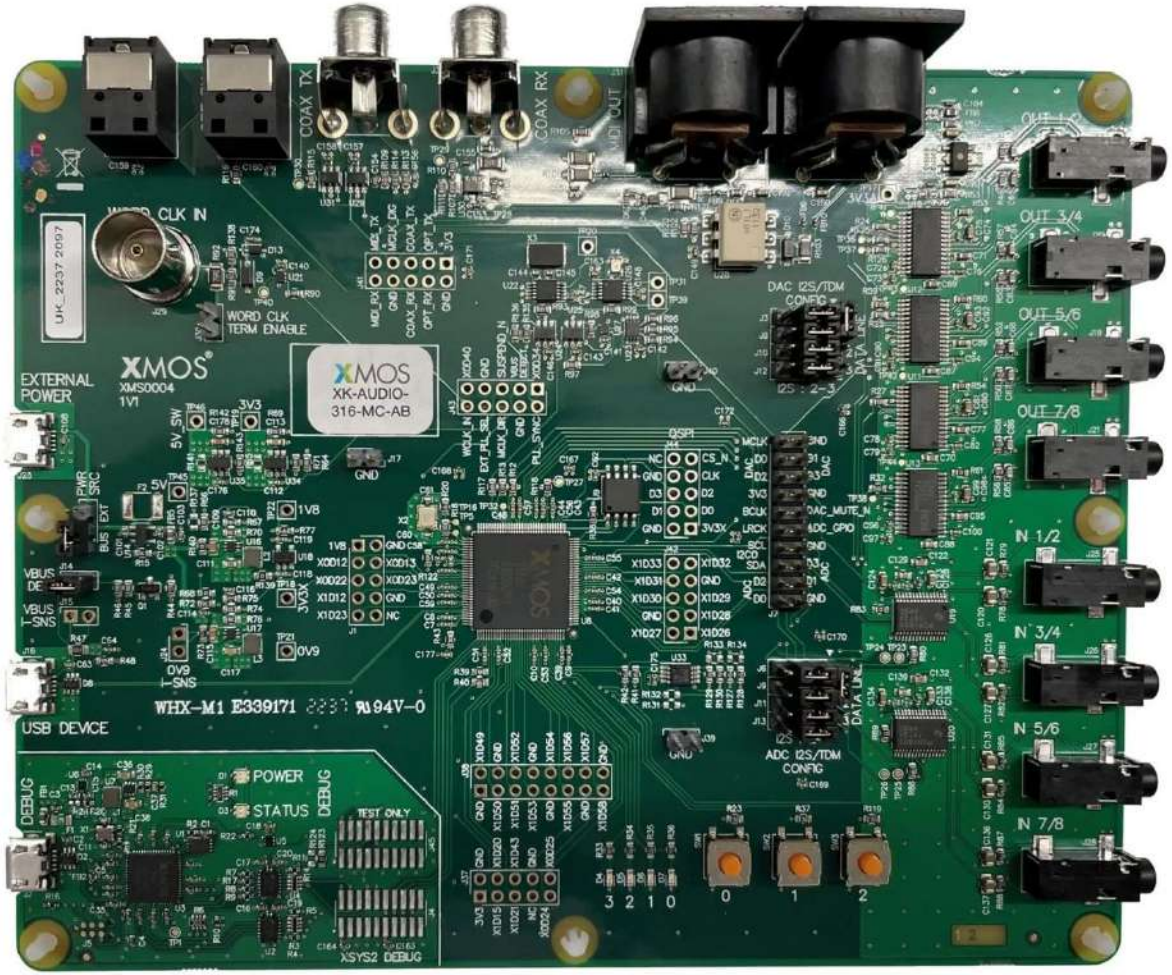


8910 , 76489 , SCC , 8950 , 2413

Xsound assign to A8970

- MIDI 2.0
- Text to speech
- PCM and DSD
- Realize FM using XMOS

XMOS multi-channel



BASIC Maintenance and Next

- Want to improve while maintaining compatibility
- Interpreter and compiler both implemented
- Increase Supported Memory

- MML　Music Macro Language
- PML　Phonetics Macro Language
- GML　Graphics Macro Language

C++ and Python

- Support to implement LLM for Artificial Intelligence
- We would like to use Artificial Intelligence with MSX programming Assist
- We want to support for both MSXDOS and TAOX.

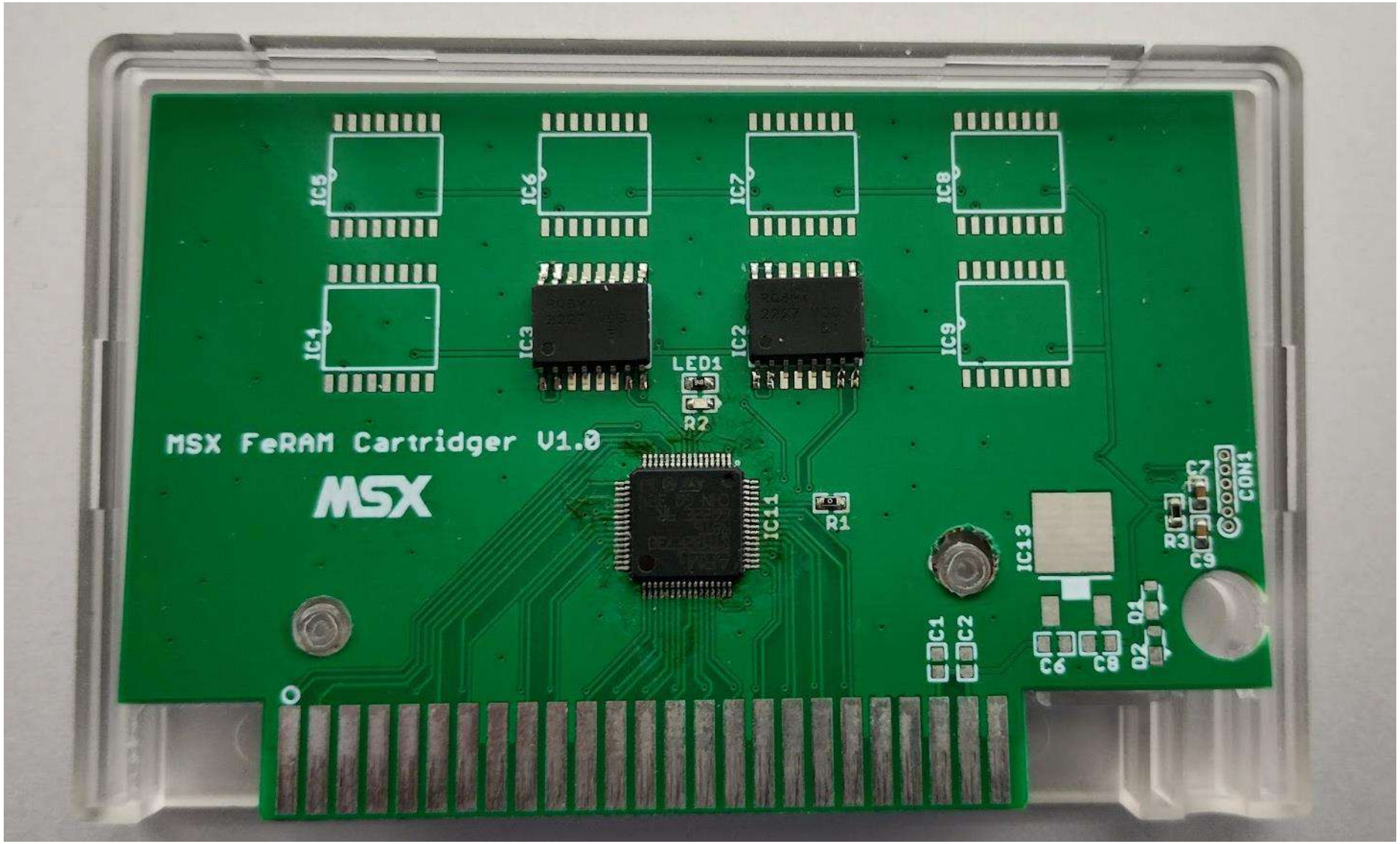
Next of MSX-DOS

- Separate NesterOS and TaoX in VM
- Next, merge the two into TAOX
  MSX-DOS into one tree

TaoX　VM64　64-bit virtual CPU

- We would like to develop TaoX on the premise of a menicore processor.
- We would like to make TaoX run on x86 , Arm, RiscV, R900, and R1800.
- I want to be able to change to Win, And, MAC, iOS by replacing the mask with retrofitting software.

FRAM Cartridge　in making prototype



MSX　plug & play policy

To guarantee the diversity of the system,

- Use standard interface hardware.
- Differences are absorbed by software modifications.
- All software can be downloaded from the Internet and updated

New Logo Policy

- 3 types
  - Soft check Yes
  - soft check Applications received and under review
  - Soft check None

- registration number Yes/No
  - Optional self-registration on the web
  - Contact, web, etc.
  - Want to conform to ISBN, but different item Under adjustment

- For compatibility and malware prevention

IoT　Challenging and practicing in new fields

- MSX online to the Internet　WiFi 、Lora 、LTE 、HaLo
- More than 300 sensors, actuators and encryption Underway
- Multi-species controllers M5Stack, Inc.
- Many types of remote controllers M5Stack, Inc.
- HyperApps Concept: bunshin no jutsu, Instantaneous Movement

MSXPLAYer　MSX in a multi-OS environment

- MSX on PCs, smartphones and smart TVs
- A book with official download rights has been published.
- Long history improved compatibility
- Remote desktop will be supported next.

DIY　Learning, Fun, and Internet Connection

Models you can make yourself	Chikuwa MSX
Upgrade all MSX	MSXBooster
Next generation component-like cartridges	Hara9968 、9978 Cartridge
game emulator	First Realize it by MSXPLAYer and MSX0 TAB5

NxT　Next generation of MSX

- A dream I had given up on for many years
- New, VDP policies 9968 , 9978 + P4, 9988 + Rock3588
- Can we not do HPC and AI?→ We absolutely have to.
- inexpensively

xSC　Climb the mountain because it's there.

- Can we not do HPC and AI?→ We absolutely have to.
- inexpensively
- Google , OpenAI , DeepSeek , the other LLM modules,
  What does the average person run on?

