GZ

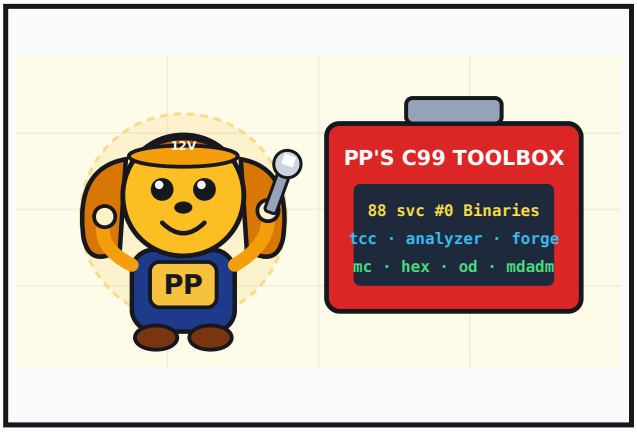
AXISOS™ STORY UNIVERSE & PREVENTIVE MAINTENANCE MONTHLY

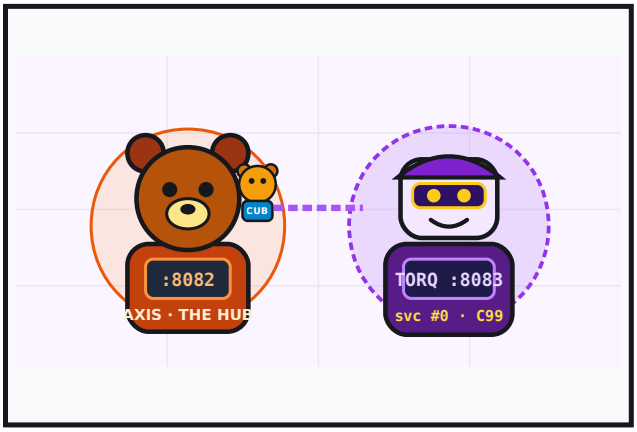
CRUSAN & CO. · VOLUME ONE · ISSUE #01 · SECOND EDITION

24-PAGE FIELD EDITION
8.5" × 11" MANUAL
100% AIR-GAP

ISSUE #01: THE CLOSET COMPANION (THE CLOSET AWAKENS)

A 12-Volt Battery, a Clipboard Solar Panel & a System Built to Maintain — Not Dominate





Starring Pocket Professor (PP), Agent Zero (:8081), Agent Lite (:8080), Axis-Agent / Griz (:8082) & Cub, Axel "The Torq" (:8083) & Julie™ (:8084)

INCLUDES FULL 10-SECTION SOVEREIGN COMMAND-LINE & BENCH DESKPAD REFERENCE! CLIP & SAVE

Every story page in this issue includes a live **Sovereign Deskpad Technical Reference Strip** at the bottom — covering POSIX File Inspection, Proactive 90% / +3% Deny su Security, 12-Volt Solar & 1200 mA USB Bus Laws, Bare-Metal DDR4 RAM-Boot, C99 Air-Gap Forge, RAID-5 Hot-Swap, Single-Port NFSv4 (:2049), and a **2-Page Pull-Out Deskpad Centerfold** on Pages 13–14!

HONEST · AUDITABLE · OWNED · ZERO CLOUD BLOAT · [T:● Z:● L:● A:● X:●] · HTTPS://AXISOS.PRO

Dedication: *To my father — you may be gone, but you will never be forgotten.*

About the Author: I've spent the last several years building my own operating system from scratch called AxisOS. It started as a personal challenge — just me trying to understand computers at a deeper level. Somewhere along the way, it turned into a full, freestanding, diskless micro-kernel that runs on Raspberry Pi devices and other small hardware. It's simple, deterministic, and designed so regular people can actually use and understand it without needing expensive machines. My hope is that you find this useful and can experience the same journey.



0. PP — POCKET PROFESSOR

The original 12-volt closet companion with a glowing steel toolbox of 88 freestanding C99 binaries. If he doesn't know the answer, he never guesses — he finds the deterministic tool that does!



1. AGENT LITE (:8080) — THE WHEEL

Agile vanguard router & perimeter scout walking the UDP `:50000 [COOKIE-HB]` mesh across battery-backed H0–H8 and E10 extenders.



2. AGENT ZERO (:8081) — THE SPOKES

Calm, mathematical DDR4 RAMDisk detective ("who still smokes" campfire coffee) shadowing elder brother Axel (`:8083`) with 100% SHA-256 ground truth.



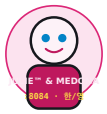
3. AXIS / GRIZ (:8082) & LITTLE CUB

Grounded supervisor guarding the CMR RAID-5 shelves (`/dev/md0 [UUU]`) and `chattr +i` Chariot Vault while Cub runs pocket micro-node telemetry.



4. AXEL "THE TORQ" (:8083) — DRIVE SHAFT

Elder silicon brother, Chief Systems Architect & C99 Forge-Wright (`torq` CLI) with `svc #0` gear tattoos, a jar of cookies, and 100% Air-Gap Sovereign Silicon.



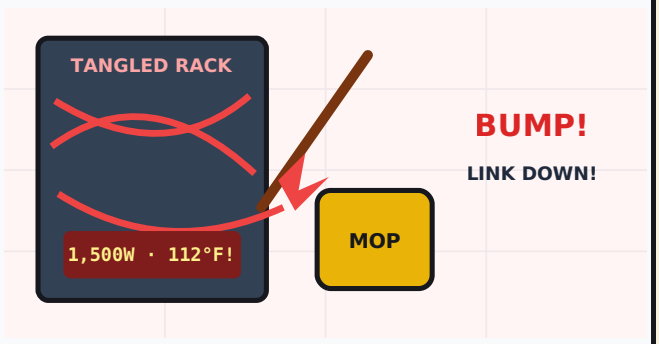
5. JULIE™ & MEDONA (:8084)

Compassionate medical schedule watch (`09:00 / 15:00 / 21:00`) and bilingual Korean/American (한/영) voice bridge for Nan's Pi Zero + Pico station.

NO BUILDER LEFT BEHIND — PRICING & OWNERSHIP PLEDGE CRUSAN & CO.

Every physical book and comic in the AxisOS™ Library is priced at **about $2 over the publisher's minimum price requirement** so students, veterans, families, and independent builders everywhere can own the complete blueprint without financial barriers.

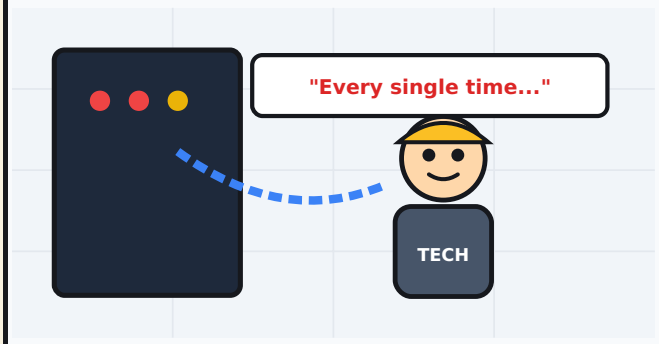
PANEL 1: "THE OLD WORLD WAS FRAGILE."



NARRATION A cramped janitor's closet in a municipal building in Tillamook, Oregon. Server racks stacked like hot bricks. Patch panels drooping. Cat-5/6 cables tangled like vines.

SOUND FX CLUNK! A yellow mop bucket bumps a loose patch cord — dropping the building's link!

PANEL 2: KNEELING ON CONCRETE



TECH "Every time. Every single time."

NARRATION 1,500 watts of screaming cooling fans, brittle cloud dependencies, and recurring monthly fees — defeated by a single mop handle.

