



FujiNet RAPID 13

Regular Announcements in Performance, Innovations, and Development

FujiNet Forever

RAPID #13.2 2024

<http://atariorbit.org/rapid>

Wrap-up

This year marked a transformative year for FujiNet, evolving from an experimental device into an essential tool for modern 8-bit computing enthusiasts. The ecosystem expanded dramatically with new platform support, significant feature enhancements, and two major releases that resolved critical issues. The project's success stems from its dedicated community whose countless hours of contribution have created something extraordinary. While this wrap-up issue can only scratch the surface of the year's achievements and recognize a fraction of our contributors, their impact will be felt by FujiNet users for years to come as they explore the bridge between classic computing and modern technology.

The core team strengthened its bonds through in-person meetings at retro computing shows throughout the year. These gatherings proved invaluable, fostering both personal connections and accelerated development through collaborative hacking sessions. As our community grew with new friendships and supporters, we're energized for what promises to be another groundbreaking year in 2025.

Platforms

Atari 2600: Development efforts led by Jeff Piepmeier, Al Nafuur, and Gennaro Tortone brought FujiNet support to the Atari 2600, enabling features like loading games from PlusStore and even playing multiplayer games via the FujiNet Game Service.

Apple II: Significant progress was made on the Apple II platform, including writable Disk II image support, a faster and more stable CONFIG application, and the introduction of the A2Pico board, which serves as both a softSP card and a versatile storage and peripheral interface.

CoCo: Official support for the CoCo was added in Firmware 1.4, and subsequent developments included a bus version using the ESP32-S3 microcontroller and RP2040, eliminating the need for a serial dongle.

C64: Efforts focused on stabilizing the IEC firmware and bringing FN-Lib support to the platform, culminating in a working CONFIG application and the porting of FN-Tools and multiplayer games.

Mac 68k: Success on the Macintosh platform included prototype boards that could boot DCD HD20 and MOOF floppy images, the initial development of a CONFIG application as a Desk Accessory, and successful experiments with sending commands over the floppy port.

BBC Micro: Initial steps were taken to bring FujiNet support to the BBC Micro, with plans for a parallel bus implementation.

Hardware

The FujiNet project wouldn't be possible without the ingenuity and dedication of individuals passionate about creating hardware that enhances these experiences. Here's a look at some of the prominent hardware contributors and builders:

Chris Tersteeg's expertise in hardware design proved crucial to the CoCo initiative. His comprehensive work encompassed designing, prototyping, building, and testing both the initial serial boards and subsequent bus versions—laying the essential foundation for the entire CoCo project. Chris also designed the prototype Mac68 board. **Oliver Schmidt** developed the innovative A2Pico board, a versatile tool for Apple II systems. The A2Pico can act as a SoftSP for FujiNet, enabling networking and other FujiNet features for Apple II systems pre-SmartPort. **Ben Krein** was key in MacFuji's development, transforming Chris T's PCB design into reality by building the first five prototype boards. These boards achieved a crucial milestone by successfully booting both HD20 images and MOOF floppy images, paving the way for FujiNet integration with classic Macintosh systems.

BUGS

The infamous **HTTP memory leak** plagued the FujiNet firmware for some time, impacting stability across all platforms. In May, Thomas Cherryhomes, aided by Eric Carr and others, finally tracked down and resolved this issue. They used FN-Pic and Valgrind to pinpoint the source of the leak and implement the necessary fix. This fix resulted in a much more stable experience for all users interacting with HTTP client apps on the retro systems.

Slow boot times were another issue that affected FujiNet's usability. Mozzwald spearheaded an effort to address this problem by switching the underlying filesystem of the ESP32 flash from SPIFFS to LittleFS. This small change dramatically reduced the time it took for FujiNet to become operational after power-on, dropping from 855ms to a mere 160ms. This optimization led to significant improvements in the boot process for the Apple II, ADAM, and Atari systems.

The C64 IEC implementation, while functional, was hindered by a persistent bug causing dropped characters, limiting its practical use. Jaime Idolpx, in collaboration with Mark Fisher, FozzTexx, and other external IEC experts tackled this issue, enhancing the stability of the IEC firmware for the C64 platform.

Firmware

Firmware 1.4

- Official support was added for the Tandy Color Computer.
- Improvements and fixes were made to the CONFIG application for the Apple II, including IJKM key navigation.
- Enhanced boot support for alternate disks was implemented for the ADAM computer.

Firmware 1.3

This release introduced a significant number of enhancements and bug fixes across multiple platforms. Here's a breakdown of the key improvements.