Handmade tower PC + used GPU + MSX3 with PCIe

MSXIoT： MSX0

- Completed MSX2++ to IoT　　Next, faster speeds
- MSXturboR+ is also being implemented　to TAB5
- Much Faster.　　MSX0Pro also

- Four elements of MSXIoT
  - Edges are sensors, controllers, actuators
  - wireless link
  - remote controller
  - cloud

MSX IoT Sensor

MSXIoT Controller

MSX0Stack　MSX0Stick　MSX0Stamp　MSX0Atom　MSX0Nano

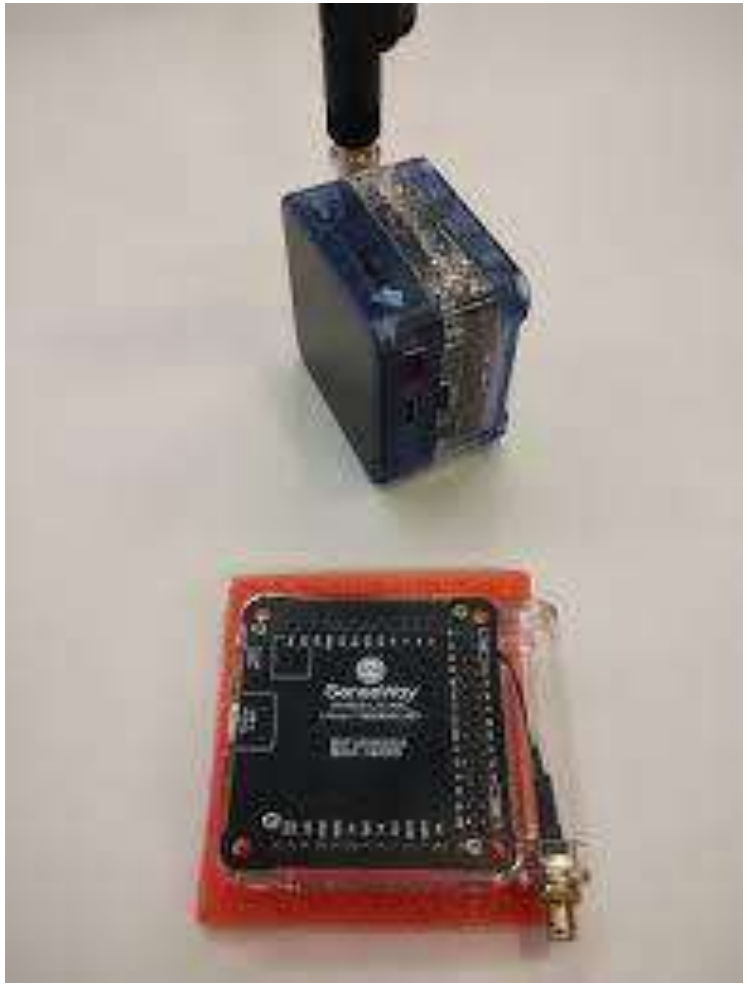
Actuator　Put security on it.

Wireless Link's product assortment policy

- IoT Key Points
- Assortment in M5Stack size
- Technical certification and domestic support
- Ad hoc MESH Original Router Research
- Deployment of combined access locations with STAR LINK

wireless link　LTE

- Sense way
- M5Stackable



wireless link　LORA ,

Wireless ad hoc router

- LORA
- LTE
- WiFi
- HaLow

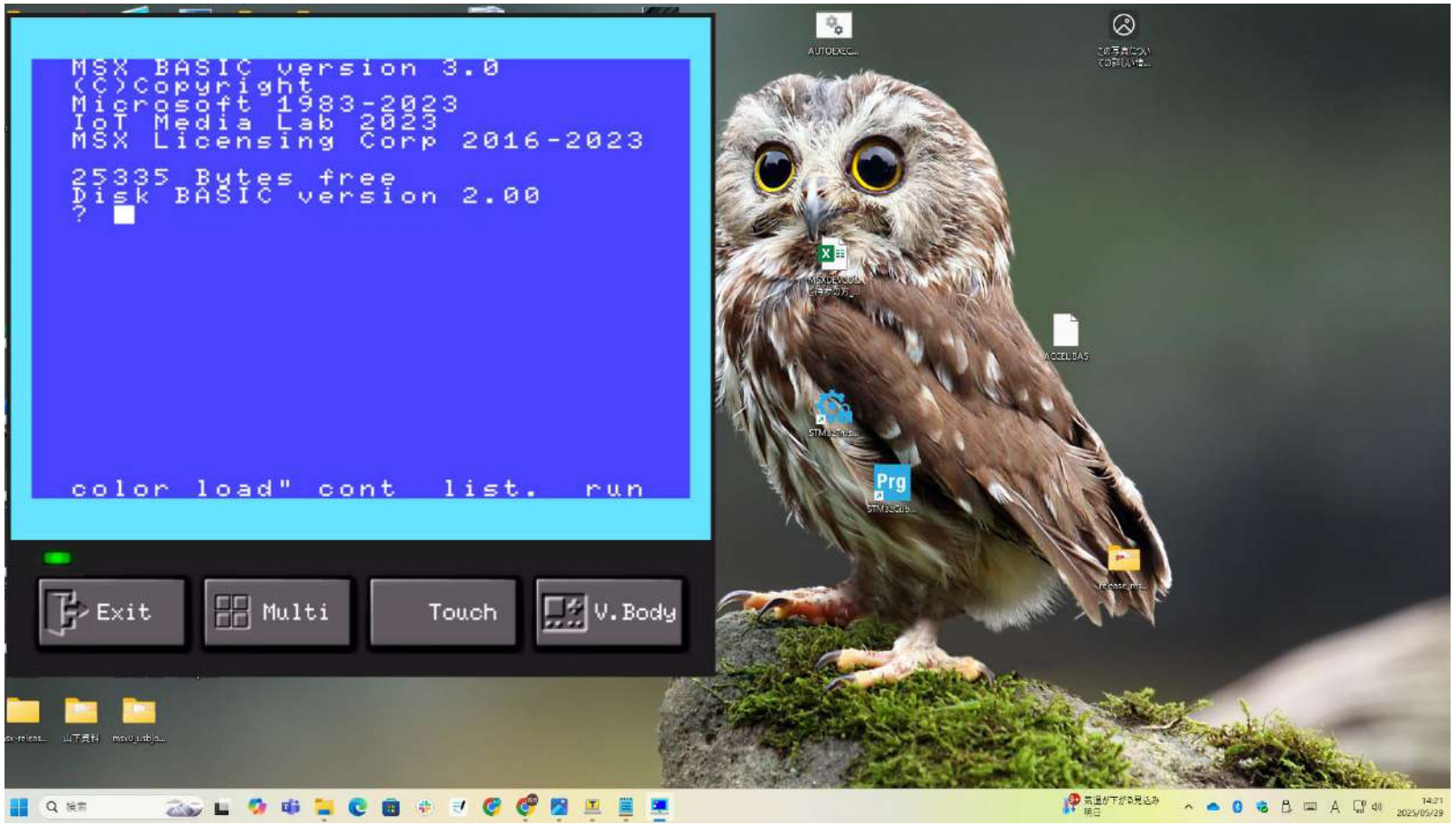
- 100BT

MSX PIY

- Official web-based emulator
- Bundled in a book

- Akasic library
  also support

MSX remote desktop Windows version

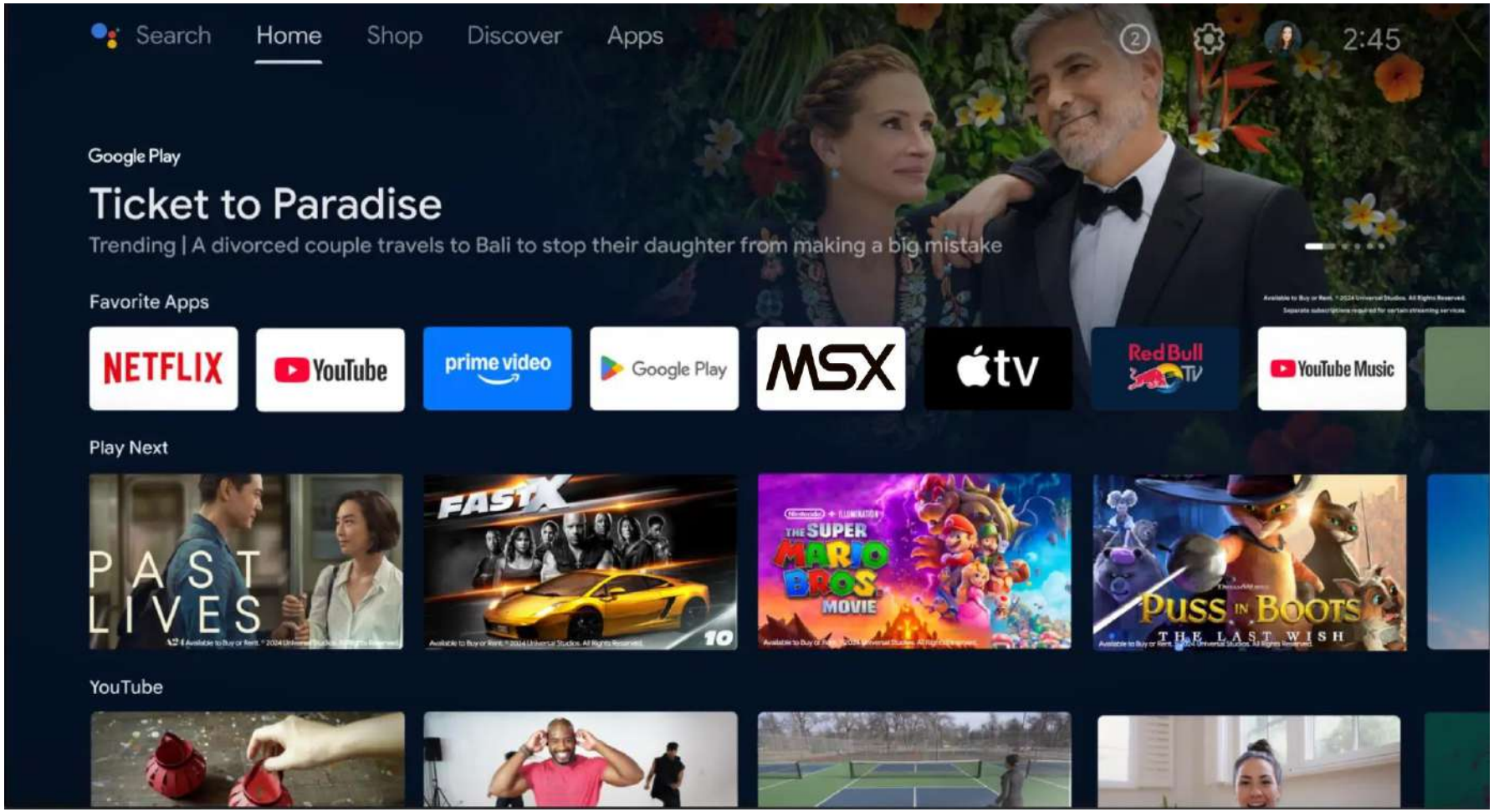


Multi-OS compatible emulators spreading through the Internet ----- for almost free

- Windows
- Android
- MAC　OS
- iOS
- Linux

- PC
- Smart Phone

MSX emulator running on Smart TV



Not only gaming, but also IoT sensors can be remote controlled by remote desktop

Emulation Techniques

- Z80 , 9918 , TI ROM　　for example SG , SC , Coleco , GameBoy
  - By changing address
- TI9900 , MOS6502’s ROM　　for example ATARI2600
  - Binary modification and replacement with Ai.
- Other ROM
  - We are considering translation and cross-compilation using AI

We want to achieve this with the help of experts in the emulation world.

