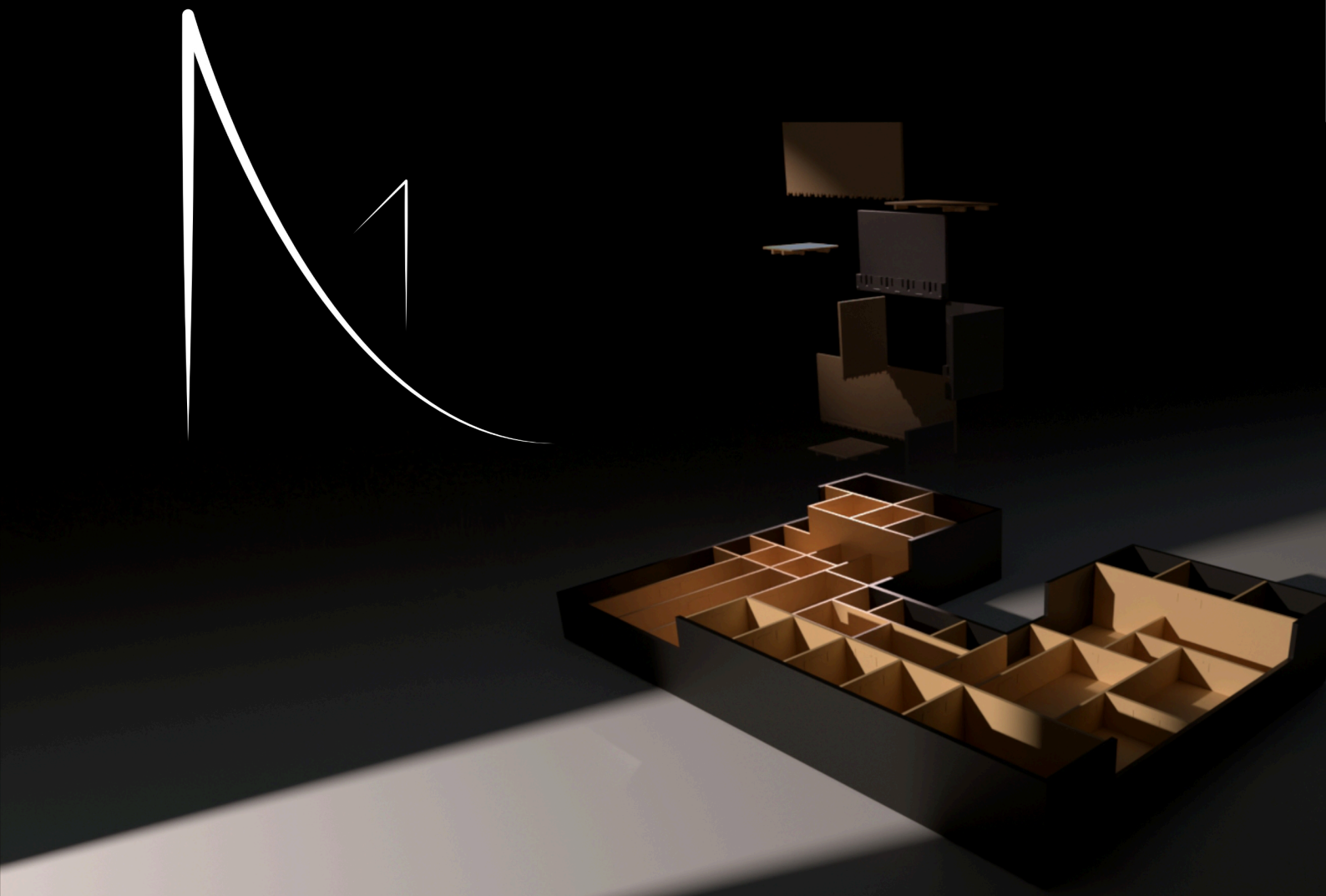
DOC ID: MNZ-TK-v1.1
Release: May 2026

Modunizer™

Test Kit Manual

Tolerance & Fit Validation Guide



© 2026 NexModulo Lab. All rights reserved.

System Introduction

Welcome to the Modunizer™ architecture.

Every module in this ecosystem was engineered with exact tolerances to deliver a rigid, uncompromising, and premium structural feel. Because every 3D printer has unique mechanical variances, we rely on physical validation to guarantee your final assembly is flawless.

The Objective

This Test Kit is your baseline validation tool. It is designed to help you identify the exact tolerance profile that perfectly matches your specific hardware, ensuring a smooth and secure lock before you begin printing the full system.