General Enhancements:

- TCP Support in TNFS: This improvement benefited the CONFIG application for users with network congestions and drops. UPD was still available for all users.
- Mounting from SMB and FTP Hosts in CONFIG: Users could now mount disk images from SMB and FTP servers directly within the CONFIG application.
- WebUI Enhancements: The WebUI was updated with options to select an alternate CONFIG disk and to reset FujiNet.

- CONFIG Bug Fixes: Various bug fixes were implemented to improve the stability and functionality of the CONFIG

Atari-Specific Enhancements:

- Faster Boot Times for 400/800 Models: Optimizations were made to speed up boot times on Atari 400 and 800 models.

- PC-Link Support: Support was added for PC-Link, enabling Atari to access SD card on FN as a mounted disk.

Apple II-Specific Enhancements:

- Support for 40-Track DSK Images in Disk2 Mode: This enhancement expanded compatibility with older Apple II disk images.
- Faster Boot Times: Boot times were improved, including a significant reduction for the Apple IIc, allowing for auto-booting.

- FujiNet Lib Integration in CONFIG: The FujiNet library (FN-Lib) was incorporated into the CONFIG application for the Apple II leading to faster UI.

Applications

• **Five Card Stud (5cs):** This multiplayer poker game received client updates for various platforms. An Atari client was released early in the development cycle, followed by Apple II and Commodore 64 clients.

• **Fujitzee:** Based on the popular dice game Yahtzee, Fujitzee was initially released with an Atari client and server with support for the FujiNet Game Server's Lobby Server. Later, clients for Apple II and Commodore 64 were developed, along with a beta version for the COCO platform.

• **Bouncy World:** This demo showcased a multiplayer environment where "bouncy" characters interacted across the screens of connected clients. It was initially released with an Atari client, followed by releases for Apple II and Commodore 64 clients.

• **Weather App:** Originally developed for the Atari by Bocianu, this application provided weather information using FujiNet's networking capabilities. It was updated with enhanced weather APIs and later ported to the Apple II by ShunKita, who also added support for a free weather API and features like location saving and 14-day forecasts.

• **ISS Tracker:** Apple II version of the classic app was updated to support lowercase input and the FujiNet Library (FN-Lib) was incorporated for speed.

• **Tootiki Web Browser:** This web browser was updated (Oliver Schmidt) to offload TCP/IP code to FujiNet using FN-Lib, significantly improving its performance on both Atari and Apple II platforms. It was further enhanced to support relative links, making web browsing more seamless.

• **Cater VT100 Terminal:** Oliver Schmidt ported a VT100-capable terminal application called Cater, initially for the Commodore 64. He enhanced it to work with the Apple II's 80-column display and to utilize FN-Lib for full FujiNet integration.

• **FN-Tools:** These command-line tools provided support for various FujiNet functions from BASIC on supported platforms. They were initially released for the Atari and later ported to the Apple II and Commodore 64 by Thomas Cherryhomes.

• **Yet Another Image Loader (YAIL):** This Atari application received updates from Brad Colbert, including a new back-end server and client capabilities for streaming video from a webcam attached to the server.

Core System Software

NOS: This Network Operating System for Atari, developed by Michael Sternberg, received updates including new commands (NCOPY/COPY, DUMP, and FILL), reduced memory usage, a binary SAVE command, and the replacement of the NOBASIC command.

CONFIG: The primary configuration application for FujiNet, CONFIG, received various updates and enhancements. Major improvements included TCP support, the ability to mount from SMB and FTP hosts, options to select an alternate CONFIG disk and reset FujiNet from the WebUI, and integration with FN-Lib for improved stability and speed on the Apple II. Platform-specific updates included IJKM key navigation for the Apple II, improved status bit handling and faster boot times for Atari 400/800 models, and support for the upcoming gaming lobby feature on the ADAM and COCO platforms.

CONFIG-NG: Developed by Mark Fisher as an alternative CONFIG application for Atari, CONFIG-NG was written in assembly language and boasted a unique user interface, high speed, and color UI customization options. It received updates for bug fixes, stabilization, support for APP-KEYS, and a version 1.0 release.

IC: Jaime Idolpx

CBM/IEC Platform: The firmware spearheaded the effort to build then stabilize the firmware on the Commodore 64, tackling a persistent issue of dropped characters that hindered the platform's usability. He collaborated closely with FozzTexx, leveraging FozzTexx's extensive knowledge of the IEC protocol to resolve this problem and enhance the overall stability of the FN on C64. This work laid the groundwork for further C64 development, including FN-Lib support.