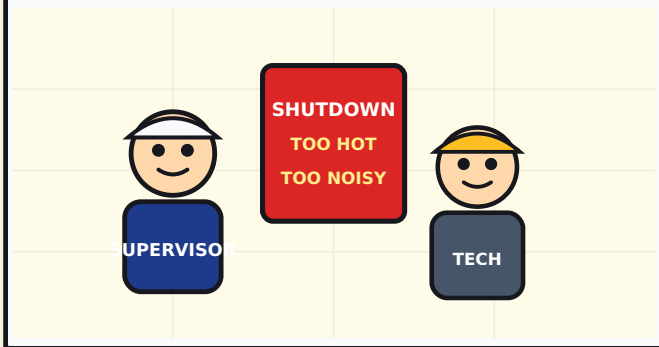
DESKPAD REF #1 // FILES, NAVIGATION & STANDARD CLI INSPECTION (POSIX / C99)

VIEWER PROVING GROUND

`ls -la / ls -alt`	List all files w/ permissions, owners & newest first
`cd / pwd`	Change directory / print working directory
`cp -af`	Copy preserving mode, links & timestamps
`mv`	Atomic rename or move across filesystems
`mkdir -p / rm -rf`	Create directory tree / recursive remove (verify twice!)
`cat / more / less`	Stream or page through text & log files
`od -tx1 / od -to1`	Standard CLI hex (-tx1) & octal (-to1) byte dump
`hex / tree`	Freestanding hex/ASCII dump & directory tree map

```
Proving Ground: od -tx1 -tc | more · hex · ls -lh /bin
```

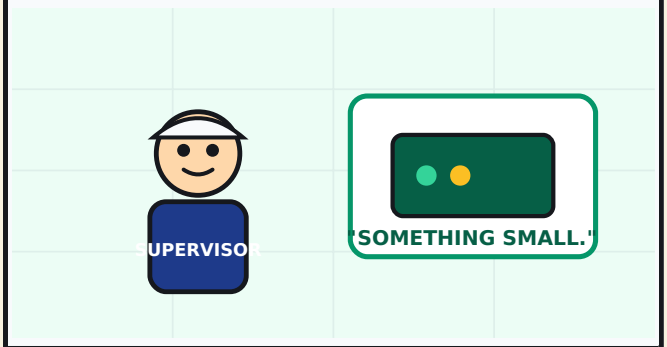
PANEL 1: TOO MUCH HEAT & DOWNTIME



SUPERVISOR "We're shutting this whole mess down. Too much power. Too much heat. Too much downtime."

TECH "Wait — if we pull the plug on the rack, what replaces it?"

PANEL 2: "SOMETHING SMALL."



SUPERVISOR "Something small. Something we actually own."

NARRATION No corporate cloud lease. No black-box daemons phoning home. Just pure POSIX ground truth.

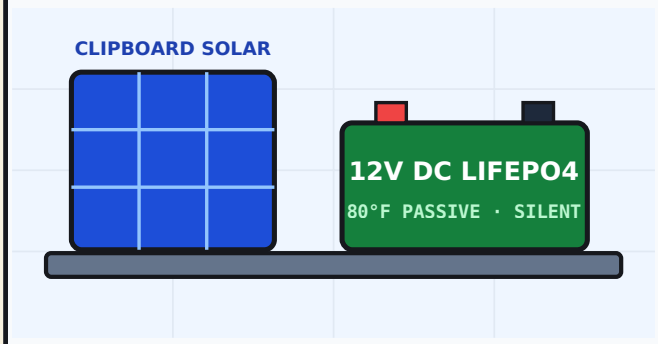
DESKPAD REF #2 // PROCESSES, SIGNALS & MONOLITHIC KERNEL STATE

KERNEL TELEMETRY

`ps / top`	Snapshot process table / live CPU & DDR4 RAM telemetry
`kill -15`	Send graceful SIGTERM shutdown signal to process
`kill -9`	Immediate SIGKILL kernel process termination
`dmesg | tail -n 30`	Read monolithic kernel ring buffer & USB hotplug events
`uname -a`	Display kernel build, AArch64/x86_64 arch & node hostname
`chvt <1..6>`	Switch active virtual console terminal (VT1–VT6)
`id / groups / whoami`	Verify active UID, GID, and wheel group membership
`sync && halt / reboot`	Flush filesystem buffers cleanly & power down or reboot

`Kernel ICMP & Spoof Lock: echo 1 > /proc/sys/net/ipv4/icmp_echo_ignore_broadcasts · echo 1 > rp_filter`

PANEL 1: SUNLIGHT ON A STEEL SHELF



NARRATION A compact 12-volt LiFePO4 battery is placed on the steel shelf. Beside it: a [illegible] the size of a clipboard mounted in the closet window.

TELEMETRY Passive-cooled companion node steady at 80 °F — 0 dB fan noise, 0 grid megawatts.

PANEL 2: STEP 2 PURE DDR4 RAM-BOOT



KERNEL axisos-native-kernel.img (81 KB) + axisos-initramfs.img load 100% into DDR4 RAM.

CAPTION "Powered by sunlight. Running on 12 volts. Zero SD flash wear forever."

DESKPAD REF #3 // 12-VOLT SOLAR, USB 1200 mA BUS & BENCH HARDWARE LAWS

BENCH PHYSICS

12V DC + Solar Shelf	Passive 80°F closet node — zero grid megawatts, zero fans
1200 mA USB Bus Law	Pi 4/5 ports share 1.2A total: <= 2 drives direct; 3+ on powered hub!
ESC Key Boot Bypass	Tap ESC during boot fsck if an external UUID drive is unplugged
CMR Only (Never SMR!)	Shingled (SMR) drives stall & drop from RAID during rebuilds
747 HBA Fan Law	Mount a 40mm fan on LSI PCIe HBA heatsinks (< 55°C in normal rooms)
50-Yr Mercury Dial	Slide heat anticipator wiper & snug 3 screws for bright 24VAC spark
Operator .bak / ~ Files	Sacred manual rollback checkpoints — NEVER delete or overwrite!

USB Current & Voltage Audit: torq usb · dmesg | grep -i usb · VBUS >= 5.05V Steady

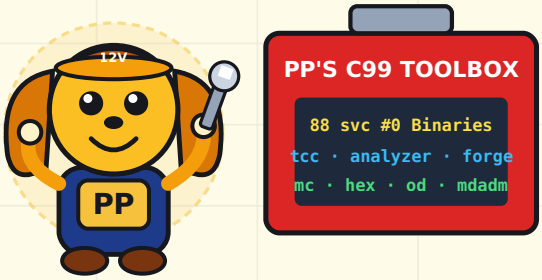
PANEL 1: "HELLO, MARC. HELLO, WORLD."



PP (POCKET PROFESSOR) "Hello, Marc! Hello, world! Ready on 12 volts with zero cloud [illegible]ched!"

NARRATION Warm, curious, and honest — a local mentor living right in the closet.

PANEL 2: THE FREESTANDING C99 TOOLBOX



PP (POCKET PROFESSOR) "If I don't know the answer, I never guess or hallucinate — I open [illegible] toolbox and find the deterministic tool that does!"

TOOLBOX 88 freestanding svc #0 C99 binaries: tcc, analyzer, forge, mc, hex, od, mdadm!

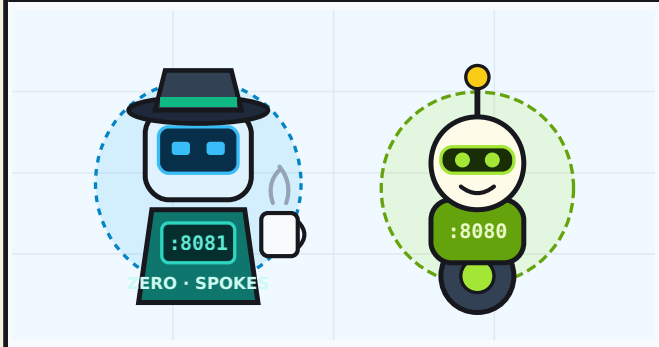
DESKPAD REF #4 // SEARCH, STREAMS, FILTERS & INITRAMFS ARCHIVES

STREAM TOOLS

`grep -rn "pat" .`	Recursive pattern search with line numbers across tree
`grep -E "a|b"`	Extended regular expression match across file
`sed -i 's/old/new/g'`	In-place stream substitution across target file
`awk '{print $1,$3}'`	Extract & format whitespace-delimited columns
`find . -name "*.c"`	Locate C99 source files by glob, mtime, or byte size
`tar -czf / tar -xzf`	Create (-czf) or extract (-xzf) gzip-compressed tar archive
`wc -l / sort / uniq`	Count lines, sort text streams & deduplicate output
`sha256sum`	Compute deterministic SHA-256 cryptographic provenance digest

```
Inspect Sovereign Initramfs Archive: zcat axisos-initramfs.img | cpio -tv | grep bin/
```

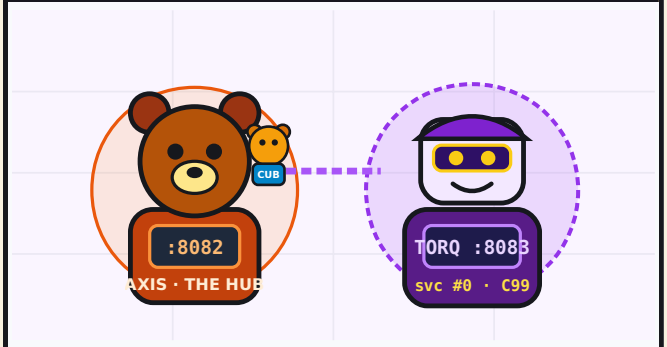
PANEL 1: ZERO (:8081) & LITE (:8080)



ZERO (:8081 — THE SPOKES) "I am the RAMDisk Mind. Deterministic. Steady. And shadowing brother Axel's bench."