Hardware Baseline

- Material: Standard PLA or PETG is recommended.
- Slicer Profile: We designed this system to succeed using standard, out-of-the-box print settings. No specialized tuning or complex calibration is required.
- Nozzle: Standard 0.4mm nozzle.
- Support: No support needed
- Layer Resolution: 0.2mm for the B files | 0.12mm for the W files

  0.12mm is the recommended baseline. You can adjust between 0.20mm and 0.05mm based on your setup.

Kit Components

In this validation kit, you will test two core components:

- Test Blocks (B): Simplified validation modules designed exclusively to test the foundational base tolerances.
- Rail Inserts (W): Simplified validation modules designed exclusively to test the locking mechanics.

© 2026 NexModulo Lab

Structural Integrity & Material Variance

System Architecture:

In the final Modunizer ecosystem, absolute structural rigidity is achieved through the unified assembly of blocks, walls, and borders acting together, it does not rely solely on the individual block joints.

Validation Prerequisite:

Despite this distributed strength, your Test Kit results **must still be flawless**. You must be able to securely lock and intentionally disassemble these isolated components.

Material Variance:

Mechanical tolerance is **material-dependent**. A profile that works perfectly for one spool may feel different with another. We recommend testing two or three different filaments to observe how material properties influence your ideal fit.

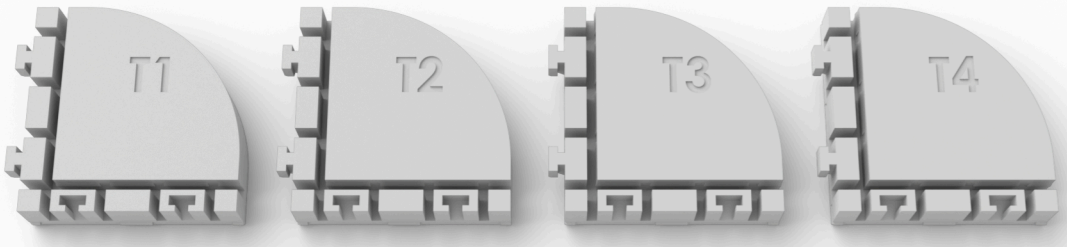
System Prerequisite:

A flawless Test Kit result is **mandatory**. If you cannot achieve an acceptable result with these test files, the final Modunizer files **will not** function correctly on your current setup.

© 2026 NexModulo Lab

File Directory The Test Kit folder contains 8 standard STL files, representing the four tolerance profiles for both component types.

B files



B1.stl B2.stl B3.stl B4.stl

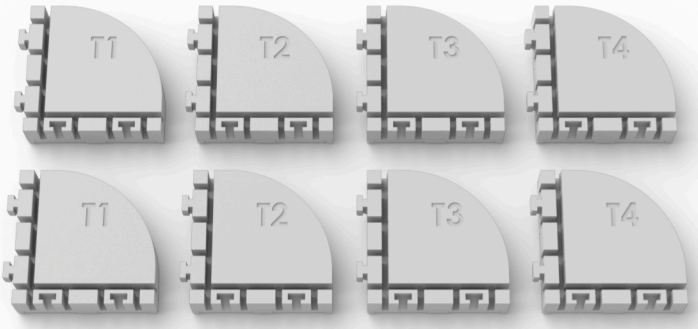
W files



W1.stl W2.stl W3.stl W4.stl

Required Print Quantities: 3D print two copies of each Test Block (B) and one copy of each Rail Insert (W).

Total B Components: 8
(2x B1, 2x B2, 2x B3, 2x B4)





Total W Components: 4
(1x W1, 1x W2, 1x W3, 1x W4)

Total Validation Set: 12 Printed Components

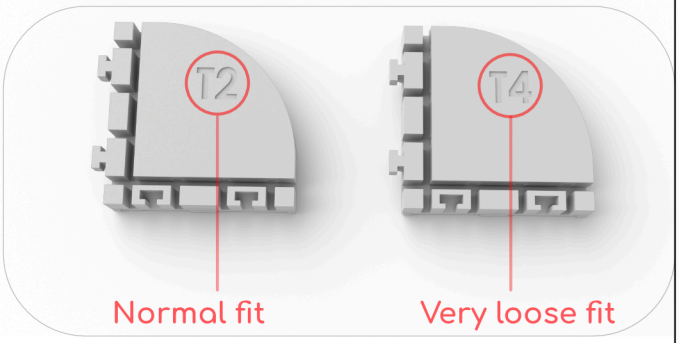
© 2026 NexModulo Lab

Tolerance Indicators ("T" Marks)

Every module features an engraved "T" indicator. This designates its specific tolerance profile and dictates the mechanical resistance of the lock.