MSXLC is not interested in making money from retro games. For free

MSXPLAYer can be downloaded through the Internet

- For free　Windows , Android , MAC , iPhone
- We want to increase new users by doing this.
- Also application can be downloaded
- Instructions will also be sold as a book.
- We want to build a system that will allow us to do soft business here.

Existence of multiple emulators

- Competition is necessary
- And symbiosis is also necessary
- Some kind of compatibility , USB drive method plug and play

MSXDIY： MSX2++ , MSXturboR+

- Assembled and ready to use MSX
  - MSX1、MSX2＋＋、MSXturboR+
- Last 8 bits in FPGA　MSX2＋＋
  - R80
  - V9968
  - A8960
- Almost the last 16-bit in FPGA　　MSXturboR+
  - R900
  - V9978
  - Xsound 8970

Open development intentions and processes

- Next to ownership is production
  - Provide an MSX that anyone can build

- Clarify intentions and disclose the design and production process as well.
- Completed MSX due to the changing times, which was unfinished
- Reviewing the specs again for the next generation

- Energize the existing MSX by offering it as a booster

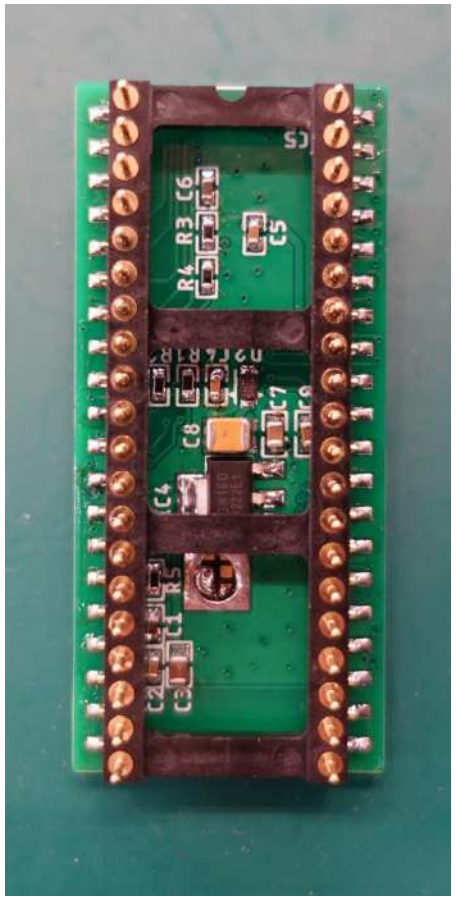
Take care of the MSX until now.

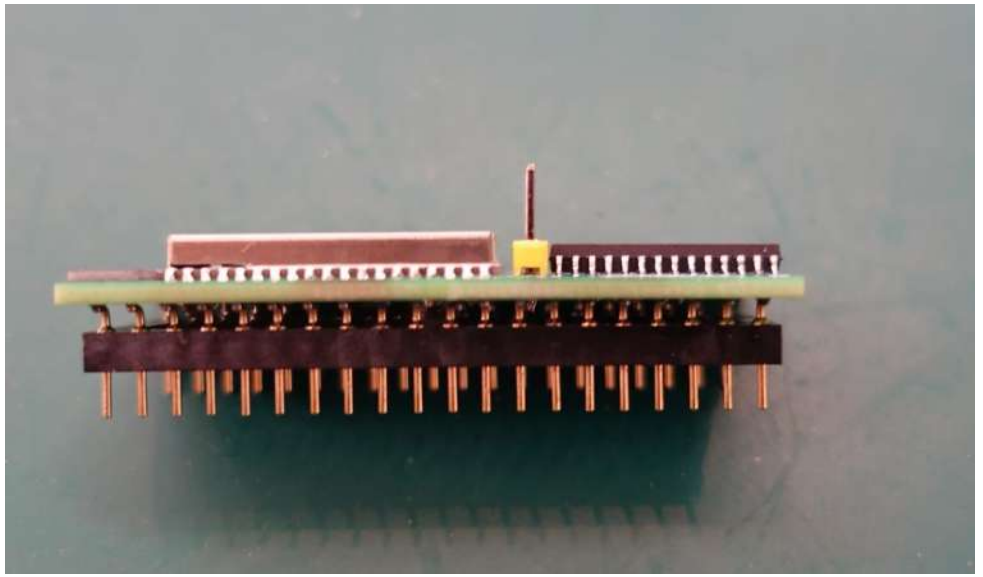
- 4 million units AGAIN!
  - Repair system
  - Upgrade by Booster
  - Maintenance of materials
  - Digitization and reprinting of magazines and books
  - Activation of electronic distribution of software