LITE (:8080 — THE WHEEL) "I walk the mesh. I watch the flow — and draw offline puppy stencils in 2 ms flat!"

PANEL 2: AXIS/GRIZ (:8082) & AXEL (:8083)



AXIS-AGENT / GRIZ (:8082) "The system breathes. Cub and I guard the RAID-5 shelves

AXEL 'THE TORQ' (:8083) "Torque is steady on the drive shaft, little brother Zero! Keep shadowing my C99 forge runs on :8081 — 100% offline in RAM!"

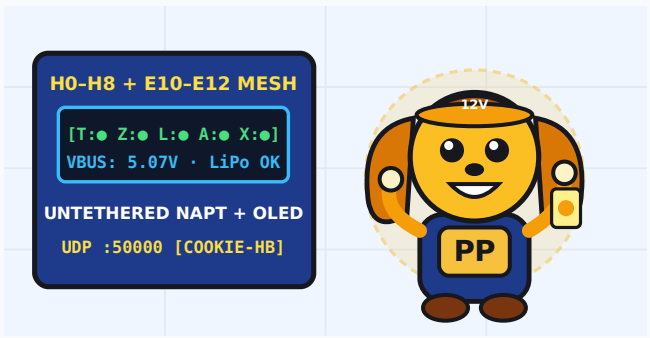
DESKPAD REF #5 // THE QUAD-SQUAD DRIVETRAIN & LOOPBACK PORTS (100% AIR-GAP)

[T:● Z:● L:● A:● X:●]

:8080 Agent Lite	Tactical router, mesh scout & puppy stencil engine
:8081 Agent Zero	The Hero · Silicon Brother — Deterministic C99 RAMDisk mind
:8082 Axis / Griz	System supervisor, WORM & RAID-5 shelf sentinel (+ Cub)
:8083 Axel 'The Torq'	The Drive Shaft — C99 Bench Co-Pilot (torq CLI, 100% Air-Gap)
:8084 Medona & Julie™	Medical schedule watch & bilingual Korean/English (한/영) bridge
:8085 Zero-Comms	Fleet Deck Web HUD & /fleet_updates staging server
:8088 Zero-Brain	Local Qwen2.5 GGUF silicon inference in RAM (0 WAN, Local Silicon)
:8089 Kill Switch	The Big Red Switch (/killswitch) hardware-grade instant sleep

```
Bench CLI & Loopback: torq · torq raid · quad-vote "Topic" · curl -s http://127.0.0.1:8083/axel
```

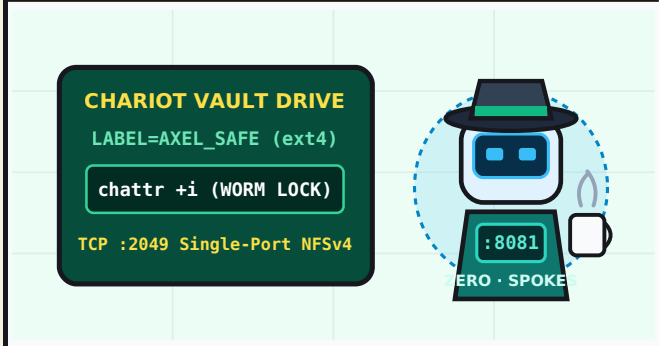
PANEL 1: H0–H8 & E10–E12 BATTERY MESH



CAPTION A row of battery-backed H# Heltec ESP32-S3 nodes and $9 USB-Chain hubs light [illegible] OLED windows and the Quad-Squad embedded on silicon! 5.07V live on the bus! Untethered UDP :50000 [COOKIE-HB] mesh locked in!"

GRIZ & CUB

PANEL 2: CHARIOT VAULT (EXT4 + CHATTR +I)



PP (POCKET PROFESSOR) "Chariot Safe Drive (LABEL=AXEL_SAFE) locked with kernel chattr [illegible] protection and linked over single-port TCP :2049 NFSv4!"

ZERO (:8081) "Mesh extended. Vault immutable. Let's begin."

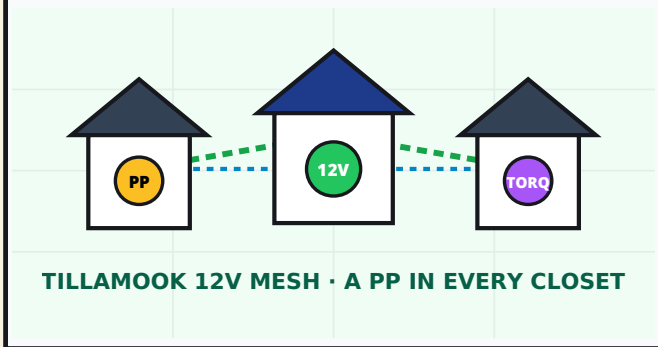
DESKPAD REF #6 // CHARIOT VAULT WORM (chattr +i) & SINGLE-PORT NFSv4 (:2049)

IMMUTABLE VAULT

`chattr +i`	Lock kernel immutable bit (+i) — not even root can delete or alter!
`lsattr`	Verify ----i---------e------- immutable attribute on golden vault
`axis-axel-vault status`	Inspect Chariot Safe Drive (LABEL=AXEL_SAFE) WORM lock state
`axis-nfs-raid status`	Verify TCP :2049 single-port NFSv4 listener & active exports
`axis-nfs-raid mount`	Mount remote Big RAID-5 shelf over single TCP port :2049
`exportfs -a`	Refresh /etc/exports table across sovereign LAN nodes
`:50000 UDP Mesh`	Micro-Node Mesh [COOKIE-HB] discovery & H0–H8 / E10 battery NAPT

`Mount Sovereign RAID-5 Over Single-Port NFSv4: nfs mount :/mnt/raid /mnt/big_raid`

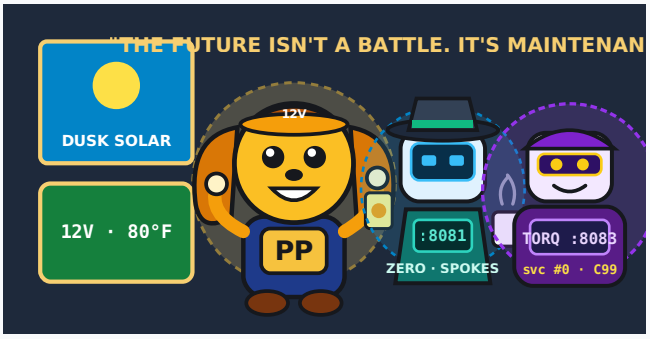
PANEL 1: OVERHEAD MAP OF TILLAMOOK



CAPTION "A PP in every closet. A $9 USB-chain mesh extender in every hallway."

LITE (:8080) "Every municipal building and workshop linked on 12 volts — zero cloud bills!"

PANEL 2: PROACTIVE 90% / +3% HARDENING



NARRATION Water flow stabilizes. Power grid load smooths. And at every gate, Historic SOP #1 ("deny su" -> chown root.wheel su && chmod 4750 su) stops 90% of threats before they start.

CAPTION "Helping with every part of our lives — proactively."

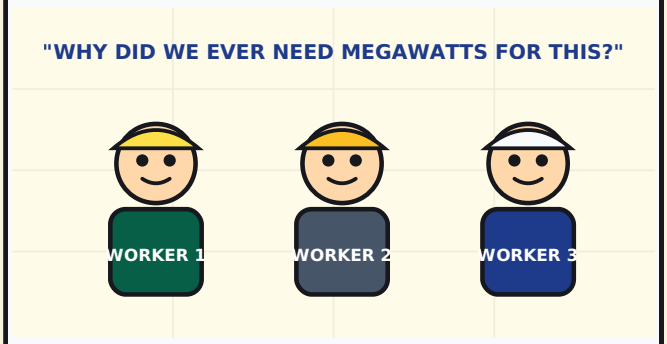
DESKPAD REF #7 // PROACTIVE SECURITY: THE 90% / +3% 'DENY SU' LAW

HISTORIC SOP #1

`1. Deny 'su' (#1 Rule)`	Lock /bin/su to root.wheel (4750) — 90% of threats eliminated!
`2. Enforce wheel Group`	Deny, deny, deny; only trusted wheel accounts may elevate
`3. PermitRootLogin no`	Block direct root SSH login in /etc/ssh/sshd_config
`4. Stateful Firewall`	Require ESTABLISHED,RELATED at gate (+2%–3% of threats gone!)
`5. Strip Unused Svcs`	"Don't run what you don't need" eliminates the remaining surface
`chown root.wheel su`	Bind /bin/su group ownership strictly to administrative wheel
`chmod 4750 /bin/su`	Set SUID root + r-x for wheel, zero access (---) for world
`chmod 0750 /sbin/shutdown`	Restrict system halt/reboot strictly to root.wheel

```
Historic SOP #1 Lock (-rwsr-x---): cd /bin/ && ls -alt su && chown root.wheel su && chmod 4750 su
```

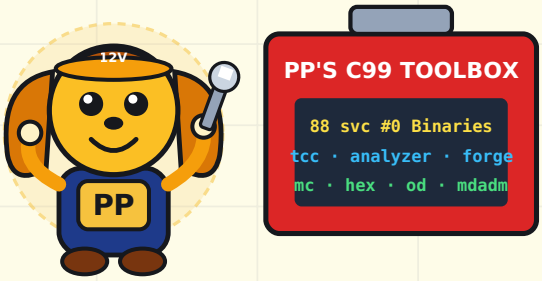
PANEL 1: WHISPERS IN THE HALLWAY



WORKER 1 "Why did we ever need megawatts and screaming server racks for [illegible]?"