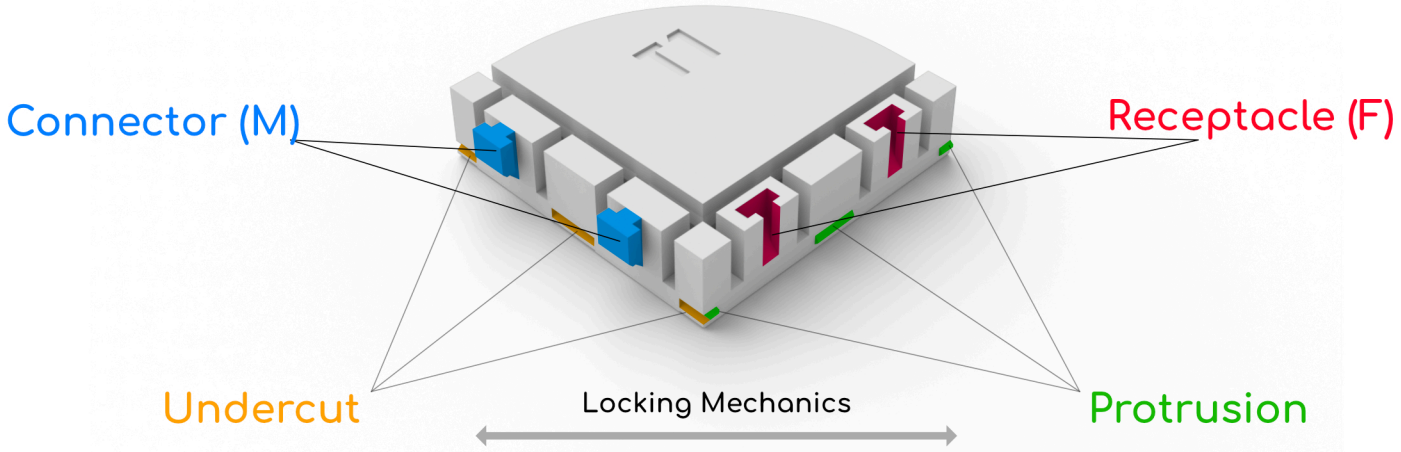
T1 : Maximum Interference (Very Tight)
T2 : Standard Profile (Firm)
T3 : Reduced Resistance (Loose)
T4 : Maximum Clearance (Very Loose)

Example

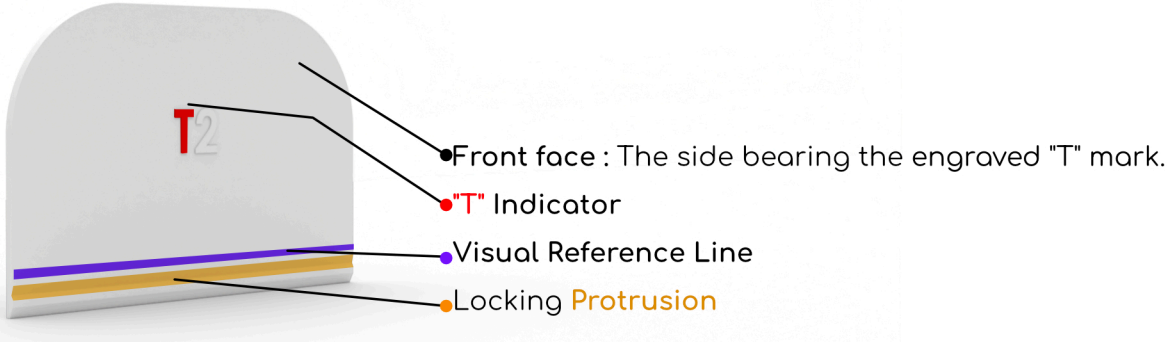


Test Block (B) Anatomy

Each block is designed with two distinct joint types and an integrated locking mechanism.



Rail Insert (W) Anatomy



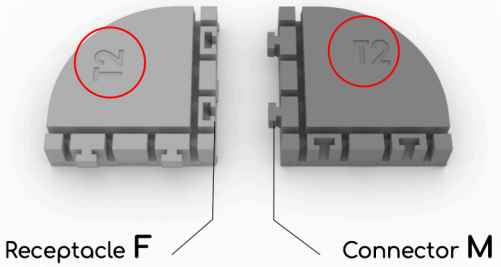
© 2026 NexModulo Lab

Assembly

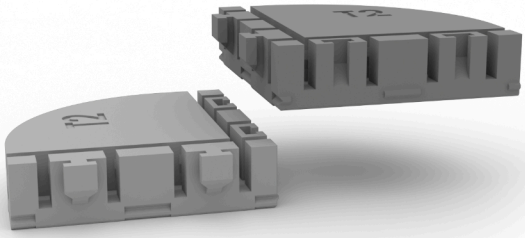
Important
Always begin testing
with **T4, then progress down to T1.**

Due to individual printer variance,
your ideal fit **will be unique.**
T4 offers maximum clearance,
while T1 provides a firm lock.

