MATHSOFT / generation 2 — User manual

Library: `src/lib2/mathsoft/2/`
Edition: 2026-11-23, bounded source-admission documentation (no new build)
Qualification: SOURCE-ADMITTED EXPERIMENTAL — 28/28 Chapter 09 donor-matched `.inc` files only. Seven additional library-only `fn/` split files are *not admitted*. General reusable ABI, seven-file split native parity and independent consumer runtime remain unqualified.

What this member does

An independent B9 numerical engine with 17 `M11_*` entry names. Its ten full-owner include files and eighteen donor-matched engine/scratch/function fragments retain the byte-exact Chapter 09 source. The library also keeps seven additional split-only function files as unadmitted candidates.

Public interfaces

Entry point or group	Inputs, outputs and behavior
`M11_ADD / M11_SUB / M11_MUL`	Binary nine-byte B9 operations using `M_IN`, `M_A_INB`, `M_OUT`; status in `$0`.
`M11_DIV / M11_SQRT / M11_EXP`	Division, square root, exponential; donor-specific B9 input/output buffers.
`M11_LGT / M11_LN`	Base-10 / natural logarithm from shared log engine.
`M11_SIN / M11_COS / M11_TAN`	Trigonometry from shared trig engine.
`M11_SINH / M11_COSH / M11_TANH`	Hyperbolic functions from shared engine.
`M11_ASINH / M11_ACOSH / M11_ATANH`	Inverse hyperbolic functions from shared engine.

What this admission covers — 23 November 2026

- **Admitted source:** 10 full-owner `.inc` modules, 4 shared `engine/` files, 4 `scratch/` files and 10 donor-matched `fn/` fragments: **28/28 direct raw-byte identity PASS** against the Chapter 09 donor. Owner build/stage hash ledger.
- **Outside admission:** `fn/acosh.inc`, `fn/asinh.inc`, `fn/atanh.inc`, `fn/cosh.inc`, `fn/exp.inc`, `fn/sinh.inc`, `fn/tanh.inc`. These seven library-only alternate split representations were not part of the current accepted donor tree and are not independently native-parity-qualified.
- **Evidence level:** Chapter 09's MathROM r013 and MREVAL r007 have bounded owner acceptance; earlier ten paired cases and a separate 21-case seven-function emulator witness have distinct proof environments. **No new native build or target test was made by library admission.**
- **Integration principle:** the 17 `M11_*` exports belong to the full-owner sources; do not conflate source holding with consumer safety, and do not include both alternative full-owner and split definitions in the same ROM. Pin exact source and check include closure, symbol collisions, B9 pointers and shared RAM ownership. This generation is not an automatic upgrade of `mathsoft/1`.

Donor admission receipt · Current donor root.

How to integrate

For an **admitted source-equivalent example**, use `FUNCTIONS.md` include order only for donor-matched files (SIN is among the 10 shared `fn/` leaves). Example SIN: `scratch/trig_scratch.inc`, `engine/trig_engine.inc`, `fn/sin.inc`, each exactly once. Donor r019 source and an accepted ROM remain control witnesses; this source-level admission is not a drop-in, unrestricted ABI upgrade.

Composition sketch (not an independently assembled client):

```
#INCLUDE (lib2/mathsoft/2/scratch/trig_scratch.inc)
#INCLUDE (lib2/mathsoft/2/engine/trig_engine.inc)
#INCLUDE (lib2/mathsoft/2/fn/sin.inc)
        ; Caller provides M_IN, M_OUT, UA14 and valid stack
        CAL     M11_SIN
```

Environment, dependencies and memory

Nine-byte B9 buffers `M_IN`, `M_A_INB`, `M_OUT` supplied by caller; UA14, `$SX=0`, `$SY=1`, valid stack. Shared scratch addresses intentionally overlap both math engines and B9 multiplication. Do not nest calls. No universal pointer ABI or complete register preservation established.

Limits and evidence

Although the donor/r019 and v2 layouts have historical matching ROM digests, a full native parity/build witness for the seven additional split-only `fn/` files is absent. Before use, qualify actual include closure and ROM hash in the owning client.

This admitted source documentation does not introduce a new build or runtime PASS. Source equivalence, native assembler parity, emulator execution and physical-machine evidence remain distinct.

Actual source and further reference

- This exact member folder in Google Drive
- Source modules: `fn/*.inc (17 public wrappers)`, `engine/*.inc (shared numerical engines)`, `scratch/*.inc (shared UA14 scratch)`, `add.inc through invhyp_core.inc (donor-exact full owners)`.
- Further contracts/source notes: API.md, FUNCTIONS.md, RAM.md, README.md. These may include dated donor paths or older acceptance statements.
- For a new consumer, pin exact source files and hashes, verify full include closure, inspect register/bank/resource conflicts and test the resulting application on each claimed target.

Praeteritum ad futurum servamus.