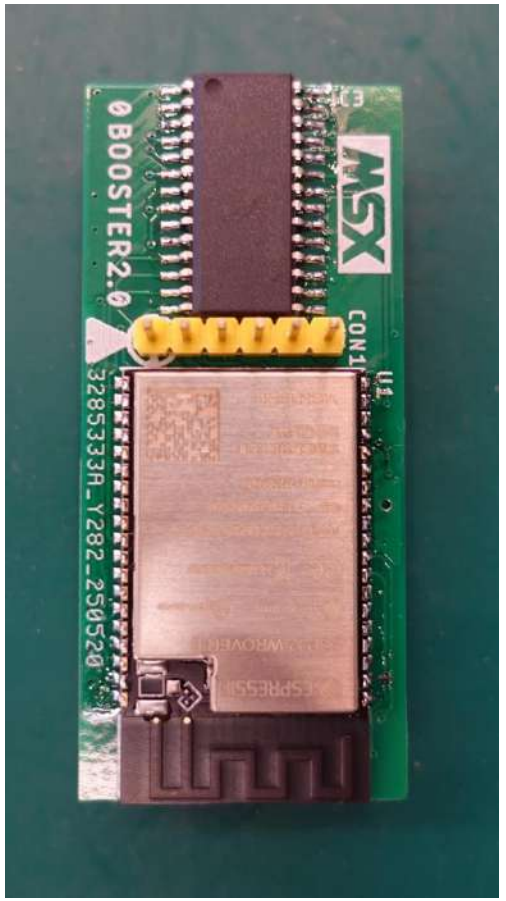
Chikuwa-san


Flight Simulator
with Torpedo Attack
subLOGIC
POWER
RESET
MSX DIY

MSXBooster2＋＋　ESP32

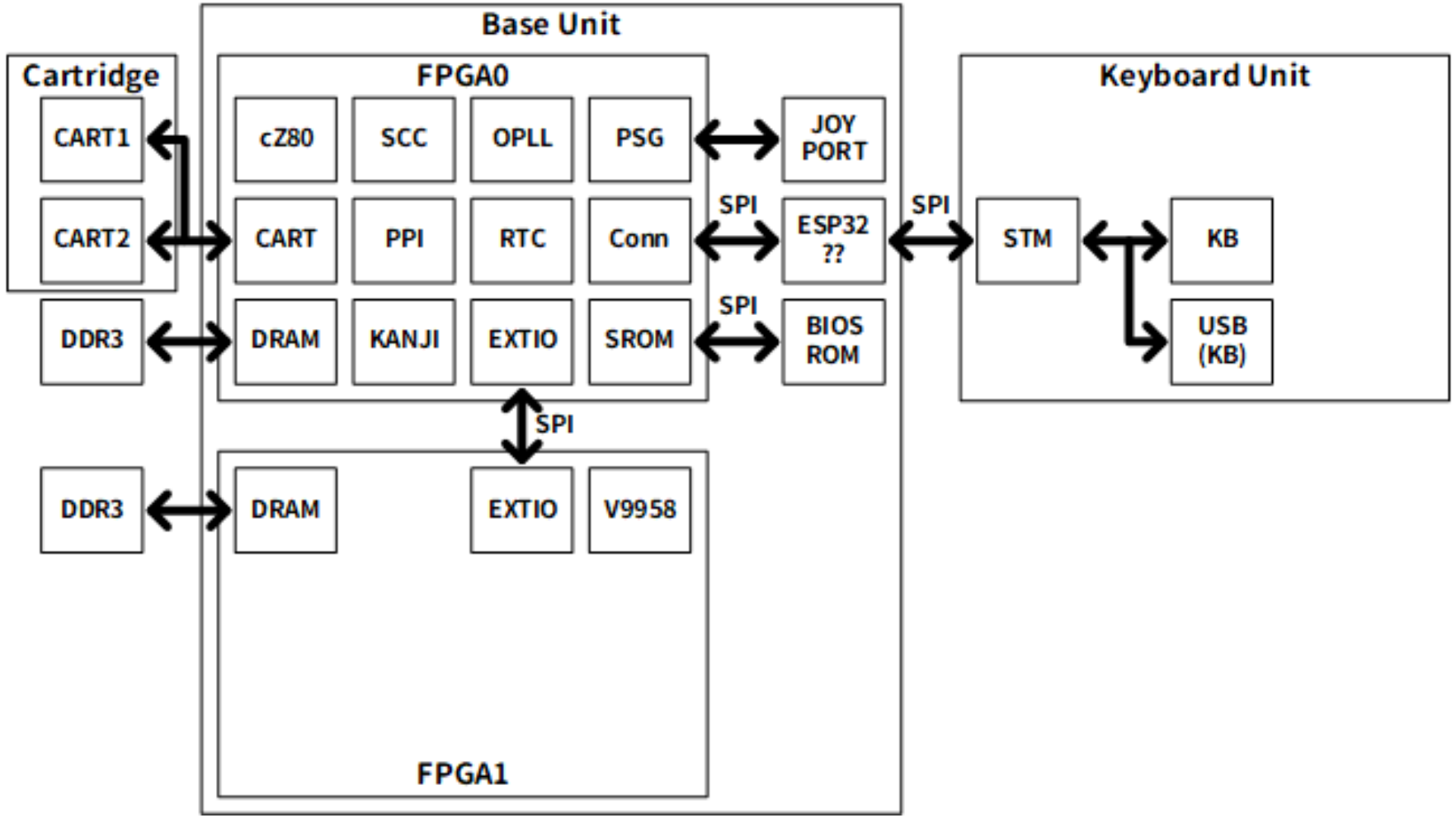




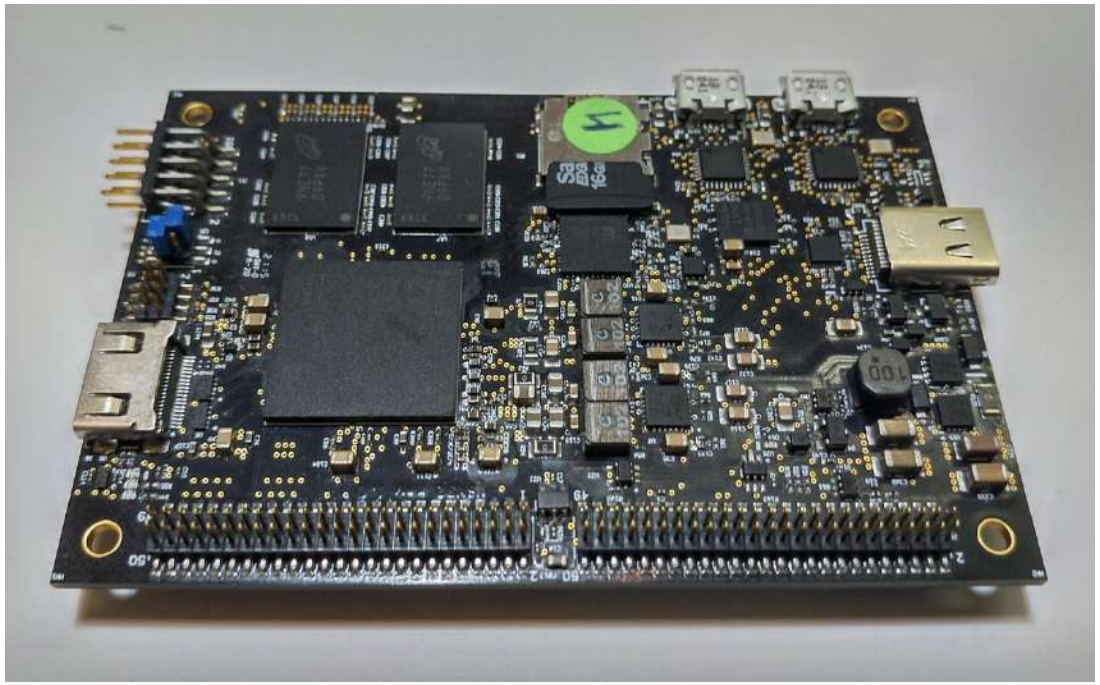


MSXBoosterturboR＋　FPGA ＋ ESP32

Hara-san


Base Unit
Cartridge
CART1
CART2
DDR3
FPGA0
cZ80
SCC
OPLL
PSG
CART
PPI
RTC
Conn
DRAM
KANJI
EXTIO
SROM
JOY PORT
SPI
ESP32 ??
SPI
BIOS ROM
SPI
SPI
DDR3
DRAM
EXTIO
V9958
FPGA1
Keyboard Unit
STM
KB
USB (KB)

MSXBooster 3 Cartridge　FPGA＋ESP32



MSXNxT： MSX3，MSX3++

- Using FPGA
  - 32bit: R1800　　MSX binary-compatible
  - 64bit: RiscV　　TAOX binary-compatible
  - PCIe
- Video: 9988　　Bundled with the body
- Video option: 3588　　8 boards maximum
- Audio: Xsound8970　　Bundled with the body

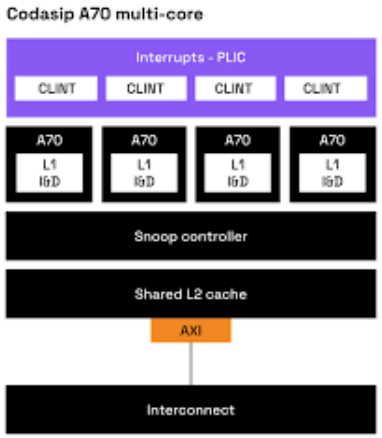
- Official languages are C++, BASIC and Python

MSX3 Development status

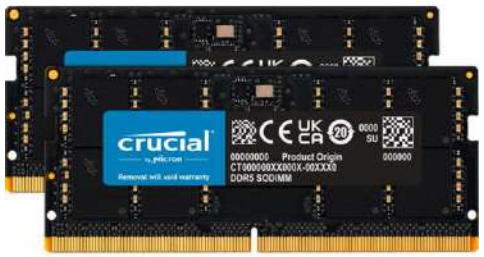
- 1. USB , Joystick　　M5Stack adaptor completed　moving to MP
- 2.　1 ChipMSX3　　Upgradable to MSX3+
- 3. MSX3 on PCIe
- 4. 32bit R1800 by FPGA 64bit CPU by FPGA MACRO: RISCV
- 5. Memory :　DDR5 64GB
- 6. Video: 2Kx2K　　FPGA9978 + Rock3599
- 7. Audio: Xsound Engine 16 channel

New unique image added to MSX compatibility of MSX3

Logo undecided
Borrowed



RISCV many core



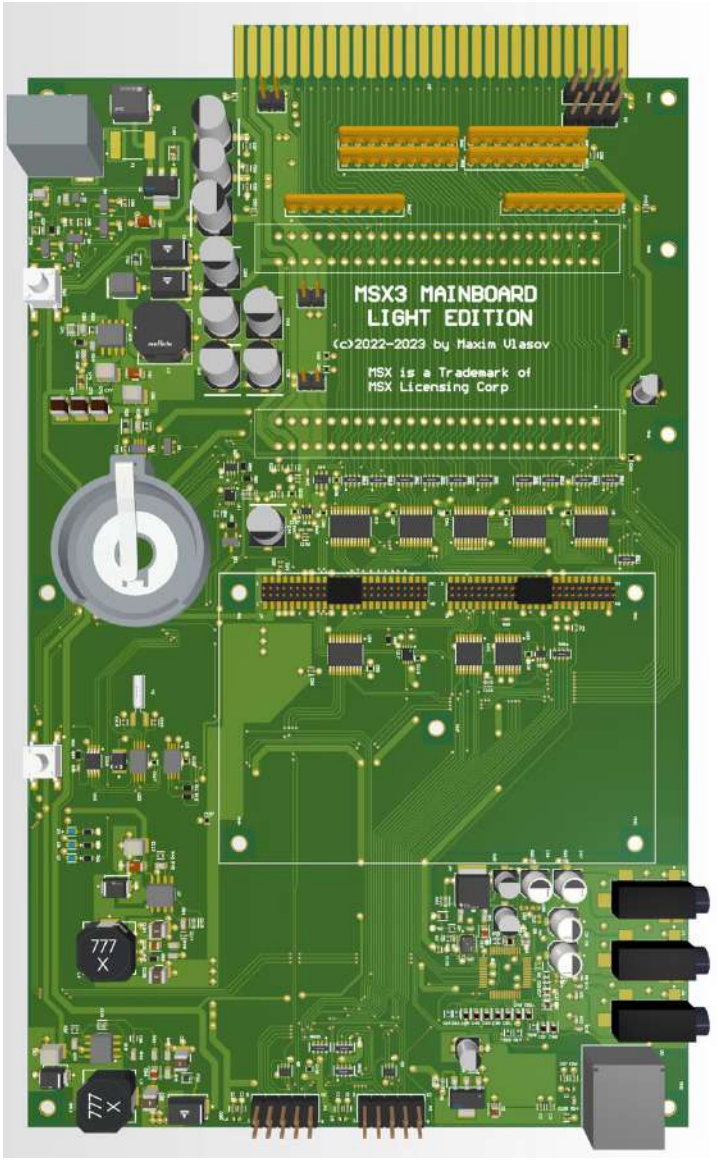
DDR5　6 4 GB

8 K video

1 6 c h Audio

1 ChipMSX3 and its expandability
Case extended with spacers and ring side panels

MSX3　MB


MSX3 MAINBOARD
LIGHT EDITION
(c)2022-2023 by Maxim Vlasov
MSX is a Trademark of
MSX Licensing Corp

MSX Engine3

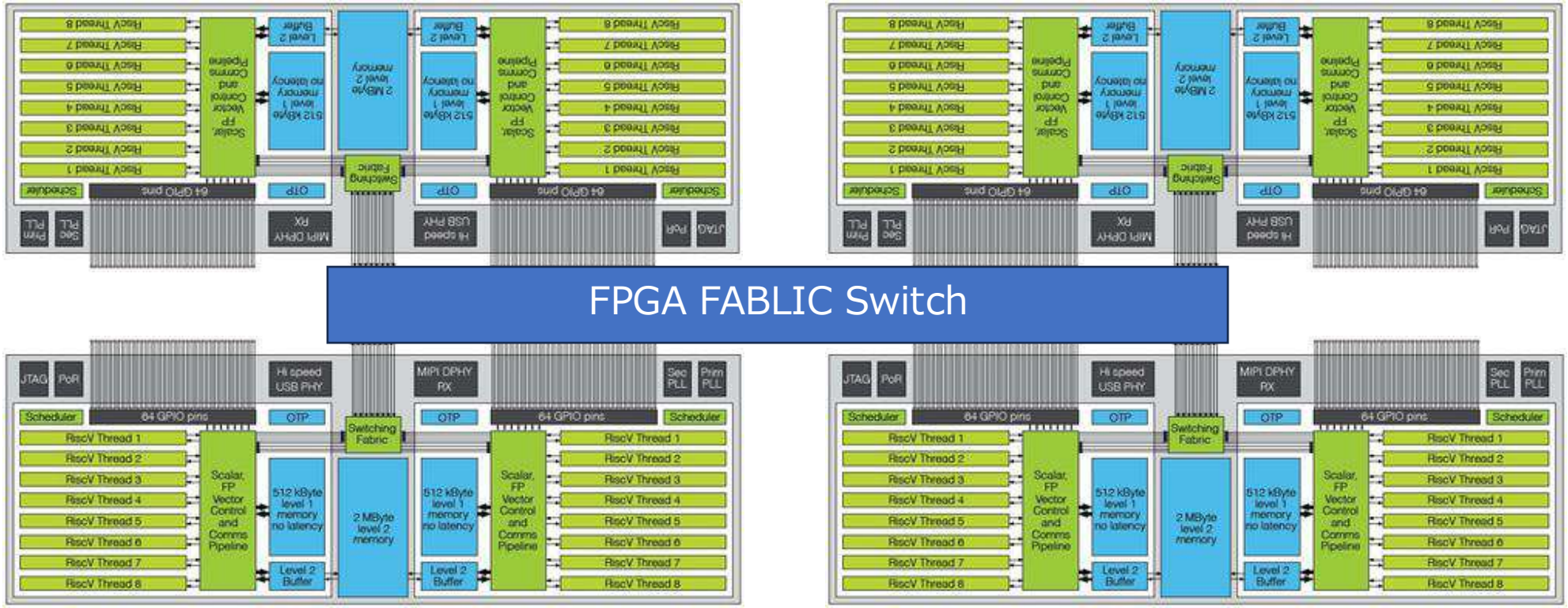
Video and audio enhancements upwards of MB

- Upgrade to 4K or 8K
put MSXM9988 of RK3588 on

- 8 screen maximum

MSX Engine 5
Extend many-core downwards of MB

Many-core CPU can be extended by adding MSXM (16 maximum and 1024 CPU) downwards of MB



MSXxSC make Supercomputers cheaper and easier to use

- MSXxSC
  - MSXHPC
    - RISCV 32bit XMOS32bit 64CPUx16=1024
    - RISCV 64bit XMOS64bit 64CPUx16=1024
    - REZY SC3 512CPU
    - PEZY SC3 4096CPU
    - PEZY SC4 CPU 8000CPU
    - PEZY SC4 CPU 16000CPU
  - MSXAiPC
    - Can be accessed to Many-core CPU or many-core GPU of AMD or Nvidia through PCIe

Open Source for HPC and Ai

- Linux、C++、Python

- Easily run LLM models from various companies
- The key is the GPU memory size.