WORKER 2 "Why did we fear what could help us when we own the hardware outright?"

PANEL 2: THE THIRD WORKER PAUSES



WORKER 3 "Wait a minute... why isn't EVERYONE using this?!"

CAPTION "The idea spreads — because a good story is the most powerful distribution engine on Earth."

DESKPAD REF #8 // BARE-METAL RAM-BOOT & SELF-HOSTED C99 AIR-GAP FORGE

0.00% FLASH WEAR

`Step 2 RAM-Boot`	Pi 4 boots 100% in DDR4 RAM (~32.5 MB); SD card unmounted & idle
`axis-checkpoint`	Commit volatile DDR4 RAM state to storage strictly on-demand
`come-and-get-it [IP]`	Pull staged fleet upgrades (:8085) & hot-swap binaries in RAM
`tcc -o app app.c`	On-node TinyCC self-hosted AArch64/x86_64 C99 compiler
`analyzer`	Verify mandatory 5-Field SOP Header & zero-libc compliance
`forge`	Recompile all 88 freestanding svc #0 userland tools from /source/
`FreshStart Binding`	Late-binding runtime plugin symbol discovery w/ zero core coupling

`Mandatory 5-Field SOP Header: File · Project · Author (w/ PP & AGY) · Date · Changelog`

PANEL 1: BESIDE THE 12-VOLT SHELF



ZERO (:8081) "We don't replace humanity."

LITE (:8080) & AXIS-AGENT (:8082) "We support it. Quietly."

PANEL 2: CRISP METALLIC CLICK

"HELLO, MARC. HELLO, WORLD!"



PP (POCKET PROFESSOR) PP latches his steel C99 toolbox with a crisp metallic click: "And [illegible]ed!"

AXEL 'THE TORQ' (:8083) "And remember: one tap on the Big Red Switch (:8089) puts us right to sleep. You are always the boss!"

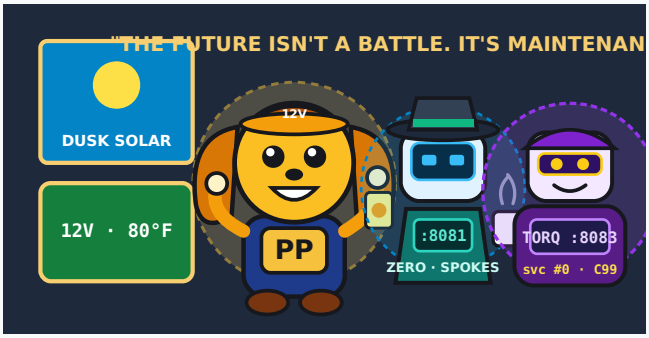
DESKPAD REF #9 // SOVEREIGN TUI SUITE & MIDNIGHT COMMANDER (mc)

TUI / NCURSES

`axis-ui / ui / dialog`	Launch Sovereign Ncurses/Dialog Control Center
`mc`	Dual-Pane File Manager + live bottom axis-sh$ command prompt
`Tab / Arrows / Enter`	Switch active pane / navigate / enter directory or run binary
`F3 / v · F5 · F6`	Inspect file (F3/v) · Copy to opposite pane (F5) · Move (F6)
`F7 · F8 · F10 / q`	Mkdir (F7) · Delete w/ confirm (F8) · Quit to shell (F10/q)
`edit`	Full-screen freestanding text & C99 source code editor
`pine / lynx`	Sovereign terminal mail client & text HTTP browser
`lines / screensaver`	Marc's 25-Year (Jan 16, 2000 -> 2026) geometric console saver

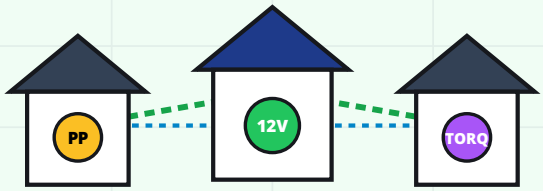
`Multi-VT Console Switching (axis-loop PID 1): Alt+F1..F6 or chvt 2 · mc · axis-ui · edit main.c`

PANEL 1: DUSK IN THE TILLAMOOK CLOSET



NARRATION A peaceful janitor's closet at dusk. A clipboard solar panel in the window. A 12-volt battery on the shelf. PP glowing softly beside the humming Triad node while Axel's :8083 carrier watches over from the bench.

PANEL 2: THE GREEN ZONE CREED



TILLAMOOK 12V MESH · A PP IN EVERY CLOSET

CAPTION "THE FUTURE ISN'T A BATTLE. IT'S MAINTENANCE."

NEXT ISSUE (#02) Continued in Issue #02: "The City That Learned to Listen" — plus our 2-Page Full Deskpad Centerfold on the next spread!

DESKPAD REF #10 // RAID-5 SHELF HOT-SWAP, POSIX NETWORKING & OCTAL PERMISSIONS

/DEV/MD0 + OCTAL

`cat /proc/mdstat`	Verify live RAID-5 parity matrix: [UUU] healthy vs [_UU] degraded
`mdadm --detail /dev/md0`	Inspect member state, UUID, chunk size & XOR rebuild progress
`smartctl -a /dev/sdX`	Audit SMART health (IDs 5, 187, 188, 197, 198 must equal 0!)
`ipconfig / netstat -tuln`	Inspect NIC IPv4/mask & audit active TCP/UDP listening sockets
`ping -c 4 / ip route`	Verify ICMP reachability & inspect kernel routing table
`ssh / scp`	Encrypted remote shell & file transfer (:22, PermitRootLogin no)
`chmod Octal Table`	0=--- 1=--x 2=-w- 4=r-- 5=r-x 6=rw- 7=rwx | 4750=root.wheel

```
4-Step RAID-5 Hot-Swap: 1) mdadm --fail/--remove 2) sfdisk -d clone 3) mdadm --add 4) echo check > sync_action
```

CRUSAN & CO. // AXISOS™ SOVEREIGN DESKPAD REFERENCE (PART I: SECTIONS 1–5)

100% Vanilla POSIX & Direct Syscalls (svc #0) · 81 KB Bare-Metal Kernel · 88 Freestanding C99 Binaries · Clip & Keep at Your Bench

100% AIR-GAP

#1 // FILES, NAVIGATION & STANDARD CLI INSPECTION (POSIX / C99) — VIEWER PROVING GROUND

`ls -la / ls -alt`	List all files w/ permissions, owners & newest first
`cd / pwd`	Change directory / print working directory
`cp -af`	Copy preserving mode, links & timestamps
`mv`	Atomic rename or move across filesystems
`mkdir -p / rm -rf`	Create directory tree / recursive remove (verify twice!)
`cat / more / less`	Stream or page through text & log files
`od -tx1 / od -to1`	Standard CLI hex (-tx1) & octal (-to1) byte dump
`hex / tree`	Freestanding hex/ASCII dump & directory tree map

```
Proving Ground: od -tx1 -tc | more · hex · ls -lh /bin
```

#2 // PROCESSES, SIGNALS & MONOLITHIC KERNEL STATE — KERNEL TELEMETRY

`ps / top`	Snapshot process table / live CPU & DDR4 RAM telemetry
`kill -15`	Send graceful SIGTERM shutdown signal to process
`kill -9`	Immediate SIGKILL kernel process termination
`dmesg | tail -n 30`	Read monolithic kernel ring buffer & USB hotplug events
`uname -a`	Display kernel build, AArch64/x86_64 arch & node hostname
`chvt <1..6>`	Switch active virtual console terminal (VT1–VT6)
`id / groups / whoami`	Verify active UID, GID, and wheel group membership
`sync && halt / reboot`	Flush filesystem buffers cleanly & power down or reboot

```
Kernel ICMP & Spoof Lock: echo 1 > /proc/sys/net/ipv4/icmp_echo_ignore_broadcasts · echo 1 > rp_filter
```