LittleFS on ESP32: Jaime was a strong advocate for switching the ESP32 filesystem to LittleFS, recognizing its potential for performance gains. His work proved instrumental in the eventual adoption of LittleFS, leading to the significant boot time reductions using this filesystem.

WebDav support: Jaime ported a WebDav stack for the ESP32, making it possible to access FujiNet SD card via WebDav. This advancement allowed for seamless file transfer and interaction with the FujiNet using standard WebDav tools, enhancing the user experience and opening up new possibilities for remote management and file sharing.

Collaboration on C64 Support: Jaime collaborated extensively with Mark Fisher in bringing FujiNet functionality to the Commodore 64. Jaime's work on the C64 platform, along with Mark's development of FN-Lib support and his first C64 CONFIG, was instrumental in expanding FujiNet's reach to this popular system.

Jaime's deep understanding of hardware and protocols, coupled with his collaborative spirit, has been invaluable to the FujiNet project. His work on the Commodore platform, along with his advocacy for technical improvements and his collaborative efforts with other developers, highlights his dedication to advancing the capabilities of FujiNet and enhancing the experience for users across platforms.

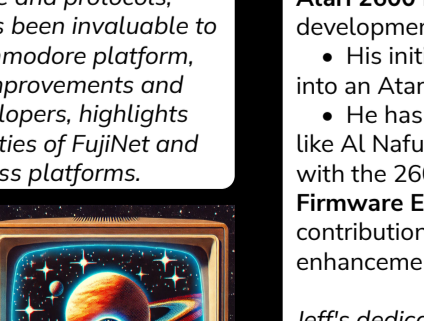
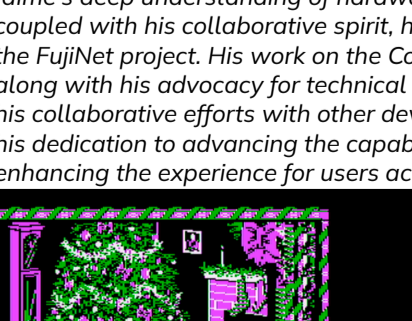
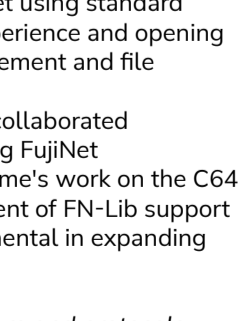
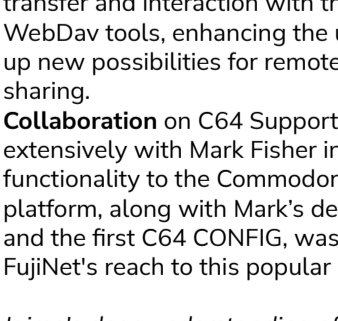
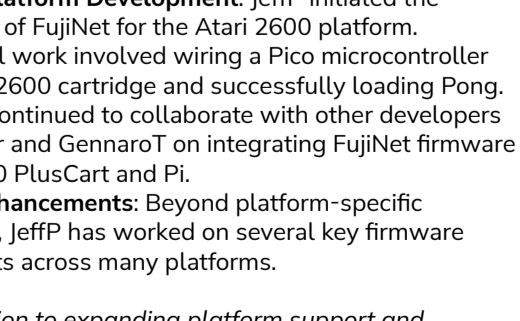


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VCFMW Table: Jeff - Jaime - Eric - Thom - Boisy - Bill - Moz - Andy

People

The FujiNet team had a remarkable year in 2024, significantly expanding the platform's capabilities and reach across a diverse range of systems.

Thom Cherryhomes, the founder of the FujiNet project, continuously pushed the boundaries of what's possible with retro-technology. His work on TNFS, Drivewire protocol integration, and the CoCo bus version was instrumental in bringing a seamless networking experience to a wider range of retrocomputers. **Mark Fisher**, the architect behind the powerful FN-Lib (FujiNet Library), played a pivotal role in enabling cross-platform development, empowering applications like the Contiki Browser, Cater, and CONFIG-NG. His relentless efforts expanded FN-Lib to support the Commodore 64 and the Apple IIGS, further solidifying the library's importance in the FujiNet ecosystem. **Jeff Piepmeier**, a driving force behind multi-platform support, spearheaded the effort to bring FujiNet to the Atari 2600, collaborating with **Al Nafuur** to bring this classic gaming console into the FujiNet fold. Jeff also led the development for Macintosh, with prototype boards successfully booting DCD HD20 and MOOF floppy images and work from **Marciot** showing off IWM integration. **FozzTexx**, with a deep understanding of Apple II hardware, achieved a monumental breakthrough by implementing writable Disk II image support, which was widely celebrated within the community. **Eric Carr**, a prolific game developer, delighted users across multiple platforms with his creations, including *Five Card Stud* and *Fujitzee*, showcasing the power of the FujiNet Game Service for multiplayer, multiplatform gaming. **Oliver Schmidt**, a key contributor to the Apple II platform, not only created the versatile A2Pico board but also spearheaded enhancements to the Contiki browser and the Cater terminal, demonstrating his dedication to expanding the capabilities of FujiNet through his ever-present knowledge sharing and insightful comments.