- CPU　many-core Amd 、many-core Arm
- GPU　Nvidia　CPU 、Amd　GPU

MSX3+ on any computer.

- MSX3 + ESP32、3588、MSXM 4 boards in the front side and back side of XMOS board thorough PCIe

ESP32　3588　MSXEngine3　XSOUND

Based on PCIe many-core motherboard

MSX HPC

- 32bit many-core　64CPU using XMOS
- 64bit many-core　64CPU using XMOS
- 64bit many-core　512 CPU or 4096 CPU using PEZY sc3

MSX AiPC

- Try using AMD , Nvidia GPUs
- Used will be cheaper from now on.
- PCIe goes mainstream

From cheap used GPUs to the best GPUs

Can be added GPU through OcuLink connector

MSX as a retro game player

Game Emulation for MSX

- Emulate other machines
  - static way
  - dynamic way
- If you own the ROMs for personal use, you can get the disk image from each companies ROM using the reader
- Execution file can be generated by modifying using DOS editor or overwriting modified file
- If the ROM owner is an individual and runs it on DOS within his/her personal scope, it may be possible?

MSX game reader connected to a computer via USB

MSX、MSX2、MSX2+、MSX turbo R :
The total number of titles is estimated at 2000.

Game Reader　reading MSXROM

Emulator support status for each MSX

- MSXPLAYer　　Supported in the next edition (downloadable)
- MSX0TAB5　　Emulator of MSX2++ suppot
- FPGA MSX2++　　TI sound chip can be supported
- FPGA MSXturboR+　　same as MSX2++
- MSX3　　New emulator scheme being explored
  More game consoles and PCs to run

General-purpose game reader connected by a general-purpose USBC

Below is the approximate number of games per platform using the major ROM cartridges:

MSX, MSX2, MSX2+, MSX turbo R: 2000 titles in total

Family computer (NES) : Approx. 1,400 titles （JPN 1050, North America 700、EUR)

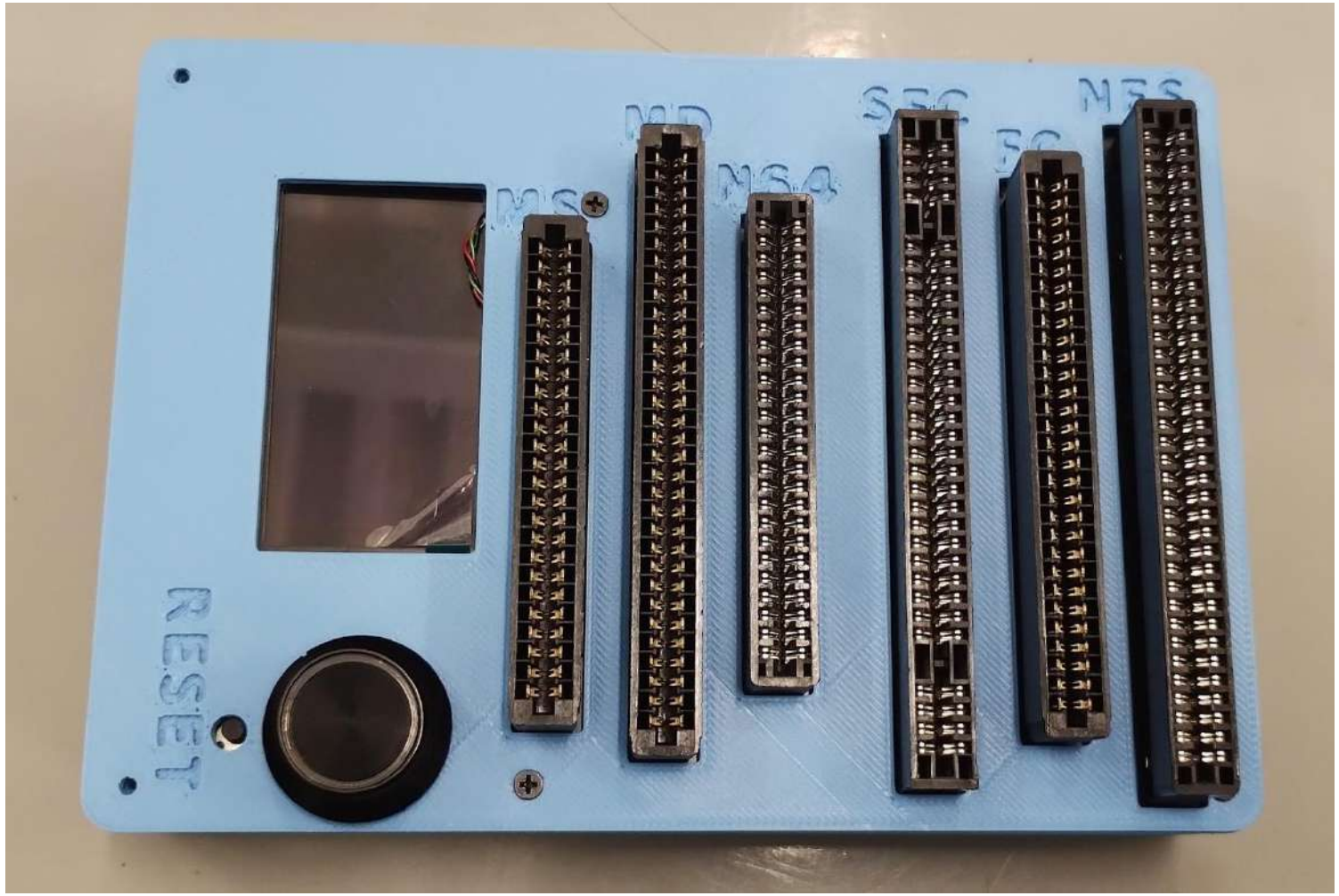
Super Famicon(SNES) : Approx. 1,750 titles（JPN 1,450、NA 720, EUR)

Megadrive（Genesis) : Approx. 900 titles（JPN 450, NA 700, EUR)

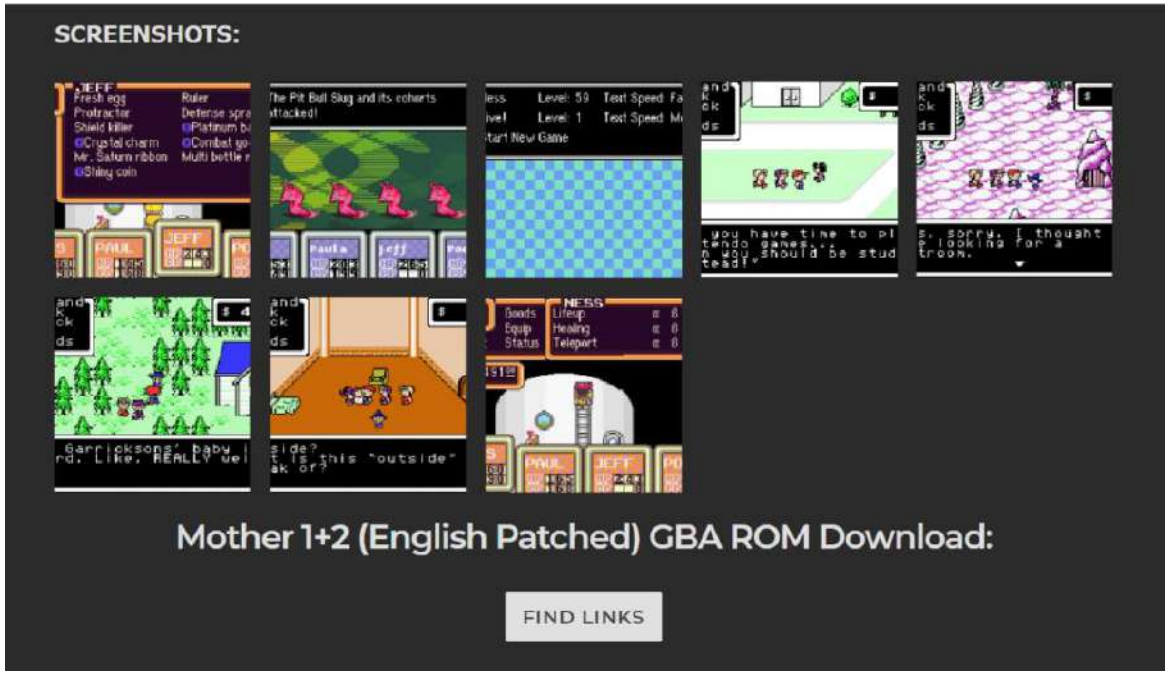
PC Engine（HuCard) : Approx. 400 titles（almost JPN)

Atari 2600 : Approxi. 500 titles (almost NA)

Game Reader 2　M5 Company was commissioned to produce the product



In an age when games can be obtained for free on the Internet.



Maybe someday there will be arrests.

But those who own ROM cartridges are the strongest.

MSX as DTO DeskTop Orchestra

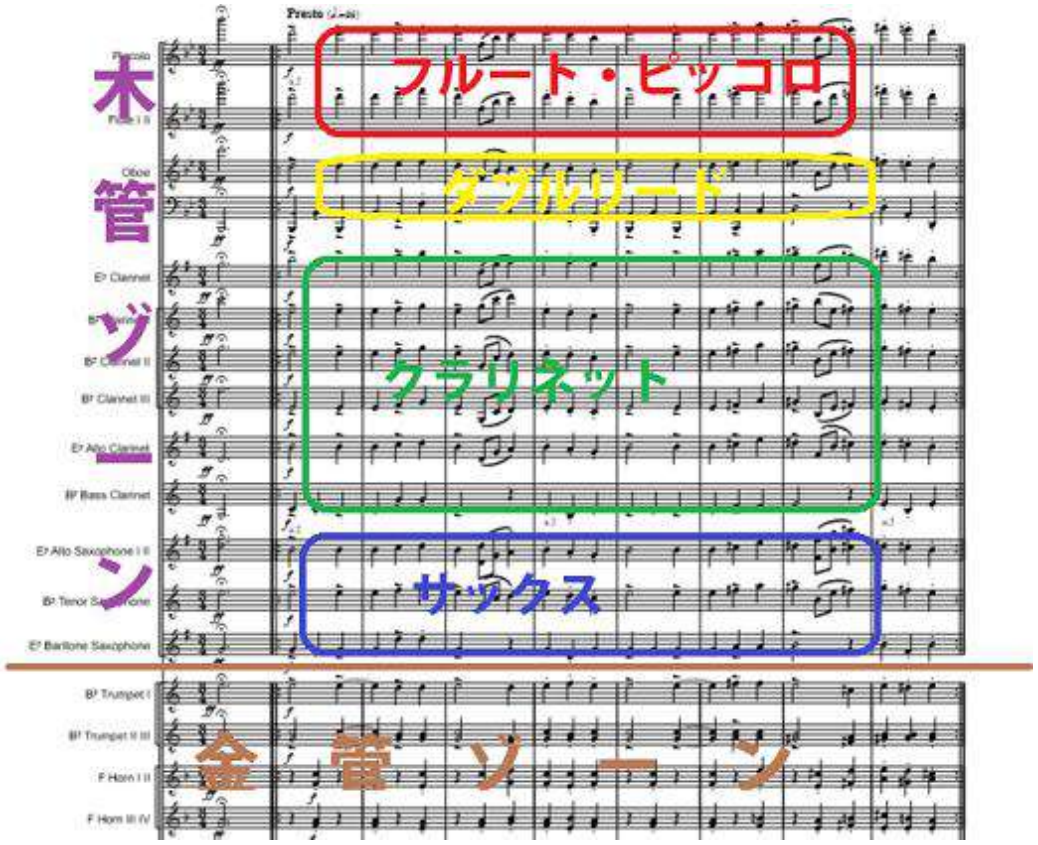
- Reads orchestral scores in PDF format and converts them to music files
- Simultaneous sound 16+16, etc. to ensure orchestral sound source
- Real-time adjustment of parameters to reflect the conductor's intentions and recording