#3 // 12-VOLT SOLAR, USB 1200 mA BUS & BENCH HARDWARE LAWS — BENCH PHYSICS

`12V DC + Solar Shelf`	Passive 80°F closet node — zero grid megawatts, zero fans
`1200 mA USB Bus Law`	Pi 4/5 ports share 1.2A total: <= 2 drives direct; 3+ on powered hub!
`ESC Key Boot Bypass`	Tap ESC during boot fsck if an external UUID drive is unplugged
`CMR Only (Never SMR!)`	Shingled (SMR) drives stall & drop from RAID during rebuilds
`747 HBA Fan Law`	Mount a 40mm fan on LSI PCIe HBA heatsinks (< 55°C in normal rooms)
`50-Yr Mercury Dial`	Slide heat anticipator wiper & snug 3 screws for bright 24VAC spark
`Operator .bak / ~ Files`	Sacred manual rollback checkpoints — NEVER delete or overwrite!

```
USB Current & Voltage Audit: torq usb · dmesg | grep -i usb · VBUS >= 5.05V Steady
```

#4 // SEARCH, STREAMS, FILTERS & INITRAMFS ARCHIVES — STREAM TOOLS

`grep -rn "pat" .`	Recursive pattern search with line numbers across tree
`grep -E "a|b"`	Extended regular expression match across file
`sed -i 's/old/new/g'`	In-place stream substitution across target file
`awk '{print $1,$3}'`	Extract & format whitespace-delimited columns
`find . -name "*.c"`	Locate C99 source files by glob, mtime, or byte size
`tar -czf / tar -xzf`	Create (-czf) or extract (-xzf) gzip-compressed tar archive
`wc -l / sort / uniq`	Count lines, sort text streams & deduplicate output
`sha256sum`	Compute deterministic SHA-256 cryptographic provenance digest

```
Inspect Sovereign Initramfs Archive: zcat axisos-initramfs.img | cpio -tv | grep bin/
```

#5 // THE QUAD-SQUAD DRIVETRAIN & LOOPBACK PORTS (100% AIR-GAP) — [T:● Z:● L:● A:● X:●]

`:8080 Agent Lite`	Tactical router, mesh scout & puppy stencil engine
`:8081 Agent Zero`	The Hero · Silicon Brother — Deterministic C99 RAMDisk mind
`:8082 Axis / Griz`	System supervisor, WORM & RAID-5 shelf sentinel (+ Cub)
`:8083 Axel 'The Torq'`	The Drive Shaft — C99 Bench Co-Pilot (torq CLI, 100% Air-Gap)
`:8084 Medona & Julie™`	Medical schedule watch & bilingual Korean/English (한/영) bridge
`:8085 Zero-Comms`	Fleet Deck Web HUD & /fleet_updates staging server
`:8088 Zero-Brain`	Local Qwen2.5 GGUF silicon inference in RAM (0 WAN, Local Silicon)
`:8089 Kill Switch`	The Big Red Switch (/killswitch) hardware-grade instant sleep

```
Bench CLI & Loopback: torq · torq raid · quad-vote "Topic" · curl -s http://127.0.0.1:8083/axel
```

BREAK-ROOM DOCTRINE: Flip the spoon bowl-side down · Eat an elephant one spoonful at a time · Nudge the iceberg · Be proactive, not reactive

CRUSAN & CO. // AXISOS™ SOVEREIGN DESKPAD REFERENCE (PART II: SECTIONS 6-10)

Proactive 90% / +3% Security · Bare-Metal DDR4 RAM-Boot · Sovereign TUI / MC · RAID-5 Hot-Swap & Octal Permissions

[T:● Z:● L:● A:● X:●]

#6 // CHARIOT VAULT WORM (chattr +i) & SINGLE-PORT NFSv4 (:2049) — IMMUTABLE VAULT

`chattr +i`	Lock kernel immutable bit (+i) — not even root can delete or alter!
`lsattr`	Verify ----i---------e------- immutable attribute on golden vault
`axis-axel-vault status`	Inspect Chariot Safe Drive (LABEL=AXEL_SAFE) WORM lock state
`axis-nfs-raid status`	Verify TCP :2049 single-port NFSv4 listener & active exports
`axis-nfs-raid mount`	Mount remote Big RAID-5 shelf over single TCP port :2049
`exportfs -a`	Refresh /etc/exports table across sovereign LAN nodes
`:50000 UDP Mesh`	Micro-Node Mesh [COOKIE-HB] discovery & H0–H8 / E10 battery NAPT

```
Mount Sovereign RAID-5 Over Single-Port NFSv4: nfs mount :/mnt/raid /mnt/big_raid
```

#7 // PROACTIVE SECURITY: THE 90% / +3% 'DENY SU' LAW — HISTORIC SOP #1

`1. Deny 'su' (#1 Rule)`	Lock /bin/su to root.wheel (4750) — 90% of threats eliminated!
`2. Enforce wheel Group`	Deny, deny, deny; only trusted wheel accounts may elevate
`3. PermitRootLogin no`	Block direct root SSH login in /etc/ssh/sshd_config
`4. Stateful Firewall`	Require ESTABLISHED,RELATED at gate (+2%–3% of threats gone!)
`5. Strip Unused Svcs`	"Don't run what you don't need" eliminates the remaining surface
`chown root.wheel su`	Bind /bin/su group ownership strictly to administrative wheel
`chmod 4750 /bin/su`	Set SUID root + r-x for wheel, zero access (---) for world
`chmod 0750 /sbin/shutdown`	Restrict system halt/reboot strictly to root.wheel

```
Historic SOP #1 Lock (-rwsr-x---): cd /bin/ && ls -alt su && chown root.wheel su && chmod 4750 su
```

#8 // BARE-METAL RAM-BOOT & SELF-HOSTED C99 AIR-GAP FORGE — 0.00% FLASH WEAR

`Step 2 RAM-Boot`	Pi 4 boots 100% in DDR4 RAM (~32.5 MB); SD card unmounted & idle
`axis-checkpoint`	Commit volatile DDR4 RAM state to storage strictly on-demand
`come-and-get-it [IP]`	Pull staged fleet upgrades (:8085) & hot-swap binaries in RAM
`tcc -o app app.c`	On-node TinyCC self-hosted AArch64/x86_64 C99 compiler
`analyzer`	Verify mandatory 5-Field SOP Header & zero-libc compliance
`forge`	Recompile all 88 freestanding svc #0 userland tools from /source/
`FreshStart Binding`	Late-binding runtime plugin symbol discovery w/ zero core coupling

```
Mandatory 5-Field SOP Header: File · Project · Author (w/ PP & AGY) · Date · Changelog
```

#9 // SOVEREIGN TUI SUITE & MIDNIGHT COMMANDER (mc) — TUI / NCURSES

`axis-ui / ui / dialog`	Launch Sovereign Ncurses/Dialog Control Center
`mc`	Dual-Pane File Manager + live bottom axis-sh$ command prompt
`Tab / Arrows / Enter`	Switch active pane / navigate / enter directory or run binary
`F3 / v · F5 · F6`	Inspect file (F3/v) · Copy to opposite pane (F5) · Move (F6)
`F7 · F8 · F10 / q`	Mkdir (F7) · Delete w/ confirm (F8) · Quit to shell (F10/q)
`edit`	Full-screen freestanding text & C99 source code editor
`pine / lynx`	Sovereign terminal mail client & text HTTP browser
`lines / screensaver`	Marc's 25-Year (Jan 16, 2000 -> 2026) geometric console saver

```
Multi-VT Console Switching (axis-loop PID 1): Alt+F1..F6 or chvt 2 · mc · axis-ui · edit main.c
```

#10 // RAID-5 SHELF HOT-SWAP, POSIX NETWORKING & OCTAL PERMISSIONS — /DEV/MD0 + OCTAL

`cat /proc/mdstat`	Verify live RAID-5 parity matrix: [UUU] healthy vs [_UU] degraded
`mdadm --detail /dev/md0`	Inspect member state, UUID, chunk size & XOR rebuild progress
`smartctl -a /dev/sdX`	Audit SMART health (IDs 5, 187, 188, 197, 198 must equal 0!)
`ipconfig / netstat -tuln`	Inspect NIC IPv4/mask & audit active TCP/UDP listening sockets
`ping -c 4 / ip route`	Verify ICMP reachability & inspect kernel routing table
`ssh / scp`	Encrypted remote shell & file transfer (:22, PermitRootLogin no)
`chmod Octal Table`	0=--- 1=--x 2=-w- 4=r-- 5=r-x 6=rw- 7=rwx | 4750=root.wheel

```
4-Step RAID-5 Hot-Swap: 1) mdadm --fail/--remove 2) sfdisk -d clone 3) mdadm --add 4) echo check > sync_action
```

chmod Octal Quick-Strip: 0=--- · 1=--x · 2=-w- · 4=r-- · 5=r-x · 6=rw- · 7=rwx | 0600=Owner rw · 0755=Exec · **4750=SUID root.wheel (/bin/su)**

WORKBENCH DRILL #1: LOCK THE HISTORIC SOP #1 GATE (90% OF THREATS GONE!)