These are just a few of the many individuals who made significant contributions to the FujiNet project in 2024. Their collective passion, ingenuity, and collaborative spirit resulted in a year of extraordinary advancements for FujiNet.

IC: Moz

Moz made significant contributions to the FujiNet project, particularly in optimizing the firmware for speed and stability.

Firmware Cold Boot Speed Improvements: Moz significantly reduced the FujiNet's boot time by switching the underlying filesystem of the ESP32 flash from SPIFFS to LittleFS. This optimization resulted in a dramatic decrease in the time it takes for FujiNet to become ready after power-on, going from 855ms to 160ms. This improvement benefited all platforms.

Apple II Auto-Boot Enhancement: As a result of the faster boot times, Moz's optimizations allowed Apple II systems to auto-boot without the need for PR#5.

Nightly Firmware Builds: Moz set up and deployed GitHub automation to build and share nightly builds of the firmware for major platforms, including ADAM, Apple, Atari, and C64.

Web Flasher Updates: Moz released a new web-based firmware flasher that supports custom zip flashing and the new LittleFS firmware builds. This tool simplified the process of updating FujiNet firmware, making it more accessible to a wider range of users using just a browser.

Masteries Firmware Builds: Moz extended the nightly firmware build process to include builds specifically for the Masteries series of Apple II FujiNets. These devices, popular in Europe, have variations that require a custom firmware.

Back-End Systems Support - Moz has written, deployed and maintains numerous back-end support systems that many FujiNet clients rely on including: news scraping server, search server, election results server, Wikipedia server, and Game Lobby server. Moz also maintains fujinet.online web site—the central web home for FujiNet.

Moz's contributions were essential in enhancing the performance, stability, and accessibility of FujiNet for a wide range of platforms. His work reflects a dedication to refining the user experience and ensuring that FujiNet remains a useful tool for the community.

IC: Mark Fisher

FN-Lib (FujiNet Library) Development: Mark Fisher is the mastermind behind FN-Lib, the powerful cross-platform library that simplifies FujiNet application development. This library, initially conceived for Atari and Apple II, has expanded to support a growing list of platforms. Mark's dedication to FN-Lib ensures that developers can focus on creating innovative applications without getting bogged down in low-level networking complexities.

App Scaffold: To guide developers in creating well-structured and efficient FujiNet applications, Mark released an application scaffold project. This scaffold serves as a template for developers ensuring that FujiNet applications adhere to best practices.

Bouncy World: Mark's creativity and technical prowess shine in his creation of Bouncy World, a captivating multi-platform demonstration showcasing the power of FujiNet's networking capabilities. This demo, initially developed for Atari and later expanded to Apple II and C64, features a server written in Kotlin and clients for each platform. The demo highlights the potential for real-time, multi-player gaming experiences on retrocomputers, with synchronized gameplay across multiple connected clients.

CONFIG-NG Development: For Atari users, Mark developed CONFIG-NG, a high-performance, alternative configuration application for FujiNet written in assembly language. This application offers a distinctive user interface, boasts impressive speed, and provides customization options not found in other CONFIG applications.

C64 Platform Enablement: Mark played a pivotal role in expanding FujiNet support to the Commodore 64. He ported FN-Lib to the C64 platform, creating the first C64 CONFIG application. He also ported the f-tools, a set of command-line tools for managing FujiNet, to the C64.

Apple II Virtualization with AppleWin: Working closely with Oliver Schmidt for tips, Mark achieved a remarkable feat: FujiNet emulation for the Apple II using the AppleWin emulator. He leveraged the SLIP protocol, originally used for modem communication, to create a virtual serial IP interface between FujiNet-PC (a virtual FujiNet for modern operating systems) and AppleWin. This innovation enabled Apple II development using full emulation on just a laptop.

Key Contributions: Mark has made numerous other contributions, including adding support for the ORCA compiler on an Apple IIGS target (along with Eric LeBras), fleshing out time and date support in FN-Lib, resolving the "DISK_0" hack by implementing FujiNet as a real device, supporting APPKEY abstraction in FN-Lib 4.x, and various other bug fixes and enhancements—too numerous to highlight here.