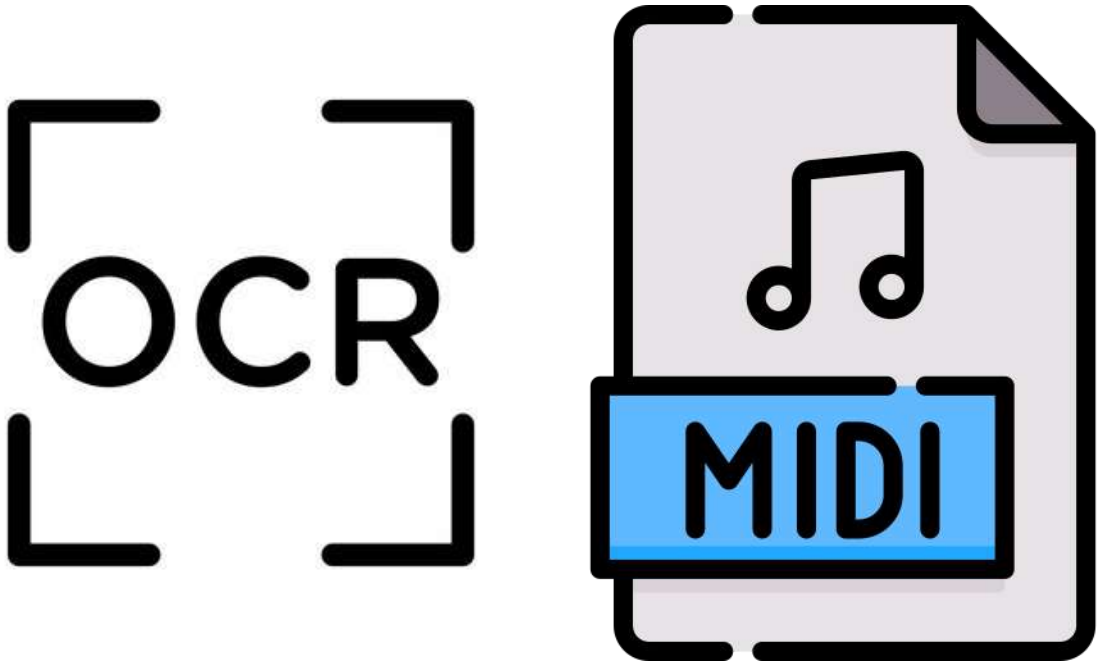
Sound, Music reorganization and MIDI 2.0

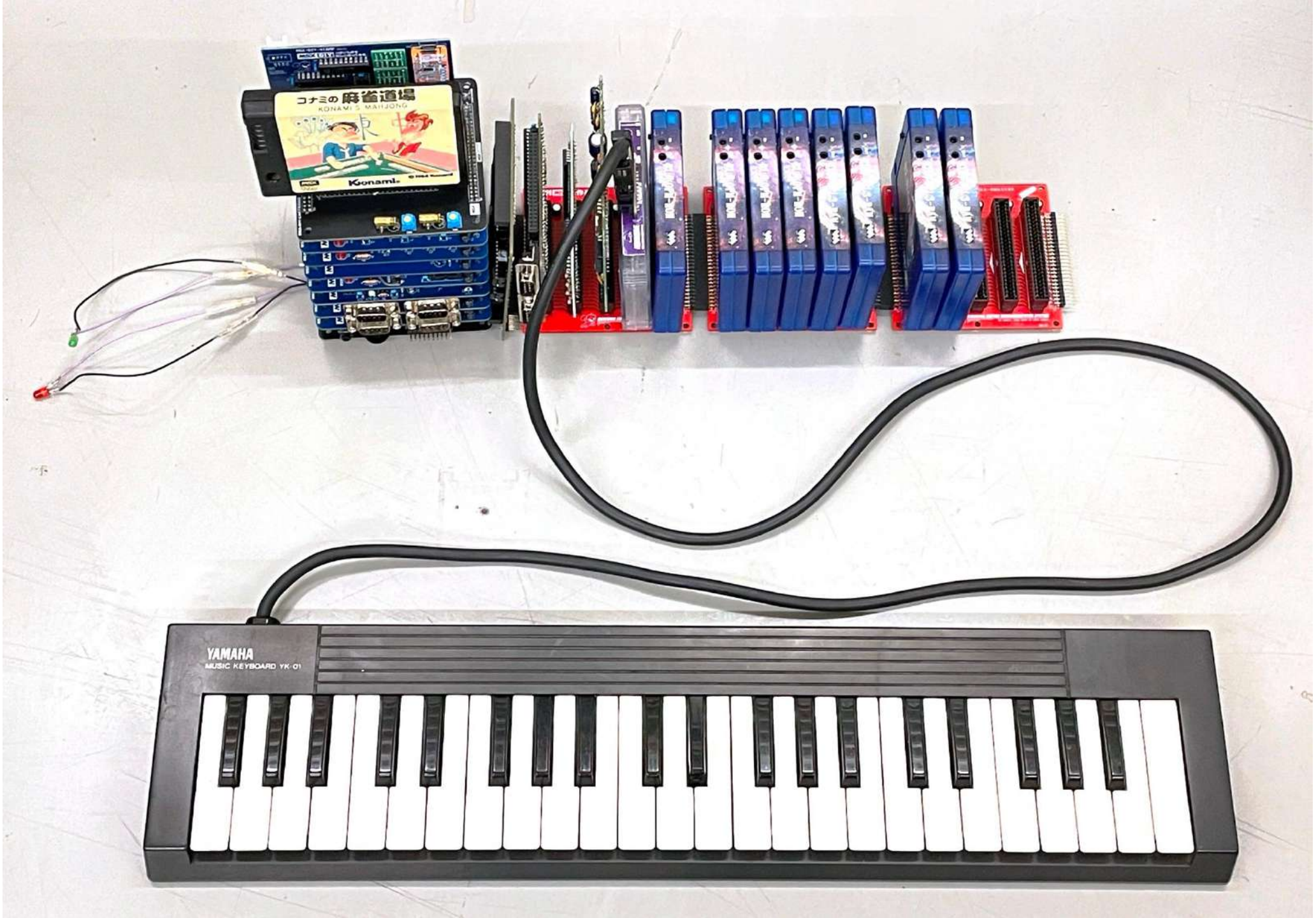
- MSX Sound All for MSX2++ , MSXturboR, FPGA support it
  - PSG,SCC,TI,MSXmusic
- XMOS support Xsound for MSX3 , MSX3+ Emulator support it
  - Can be stacked and used in multiples
- The interface
  - MIDI1.0
  - MIDI2.0

  will be supported

Orchestral score pdf to MIDI file






コナミの麻雀道場
KONAMI'S MAHJONG
Konami
YAMAHA
MUSIC KEYBOARD YK-01

Multiple keyboards and multiple sound sources supported

Illegal function call expansion slot
With audio output

MSX as MANGAnimation

There are 200-350 million comic book contents.
MSX with flip through animation

- Split frames from PDF to JPEG still image in PowerPoint format
- PML speech synthesis from OCR of callouts
- Later, MSXaudio's PCM audio will be used for recording.

You too can be a voice actor.

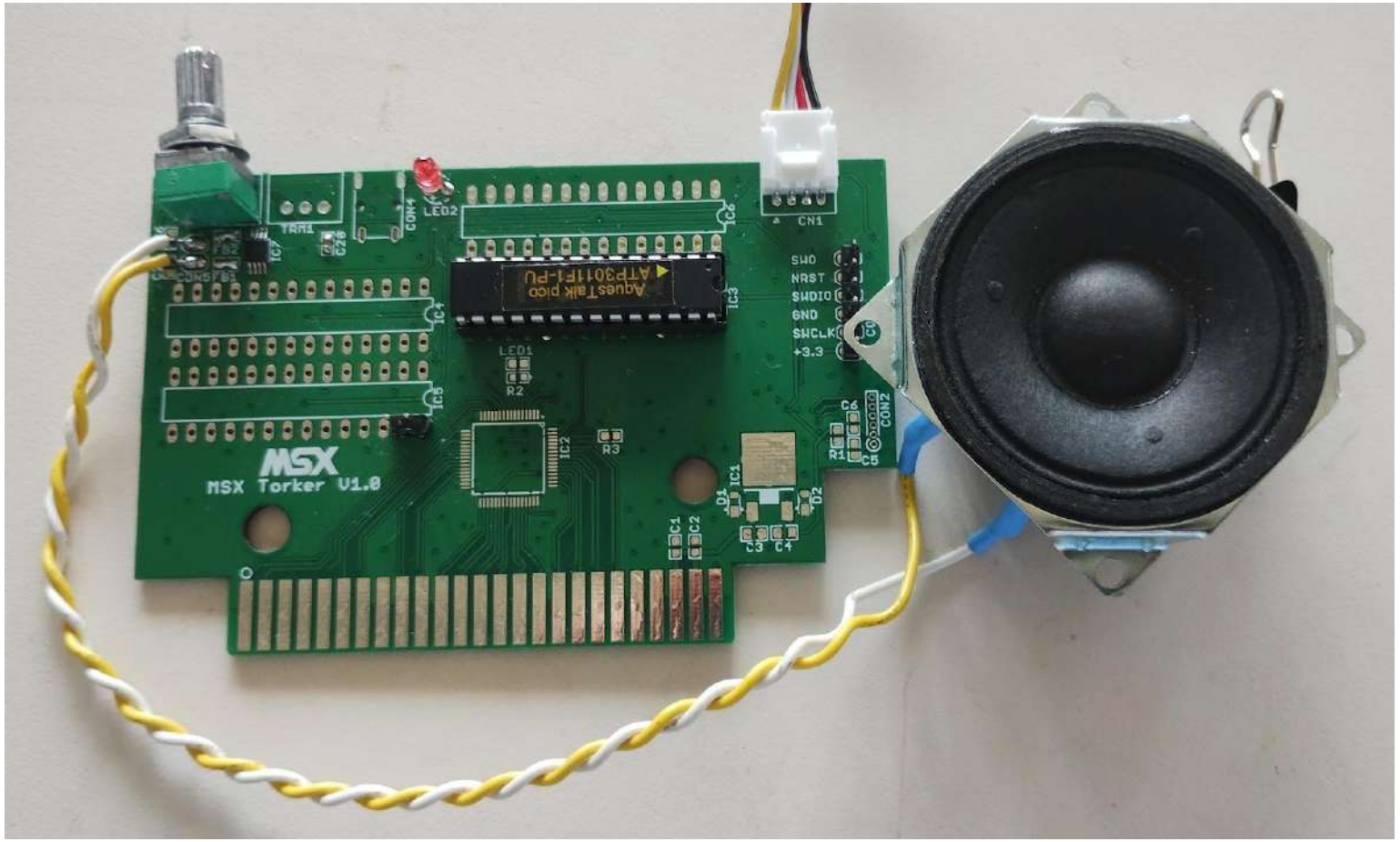
Import PDFs of cartoons into PowerPoint

- Cutting one page at a time into a picture-story show

- OCR serifs to FML and add to ppt file
- MSX Talker is available to read out loud.