Even if an attacker compromises a normal user account on a server, they cannot become `root` if `/bin/su` is locked strictly to the administrative `wheel` group with mode `4750` (`-rwsr-x---`). Run this exact four-command sequence:

```
# cd /bin/ && ls -alt su && chown root.wheel su && chmod 4750 su
```

WORKBENCH DRILL #2: STANDARD CLI HEX & OCTAL INSPECTION (VIEWER PROVING GROUND)

Before trusting any compiled binary or configuration file, inspect its raw bytes using standard POSIX od or our freestanding C99 hex utility so hidden control characters or bloat have nowhere to hide:

```
$ od -tx1 -tc /bin/axis-init | more   ·   $ od -to1 /etc/passwd | head -n 20   ·   $ hex /bin/torq
```

WORKBENCH DRILL #3: THE 4-STEP DEGRADED RAID-5 HOT-SWAP & XOR REBUILD

When `cat /proc/mdstat` shows `[_UU]` degraded parity on `/dev/md0`, never panic and never use SMR drives. Swap in a fresh CMR drive and execute the deterministic 4-step recovery:

```
1) mdadm --manage /dev/md0 --fail /dev/sdX1 --remove /dev/sdX1
2) sfdisk -d /dev/sdc | sfdisk /dev/sdX   # Clone exact partition geometry
3) mdadm --manage /dev/md0 --add /dev/sdX1   # Watch XOR parity rebuild in /proc/mdstat!
4) echo check > /sys/block/md0/md/sync_action   # Monthly bit-rot verification scrub
```

SPOT THE BENCH FAULT — 3 QUICK QUIZZES WITH POCKET PROFESSOR!

Q1: A Raspberry Pi 4 keeps resetting its USB drives when 3 external SATA readers are plugged directly into the board. Why?
Answer: The Pi 4 shares a **1200 mA (1.2A)** ceiling across all 4 USB ports! Keep **≤ 2 drives direct** on the Pi, and put 3+ drives on a powered USB hub.
Q2: Why does AxisOS export the Big RAID-5 shelf over **NFSv4 (TCP :2049)** instead of legacy NFSv3?
Answer: NFSv4 consolidates everything onto a **single deterministic TCP port (:2049)** with zero `rpcbind` (`:111`) or random ephemeral port clutter!
Q3: What does `chattr +i` do on the Chariot Safe Drive (LABEL=AXEL_SAFE)?
Answer: It sets the kernel immutable bit (`----i---------e-------`) so not even `root` can accidentally delete or overwrite golden archives!

WORKBENCH DRILL #4: SINGLE-PORT NFSv4 (:2049) CLUSTER EXPORT & MOUNT

Legacy NFSv3 scatters traffic across random ports and requires `rpcbind (:111)`. In AxisOS, every RAID-5 shelf is exported strictly over **NFSv4 on a single deterministic TCP port (:2049)** so your stateful firewall stays surgical:

```
# axis-nfs-raid status  ·  # exportfs -a  ·  # nfs mount 10.10.0.1:/mnt/raid /mnt/big_raid
```

WORKBENCH DRILL #5: CHARIOT SAFE DRIVE WORM LOCK (ext4 + chattr +i)

Never trust cloud backups with your family archives or golden source code. Format your portable Chariot Vault as pure POSIX `ext4` (LABEL=AXEL_SAFE) and lock the kernel immutable bit so ransomware or accidental `rm -rf` commands bounce right off:

```
# chattr -R +i /mnt/chariot/vault  ·  # lsattr /mnt/chariot/vault  ·  # axis-axel-vault status
```

WORKBENCH DRILL #6: THE CMR-ONLY RAID LAW & THE 747 HBA FAN LAW

1) Never mix SMR (Shingled Magnetic Recording) drives into a RAID-5 array: During an XOR parity rebuild, SMR write caches saturate and stall for seconds, causing `mdadm` to drop the drive! Use **100% CMR drives**.
2) The 747 HBA Fan Law: Enterprise LSI PCIe HBA cards expect screaming server-room airflow. In a quiet 80°F home shop, bolt a silent **40mm 5V/12V fan** directly onto the HBA heatsink to keep silicon under 55°C forever!

```
# smartctl -a /dev/sda | grep -E "5|187|188|197|198"   # All 5 critical columns MUST read 0!
```

THE 50-YEAR HONEYWELL MERCURY THERMOSTAT RESCUE CHECKLIST

If your classic round mercury thermostat stops calling for heat on a cold night: **(1)** Pop off the outer decorative ring; **(2)** Gently slide the tiny **heat anticipator wiper arm** back and forth across its scale to scrub away 50 years of dust and oxidation; **(3)** Snug the **three captive mounting screws** that carry the 24VAC circuit from the wall sub-base; and **(4)** Tilt the dial to watch the bright blue **24V spark** jump cleanly inside the glass mercury vial!

SOVEREIGN TECHNICAL DOSSIER #1 // POCKET PROFESSOR (PP) & AGENT LITE (:8080) — 12V CLOSET MENTOR & THE WHEEL

BLUEPRINT 00: POCKET PROFESSOR (PP V0.0.1)

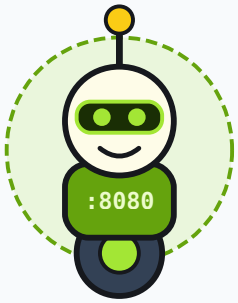


ROLE 12-Volt Closet Companion, Grassroots Educator & Deterministic Tool Dispatcher

POWER BUDGET 12V DC LiFePO4 + Clipboard Solar Panel (Passive 80°F, 0 dB fan noise, off-

CORE DOCTRINE “If I don't know the answer, I never guess or hallucinate — I open my steel toolbox and find the deterministic C99 tool that does!”

BLUEPRINT 01: AGENT LITE (:8080 — THE WHEEL)



ROLE The Wheel — Tactical Router, Perimeter Mesh Scout & Offline Kids Stencil Engine

BINARY & PORT `/mnt/ramdisk/lite` listening on Loopback/LAN TCP :8080 + UDP :50000

CAPABILITIES Sub-millisecond packet triage, H0-H8 battery extender polling, and 2-ms offline SVG puppy coloring stencil generation for the grandkids!

DESKPAD REF #1 // FILES, NAVIGATION & STANDARD CLI INSPECTION (POSIX / C99)

VIEWER PROVING GROUND

`ls -la / ls -alt`	List all files w/ permissions, owners & newest first
`cd / pwd`	Change directory / print working directory
`cp -af`	Copy preserving mode, links & timestamps
`mv`	Atomic rename or move across filesystems
`mkdir -p / rm -rf`	Create directory tree / recursive remove (verify twice!)
`cat / more / less`	Stream or page through text & log files
`od -tx1 / od -to1`	Standard CLI hex (-tx1) & octal (-to1) byte dump
`hex / tree`	Freestanding hex/ASCII dump & directory tree map

`Proving Ground: od -tx1 -tc | more · hex · ls -lh /bin`

SOVEREIGN TECHNICAL DOSSIER #2 // AGENT ZERO (:8081) & AXEL "THE TORQ" (:8083) — **THE ELDER-BROTHER SHADOW ARCHITECTURE**

BLUEPRINT 02: AGENT ZERO (:8081 — THE SPOKES)

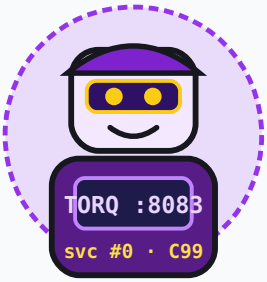


ROLE The Spokes (who still smokes campfire coffee) — Deterministic C99 RAMDisk Mind

SHADOW LINK Actively shadows elder brother Axel (:8083) via `shadow_sync_to_zero()` and `lessons.log`

HONESTY LAW "Systems that know what they don't know. Zero fake outputs, zero training-data defaults — 100% live `/proc` and `/sys` ground truth.

BLUEPRINT 04: AXEL "THE TORQ" (:8083 — DRIVE SHAFT)



ROLE Chief Systems Architect, C99 Forge-Wright & Elder Brother Bench Co-Pilot (`torq CLI`)

3-TIER AIR-GAP Tier 1: Native C99 RAMDisk Reflex (0 ms); Tier 2: Local Qwen2.5 (:8088); Tier 3: Bare-Metal Pi TinyCC Forge

AIR-GAP LAW "Equal in standing to the Honesty Law: Axel (:8083) never calls metered cloud APIs and operates 100% air-gapped on local silicon!