IC: Thomas Cherryhomes

Visionary Leadership: As the founder of FujiNet, Thomas Cherryhomes has consistently demonstrated a deep understanding of the retrocomputing landscape and a passion for bridging the gap between classic computers and modern technology. His vision and guidance have been instrumental in shaping the direction of the project and fostering a thriving community of developers, enthusiasts, and users.

TNFS Enhancements: TCH spearheaded the incorporation of TNFS protocol into FujiNet. This protocol is the backbone of FujiNet's networking capabilities and disk access for all the platforms. TNFS allows retrocomputers to seamlessly access files and resources over a network.

Drivewire Protocol Integration: TCH played a key role in incorporating the Drivewire protocol into the FujiNet firmware. Drivewire provides FujiNet a convenient way to access and manage disk images from remote systems, similar to TNFS.

CoCo Platform Development: TCH has been a leading force in bringing FujiNet to the Tandy Color Computer (CoCo), working on both the firmware and hardware aspects of the project. He ported the FujiNet firmware to the CoCo platform and collaborated with other developers to create a bus version that eliminates the need for a serial dongle. His efforts have made FujiNet a powerful and accessible tool for CoCo enthusiasts.

FSK Encoder for CoCo: TCH developed an FSK encoder for the CoCo, allowing FujiNet to generate audio on the fly and simulate cassette input. This innovation enabled the CoCo to bootstrap from a FujiNet, further streamlining the user experience.

FN-Tools for Apple II: TCH ported the FN-tools, a set of command-line tools for managing FujiNet, to the Apple II platform, making it easier for Apple II users to interact with their FujiNet devices from BASIC.

Addressing the HTTP Leak: Thom along with support from other developers, utilized the Valgrind programming tool to identify and eliminate the persistent and debilitating memory leaks in the FujiNet firmware, improving its stability on all platforms.

Community Building and Collaboration: Thomas has been instrumental in fostering a vibrant and collaborative community around FujiNet. He actively engages with developers and users, providing guidance, support, and encouragement. His dedication to community building is evident in his involvement in events like the VCF Festivals, where he showcased FujiNet's capabilities in multiple locations and led workshops on FujiNet programming.

IC: Eric Carr

Fujitzee Development: Eric created Fujitzee, a multiplayer game inspired by the popular dice game Yahtzee. He initially released the server and an Atari client, followed by Apple II and CoCo versions, making it a truly cross-platform experience. He continuously refined Fujitzee, adding features like round indicators, improved board layout, sound for the CoCo version, and a smoother exit to the text screen.

Five Card Stud (5CS): Eric developed the back-end server and all clients for Five Card Stud, another multiplayer game running on the FujiNet Game Server. He built the Apple II and Atari client and was instrumental in bringing the Commodore 64 client close to release. His work on these clients played a key role in establishing FujiNet as a premier platform for cross-platform multiplayer gaming.

Lobby Integration for ADAM CONFIG: Eric updated the ADAM's CONFIG application to support the new game lobby system, making it easier for ADAM users to connect and play multiplayer games.

Eric's work has been instrumental in expanding the FujiNet gaming ecosystem and showcasing the potential for engaging multiplayer experiences on vintage platforms. His dedication to cross-platform compatibility and game development has greatly enriched the FujiNet project.

IC: Jeff Piepmeier

Macintosh Platform Development: JeffP spearheaded the effort to bring FujiNet support to the Macintosh platform. This involved:

- Developing and refining firmware for the Macintosh.
- Collaborating with Chris Tersteeg on the design and layout of the prototype FujiMac board.
- Enabling the Macintosh firmware to boot from DSK images.

CoCo Platform Development: JeffP has been deeply involved in advancing the CoCo platform:

- Porting the FujiNet firmware to the ESP32-S3 microcontroller for the CoCo.
- Working towards a cart-based CoCo FujiNet solution using the RP2040 microcontroller, eliminating the need for a serial dongle.

Atari 2600 Platform Development: JeffP initiated the development of FujiNet for the Atari 2600 platform.

- His initial work involved wiring a Pico microcontroller into an Atari 2600 cartridge and successfully loading Pong.
- He has continued to collaborate with other developers like Al Nafuur and Gennaro T on integrating FujiNet firmware with the 2600 PlusCart and Pi.

Firmware Enhancements: Beyond platform-specific contributions, JeffP has worked on several key firmware enhancements across many platforms.

Jeff's dedication to expanding platform support and improving core firmware functionality has been essential in making FujiNet accessible to a wider range of enthusiasts. His work has helped unlock the potential of FujiNet across a diverse set of classic computer systems.