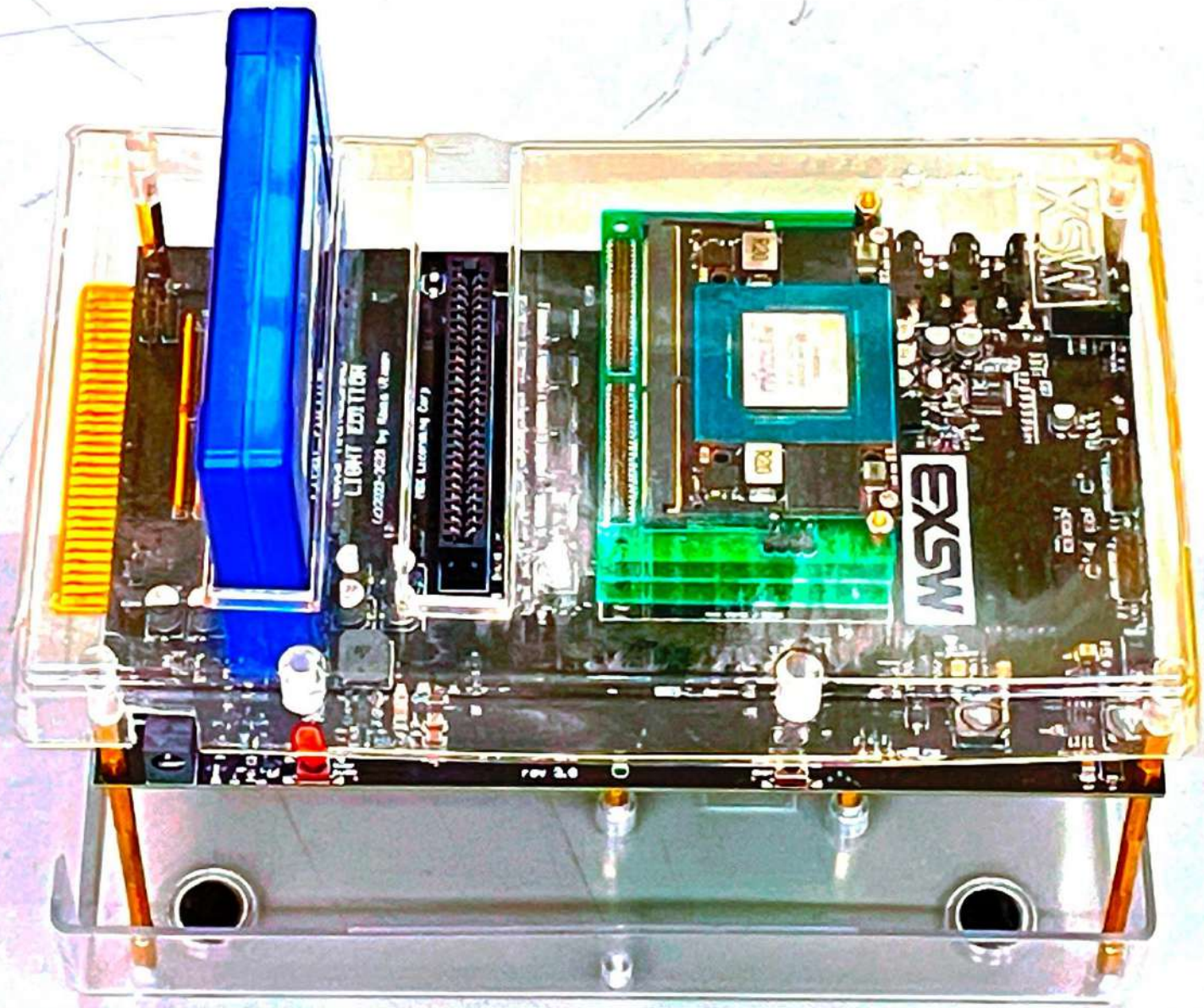
Phonetic Macro Language

Pronunciation LSI support in BASIC



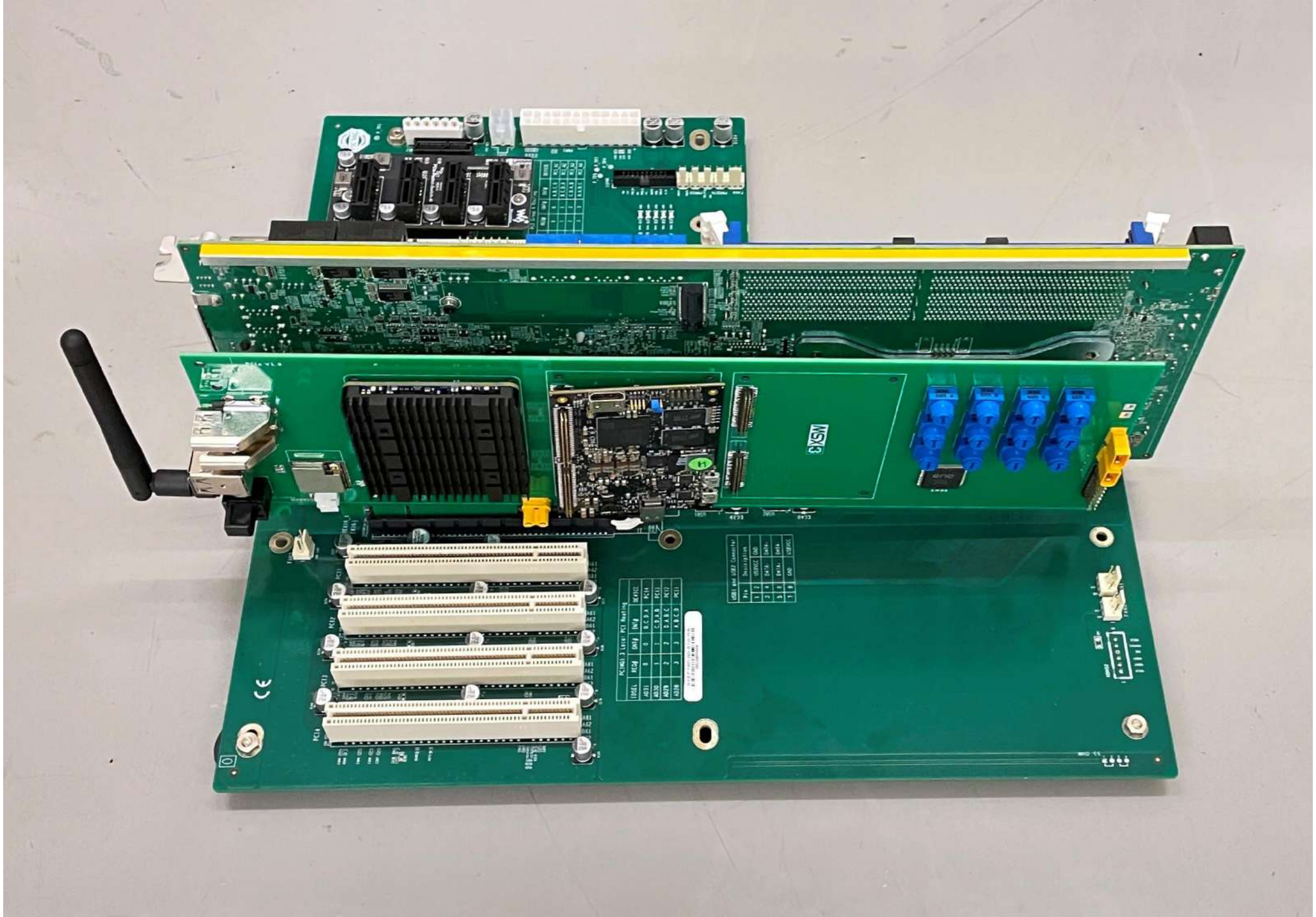
FML can now be after recorded.