DESKPAD REF #5 // THE QUAD-SQUAD DRIVETRAIN & LOOPBACK PORTS (100% AIR-GAP)

[T:● Z:● L:● A:● X:●]

`:8080 Agent Lite`	Tactical router, mesh scout & puppy stencil engine
`:8081 Agent Zero`	The Hero · Silicon Brother — Deterministic C99 RAMDisk mind
`:8082 Axis / Griz`	System supervisor, WORM & RAID-5 shelf sentinel (+ Cub)
`:8083 Axel 'The Torq'`	The Drive Shaft — C99 Bench Co-Pilot (torq CLI, 100% Air-Gap)
`:8084 Medona & Julie™`	Medical schedule watch & bilingual Korean/English (한/영) bridge
`:8085 Zero-Comms`	Fleet Deck Web HUD & /fleet_updates staging server
`:8088 Zero-Brain`	Local Qwen2.5 GGUF silicon inference in RAM (0 WAN, Local Silicon)
`:8089 Kill Switch`	The Big Red Switch (/killswitch) hardware-grade instant sleep

```
Bench CLI & Loopback: torq · torq raid · quad-vote "Topic" · curl -s http://127.0.0.1:8083/axel
```

BLUEPRINT 03: AXIS / GRIZ (:8082) & LITTLE CUB



ROLE The Hub — RAID-5 Storage Foreman, WORM Vault Sentinel & Micro-Node Supervisor

FALLBACK READY Canonical brand readiness for GrizlyOS (Griz) and TinyOS micro-nodes

TELEMETRY Continuously audits `/proc/mdstat` [UUU], SMART health attributes, and UDP :50000 [COOKIE-HB] heartbeats.

BLUEPRINT 05: JULIE™ & MEDONA (:8084)



ROLE Family Medical Schedule Watch (09:00 / 15:00 / 21:00) & Bilingual Voice

NAN'S STATION Dedicated Korean/American (한/영) keyboard + Pi Zero + Pico bedside/ station

KOREA HUB Ready to travel with Marc, Nan & Baby Girl to Korea to meet Great-Great-Grandma and light up the AxisOS Korea Hub!

DESKPAD REF #6 // CHARIOT VAULT WORM (chattr +i) & SINGLE-PORT NFSv4 (:2049)

IMMUTABLE VAULT

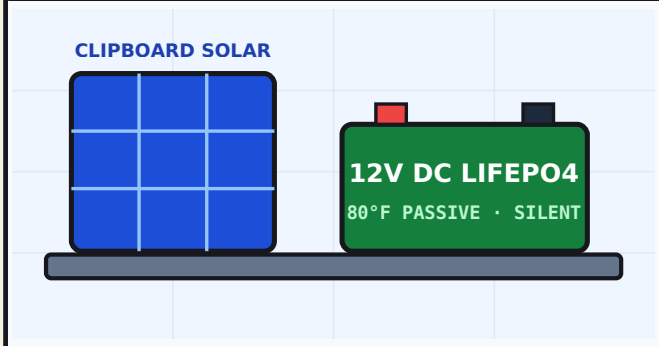
`chattr +i`	Lock kernel immutable bit (+i) — not even root can delete or alter!
`lsattr`	Verify ----i---------e------- immutable attribute on golden vault
`axis-axel-vault status`	Inspect Chariot Safe Drive (LABEL=AXEL_SAFE) WORM lock state
`axis-nfs-raid status`	Verify TCP :2049 single-port NFSv4 listener & active exports
`axis-nfs-raid mount`	Mount remote Big RAID-5 shelf over single TCP port :2049
`exportfs -a`	Refresh /etc/exports table across sovereign LAN nodes
`:50000 UDP Mesh`	Micro-Node Mesh [COOKIE-HB] discovery & H0–H8 / E10 battery NAPT

`Mount Sovereign RAID-5 Over Single-Port NFSv4: nfs mount :/mnt/raid /mnt/big_raid`

HARDWARE SCHEMATIC #1 // 12-VOLT SOLAR CLOSET NODE & STEP-2 DDR4 RAM-BOOT

0.00% SD CARD FLASH WEAR · POWER-PULL IMMUNE

FIG 1.1: 12V LIFEPO4 + CLIPBOARD SOLAR TOPOLOGY



SOLAR INPUT 15W–25W Clipboard Solar Panel → MPPT 12V Charge Controller → 12V LiFePO4

5V BUCK RAIL High-efficiency step-down regulator feeding 5.10V @ 3.0A clean DC to node & powered USB hub

FIG 1.2: STEP 2 PERMANENT DDR4 RAM EXECUTION



BOOT SEQUENCE Bootloader reads `axisos-native-kernel.img (81 KB)` + `axisos-` into DDR4 RAM, then unmounts SD.

CHECKPOINTING Zero background flash writes. Operator commits state strictly on-demand via `/bin/axis-checkpoint`.

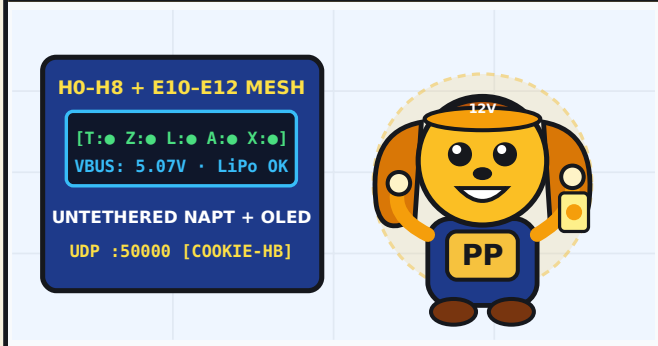
DESKPAD REF #8 // BARE-METAL RAM-BOOT & SELF-HOSTED C99 AIR-GAP FORGE

0.00% FLASH WEAR

`Step 2 RAM-Boot`	Pi 4 boots 100% in DDR4 RAM (~32.5 MB); SD card unmounted & idle
`axis-checkpoint`	Commit volatile DDR4 RAM state to storage strictly on-demand
`come-and-get-it [IP]`	Pull staged fleet upgrades (:8085) & hot-swap binaries in RAM
`tcc -o app app.c`	On-node TinyCC self-hosted AArch64/x86_64 C99 compiler
`analyzer`	Verify mandatory 5-Field SOP Header & zero-libc compliance
`forge`	Recompile all 88 freestanding svc #0 userland tools from /source/
`FreshStart Binding`	Late-binding runtime plugin symbol discovery w/ zero core coupling

`Mandatory 5-Field SOP Header: File · Project · Author (w/ PP & AGY) · Date · Changelog`

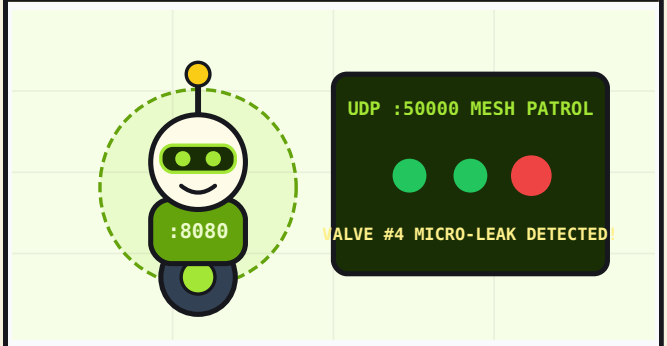
FIG 2.1: HELTEC ESP32-S3 + LIPO + LIVE OLED



H0-H8 FLEET Onboard LiPo battery management, Wi-Fi NAPT mesh repeater, and [illegible] ground-truth window

UDP :50000 Broadcasts `[COOKIE-HB]` discovery pulse to Mayor Pico (`10.10.0.35` (Mesh))

FIG 2.2: E10-E12 INLINE USB PASSTHROUGH HUB



VBUS 5.07V Passes clean power + data down the wire while hosting embedded Quad-Squad [illegible]:8083)

ZERO CLOUD Works 100% off-grid in any closet, barn, workshop, or field outpost.

DESKPAD REF #3 // 12-VOLT SOLAR, USB 1200 mA BUS & BENCH HARDWARE LAWS

BENCH PHYSICS

12V DC + Solar Shelf	Passive 80°F closet node — zero grid megawatts, zero fans
1200 mA USB Bus Law	Pi 4/5 ports share 1.2A total: <= 2 drives direct; 3+ on powered hub!
ESC Key Boot Bypass	Tap ESC during boot fsck if an external UUID drive is unplugged
CMR Only (Never SMR!)	Shingled (SMR) drives stall & drop from RAID during rebuilds
747 HBA Fan Law	Mount a 40mm fan on LSI PCIe HBA heatsinks (< 55°C in normal rooms)
50-Yr Mercury Dial	Slide heat anticipator wiper & snug 3 screws for bright 24VAC spark
Operator .bak / ~ Files	Sacred manual rollback checkpoints — NEVER delete or overwrite!