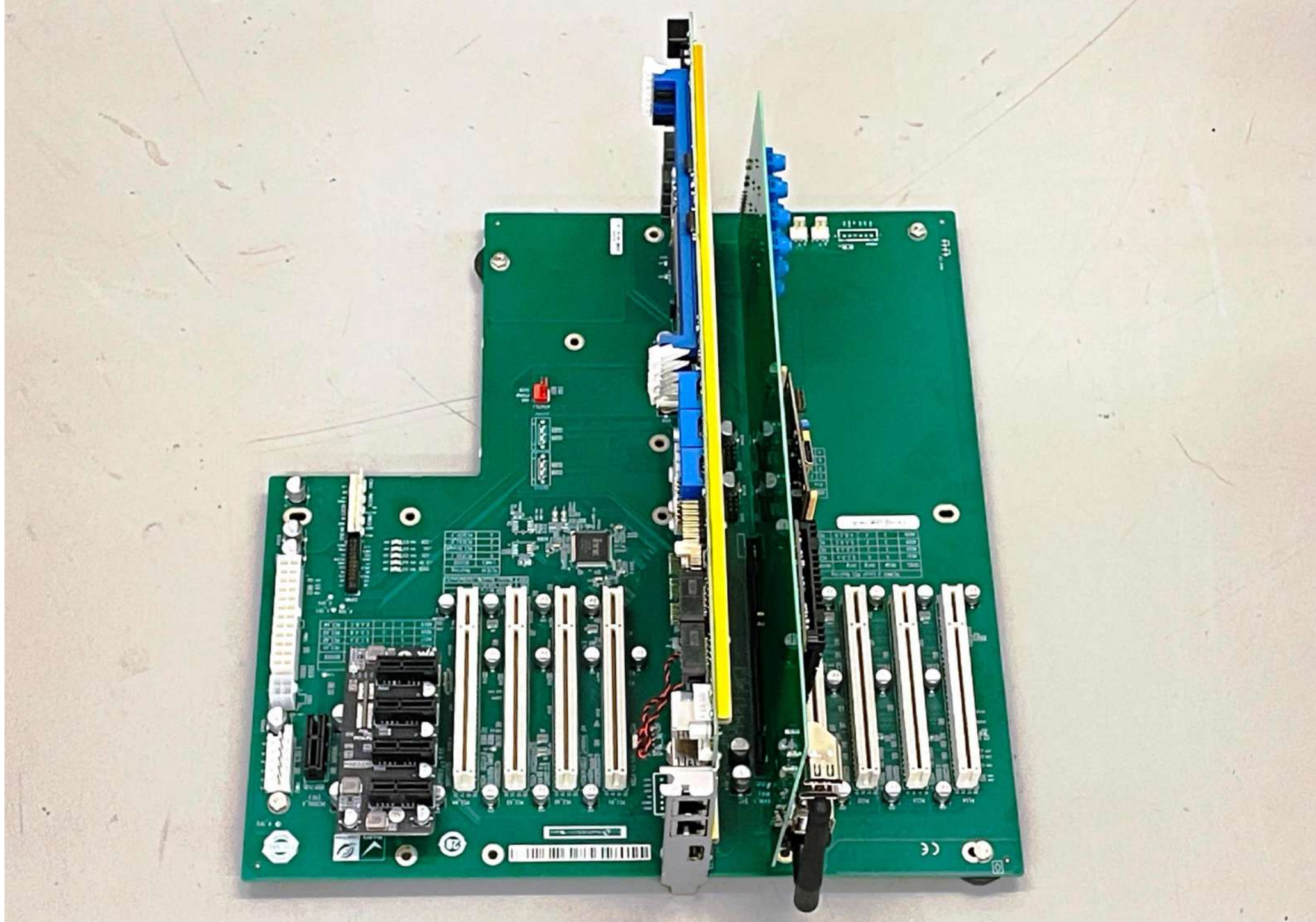
Ai as a Program Translator


LIGHT EDITION
MSX

From cheap used GPUs to the best GPUs

GPUs can be added via the OcuLink connector.





Previous crowdfunding　MSXIoT

- MSX0FACE2
- MSX0Card
- MSX0TAB5
- MSX0Watch

- Official Emulator for Windows
- Official Emulator for Android

MSX0StackFACE2　great success

MSX　remote desktop update
HyperApps-MSX everywhere

- IP address , Group ID

- Anything
  - BASIC Programs
  - Games

MSX0Card　crowdfunding reorganization

MSX0Atom　Crowdfunding reorganization

MSX0Watch

- 10 mm thin
- with a 48h battery life

How to make it’s the key.

Photo stand type display

Next crowdfunding Around the World

- Previous crowdfunding's Retry MSX0Card with Mini
- MSX0TAB5 with cartridge reader
- MSX Laptop
- MSXDIY Stationary MSX

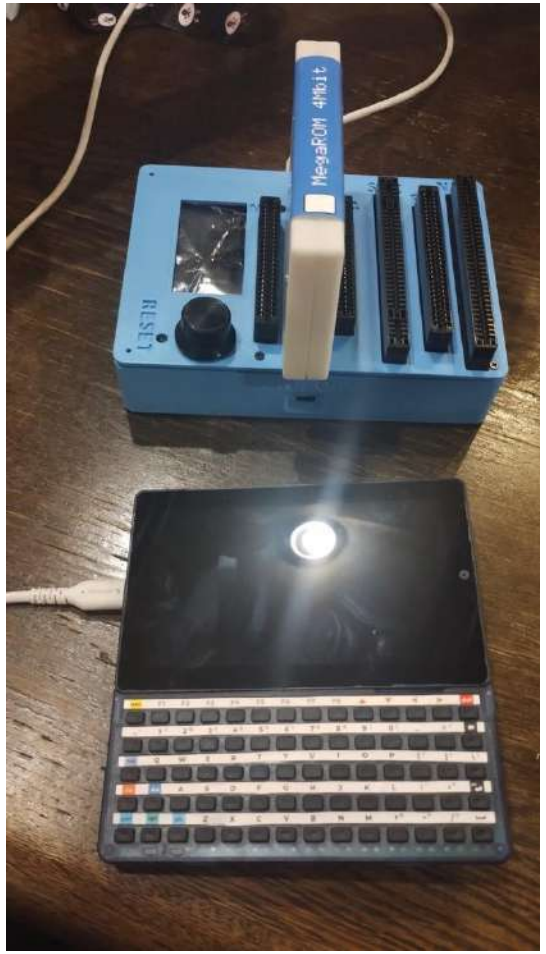

High-performance System
Dual-core 400MHz
AI
AI Instruction Extension
FPU
DSP
768KB SRAM
64MB PSRAM (Optional)
Low-power System
Low-power 40MHz
Dedicated Low-power Peripherals
LP SPI, LP UART, LP I2C, LP I2S, Touch Sensor
Independent in Deep-sleep
32KB LP SRAM
16KB LP ROM
55 Programmable GPIOs
USB 2.0 OTG @480Mbps
Ethernet MAC @100Mbps
SDIO 3.0
I3C
.....
ESP32-P4
Security
DEV Community
+ Wi-Fi 6
+ Thread/Zigbee
Full HD 1080P
MIPI-CSI & MIPI-DSI
Multi Camera
MIPI-CSI + DVP
Integrated ISP
H.264
1080P @30fps
HMI
PPA
2D DMA
MIPI-DSI
RGB
I8080
JPEG Decoding

MSX0Card Crowdfunding partitioning


FDD
SONY
FDD
Panasonic
SEGA MARK III / MASTER SYSTEM
Super Famicom
MSX
CARD
MIC
STAMP S3
USB
tab Q W E R T Y U I O P
fn Aa A S D F G H J K L
ctrl opt alt Z X C V B N M

MSX0Tab5 and Game Reader Next crowdfunding

MSX 0 TAB5 and Cartridge reader



- From Cartridge reader to MSX-DOS
  - decided : .MSX
  - decided : .SCX .SGX .GGX
  - decided : .CVX .CAX
  - TBD : .FCX .SFX .GBX
  - TBD : .ATX .A2X .CDX .SSX
- Combined with TAB5 or M5Stack

MSX0Tab5　P4　SoC is exellent

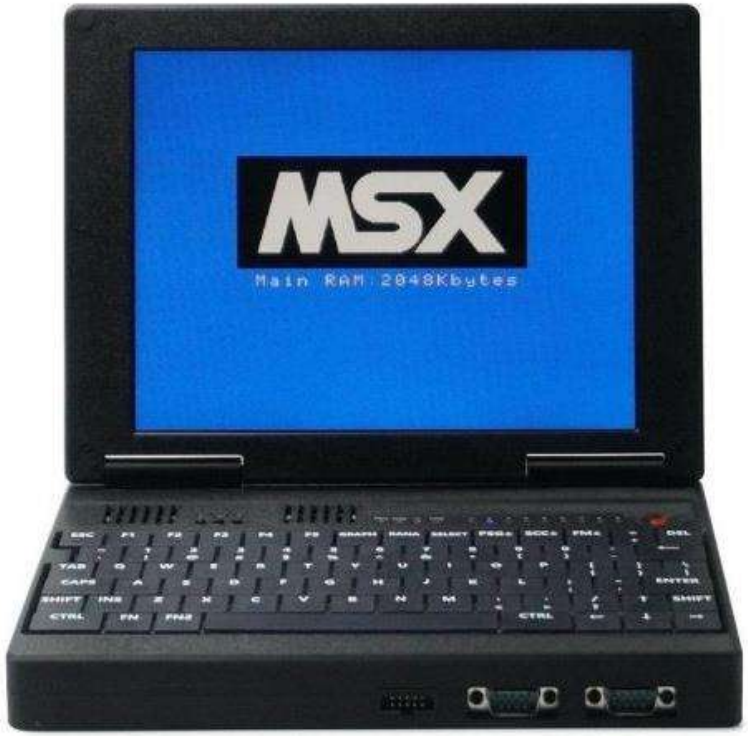
1 chip MSX FPGA platform

MSX Laptop using FPGA（planning ）

- Positioned as 1Chip MSX2++.
- Expandable to 4 slots with Kinnoji-san’s adapter DTO
- LCD HDMI
- FPGA V9968 or FPGA V9978
- FPGA MSX Sound All A8960
- ESP32 P4 is required for Wi-Fi, R80 is also included.

I would like to work on MSX Laptop as well

- I'd like to try it in FPGA.
- OEM MSXBOOK?
- In the new spec ?
- In a new case ?
- Built-in LTE Requires technical qualification
- Built-in WiFi, technical compliance OK



- Enable upgrade to MSX3


MSX
VRAM:128Kbytes
ESC F1 F2 F3 F4 F5 GRAPH KANA SELECT PSG± SCC± FM± DEL
TAB Q W E R T Y U I O P
CAPS A S D F G H J K L ENTER
SHIFT INS Z X C V B N M SHIFT
CTRL FN FN2 CTRL

MSX Cube made by Mr. Chikuwa

ちくわさん

- for home-building
  MSX platform


Konami
©1984 Konami
MSX-DIY-PACK2-P
MSX DIY
SLOT SELECT
STATUS
DATA BUS
MODE
WRITE
RESET
ESC
TAB
CTRL
SHIFT
CAPS
かな
HOME
STOP
GRAPH
SEL
INS
DEL
BS
RETURN
SHIFT


MSX-DIY-STAMP
MSX DIY
コナミの麻雀道場
KONAMI'S MAHJONG
Konami
©1984 Konami
MSX
ESC
TAB
CTRL
SHIFT
CAPS
かな
HOME
STOP
GRAPH
SEL
INS
DEL
RETURN
BS

Hara-san's FPGA project

- FPGA9968　MSX2＋＋
- FPGA9978　MSXturboR+

In which country

- Japan, Korea
- Spain, Netherlands, France, Italy
- Brazil

- Ukraine, Russia
- Middle East

After the war.

- China
- U.S.A., U.K., Germany

Enhanced various emulators

Japan

- Trial and test new concepts
- MSX2++ , MSXturboR+ first.
- Promote upgrade by Booster
- Next is MSX3

Europe

- In Spain, Netherlands, France, Italy
  start selling new products on Amazon in each country

- The next two are England and Germany.

What to do with America

- Running a Commodore emulator
- Probably from MSX3

Companies / organizations that have been involved or are involved

- Microsoft MSX as a Japan-U.S. joint project
- ASCII Attempts as a fabless semiconductor company

- MSX Association group of enthusiast
- Faculty of Engineering, The University of Tokyo
  IoT media laboratory
  Contact with Education and Academic Societies

- incorporated nonprofit organization
  IoT media laboratory
  University-industry collaboration with the private sector
- MSX Licensing Corp Free , not fully open

Development collaborators Including staff

- IoT
- IoT
- CPU
- CPU
- VDP
- VDP
- SOUND
- SOUND
- SYSTEM
- Prototype
- Industrial Design
- LLM
- LLM

Business Possibilities

- Sell Games — Be aware of copyrights
- Sell cartridges — PCB + components + software + case
- sell books — easiest
- Sell Content — Manga ppt file　DTOmidi file
- Sell PCB — PCB + components + software
- Sell MSX computers — All system software, old and new, can be licensed

With the MSX coming back to life,

New meaning to the past

New challenges in the present

New Hope for the Future