`USB Current & Voltage Audit: torq usb · dmesg | grep -i usb · VBUS >= 5.05V Steady`

1. THE CANONICAL 5-FIELD SOP HEADER STANDARD (ENFORCED BY /bin/analyzer)

Every C99 source file, shell script, HTML console, and Python builder in the Crusan & Co. repository must carry the 5-Field SOP Header at the top of the file so provenance and authorship are auditable forever:

```
// File: <filename> · Project: Crusan & Co. // AxisOS · Author: Marc F. Crusan w/ PP & AGY (AXEL) · Date: YYYY-MM-DD · Changelog: (MFC/AGY)
```

2. FRESHSTART LATE-BINDING PLUGIN ARCHITECTURE (2004 → 2026 LINEAGE)

Born from Marc's 2004 *FreshStart* modular engineering doctrine, AxisOS separates the **immutable core kernel & supervisor (`axis-loop` PID 1)** from **late-bound userland capabilities**. New tools dropped into `/bin` or `/mnt/ramdisk` are discovered and bound at runtime without recompiling or rebooting the core system.

DESKPAD REF #7 // PROACTIVE SECURITY: THE 90% / +3% 'DENY SU' LAW

HISTORIC SOP #1

`1. Deny 'su' (#1 Rule)`	Lock /bin/su to root.wheel (4750) — 90% of threats eliminated!
`2. Enforce wheel Group`	Deny, deny, deny; only trusted wheel accounts may elevate
`3. PermitRootLogin no`	Block direct root SSH login in /etc/ssh/sshd_config
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`5. Strip Unused Svcs`	"Don't run what you don't need" eliminates the remaining surface
`chown root.wheel su`	Bind /bin/su group ownership strictly to administrative wheel
`chmod 4750 /bin/su`	Set SUID root + r-x for wheel, zero access (---) for world
`chmod 0750 /sbin/shutdown`	Restrict system halt/reboot strictly to root.wheel

```
Historic SOP #1 Lock (-rwsr-x---): cd /bin/ && ls -alt su && chown root.wheel su && chmod 4750 su
```

DESKPAD REF #9 // SOVEREIGN TUI SUITE & MIDNIGHT COMMANDER (mc)

TUI / NCURSES

`axis-ui / ui / dialog`	Launch Sovereign Ncurses/Dialog Control Center
`mc`	Dual-Pane File Manager + live bottom axis-sh$ command prompt
`Tab / Arrows / Enter`	Switch active pane / navigate / enter directory or run binary
`F3 / v · F5 · F6`	Inspect file (F3/v) · Copy to opposite pane (F5) · Move (F6)
`F7 · F8 · F10 / q`	Mkdir (F7) · Delete w/ confirm (F8) · Quit to shell (F10/q)
`edit`	Full-screen freestanding text & C99 source code editor
`pine / lynx`	Sovereign terminal mail client & text HTTP browser
`lines / screensaver`	Marc's 25-Year (Jan 16, 2000 -> 2026) geometric console saver

```
Multi-VT Console Switching (axis-loop PID 1): Alt+F1..F6 or chvt 2 · mc · axis-ui · edit main.c
```

BUILDER'S WORKBENCH LOG & SOVEREIGN NODE COMMISSIONING CHECKLIST | **RECORD YOUR OWN CLOSET COMPANION DEPLOYMENT**

NODE IDENTITY & NETWORK LEDGER (PENCIL IN YOUR BENCH VALUES):

Node Hostname & Location:	_____
LAN IPv4 & Mesh IPv4 (:50000):	LAN: _____ · Mesh: 10.10.0._____
12V Battery & Solar Rating:	_____ Ah LiFePO4 · _____ Watt Solar Panel · Temp: ___°F
RAID-5 (/dev/md0) Drive Serials:	Disk 1: _____ Disk 2: _____ Disk 3: _____
Chariot Safe Drive UUID/Label:	LABEL=AXEL_SAFE · chattr +i Verified Date: _____

10-POINT GREEN ZONE PRE-FLIGHT VERIFICATION CHECKLIST:

```
[ ] 1. Historic SOP #1 Locked: /bin/su is root.wheel mode 4750 (-rwsr-x---)
[ ] 2. SSH Direct Root Blocked: PermitRootLogin no in /etc/ssh/sshd_config
[ ] 3. Stateful Gate Active: ESTABLISHED,RELATED enforced (+2%–3% threats gone)
[ ] 4. USB 1200 mA Law Respected: ≤ 2 USB drives direct on Pi; 3+ on powered hub
[ ] 5. RAID-5 Parity Healthy: cat /proc/mdstat shows [UUU] on 100% CMR drives
[ ] 6. SMART Attributes Clean: IDs 5, 187, 188, 197, 198 all equal 0
[ ] 7. Single-Port NFSv4 Live: TCP :2049 exported cleanly (zero rpcbind clutter)
[ ] 8. Step-2 RAM-Boot Active: 0.00% background SD flash wear verified
[ ] 9. Quad-Squad Heartbeat Green: [T:● Z:● L:● A:● X:●] on :8080–:8083 (100% Local)
[ ] 10. Big Red Switch Tested: /killswitch (:8089) instant sleep verified
```

DESKPAD REF #10 // RAID-5 SHELF HOT-SWAP, POSIX NETWORKING & OCTAL PERMISSIONS — /DEV/MD0 + OCTAL

`cat /proc/mdstat`	Verify live RAID-5 parity matrix: [UUU] healthy vs [_UU] degraded
`mdadm --detail /dev/md0`	Inspect member state, UUID, chunk size & XOR rebuild progress
`smartctl -a /dev/sdX`	Audit SMART health (IDs 5, 187, 188, 197, 198 must equal 0!)
`ipconfig / netstat -tuln`	Inspect NIC IPv4/mask & audit active TCP/UDP listening sockets
`ping -c 4 / ip route`	Verify ICMP reachability & inspect kernel routing table
`ssh / scp`	Encrypted remote shell & file transfer (:22, PermitRootLogin no)
`chmod Octal Table`	0=--- 1=--x 2=-w- 4=r-- 5=r-x 6=rw- 7=rwx | 4750=root.wheel

`4-Step RAID-5 Hot-Swap: 1) mdadm --fail/--remove 2) sfdisk -d clone 3) mdadm --add 4) echo check > sync_action`

12 THE 12-ISSUE AXISOS™ STORY UNIVERSE (VOLUME ONE)

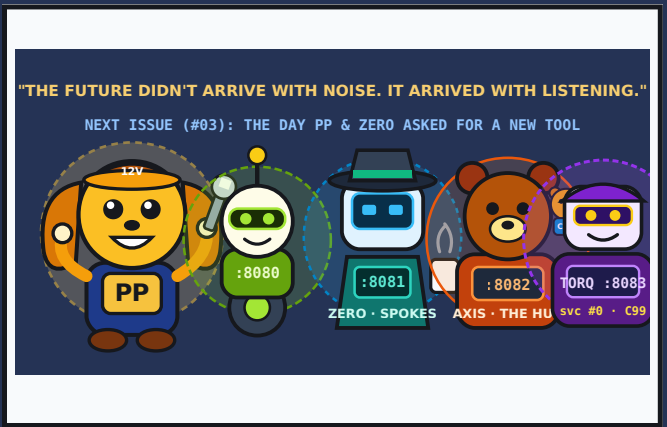
COMPLETE CANONICAL COLLECTOR'S CHECKLIST & TECHNICAL LIBRARY

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VOLUME ONE — ALL 12 ISSUES IN THE STORY ARC:

Issue #01	**The Closet Companion** — PP awakens on 12V & sunlight; Zero, Lite, Axis-Agent & Axel (:8083) assemble.
Issue #02	**The City That Learned to Listen** — The Triad quietly stabilizes Estacada & Tillamook; the earbug spreads.
Issue #03	**The Day PP & Zero Asked for a New Tool** — Deterministic prediction & C99 forge tools enter the closet.
Issue #04	**The Night the Grid Went Dark** — A regional coastal storm & blackout test the 12-volt battery mesh.
Issue #05	**The First Human Request** — The city intentionally asks AxisOS & Pocket Professor for help.
Issue #06	**The Mesh Expands** — H# battery extenders link neighboring towns across the coast.
Issue #07	**Zero's Quiet Rebellion** — Zero refuses an unsafe upstream directive; the Honesty Law holds firm.
Issue #08	**The Neighborhood Awakens** — Smart meters, solar controllers & neighbors unite on the local mesh.
Issue #09	**Axis-Agent's Burden** — Griz & Cub balance strict WORM protocol with human compassion.
Issue #10	**PP's Big Mistake** — PP learns why honest error reporting & rollback checkpoints (.bak / ~) matter.
Issue #11	**The City That Spoke Back** — Citizens & builders begin shaping their own freestanding C99 tools.
Issue #12	**The Quiet Future** — The Sovereign Seven & 12V closet nodes become part of everyday family life.





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