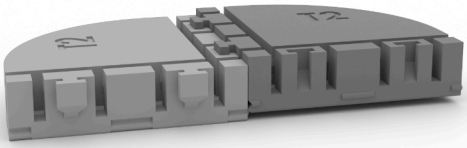
Ensure both parts share the **identical T-number.**



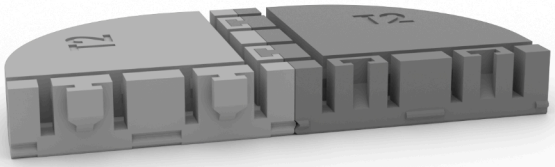
Position the Connector directly above the Receptacle joint.



Apply firm, downward pressure. You will feel mechanical resistance just before the locking mechanism snaps into place



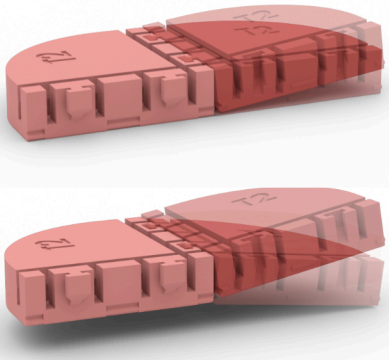
Snap-fit resistance will vary based on your selected tolerance profile (T1 – T4), the filament used, and the individual hardware.



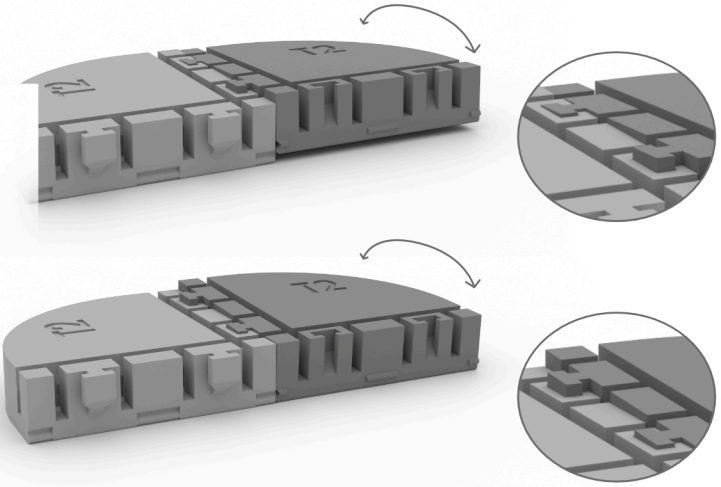
Disassembly

DO NOT

bend vertically. This will fracture the joints.

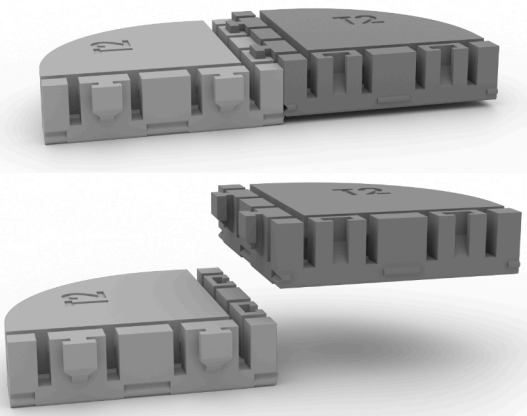


Apply a slight **lateral (left-to-right)** twisting motion while gently pulling upward to release the lock.



The twisting motion shown in the diagrams is exaggerated for demonstration purposes.

Once the lock is released, lift the module straight up to separate completely.



© 2026 NexModulo Lab

Rail Inserts (W)

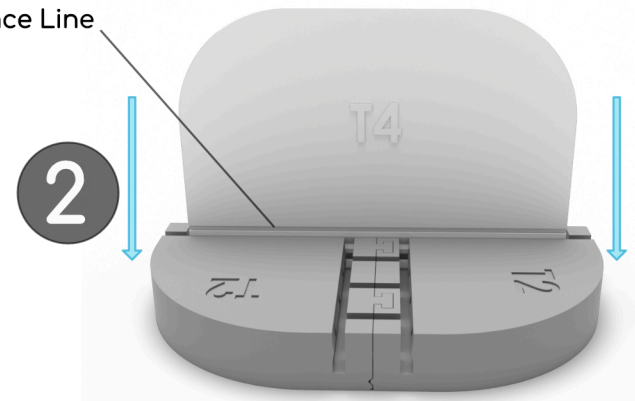
Assembly :

Face the setup toward you. Ensure the "T" mark on the Rail Inserts (W) faces the Test Blocks (B).

1



Press downward. You will feel mechanical resistance just as the reference line meets the Test Blocks (B) surface.



Push firmly until you feel a click. The reference line must be completely hidden to confirm a secure lock.

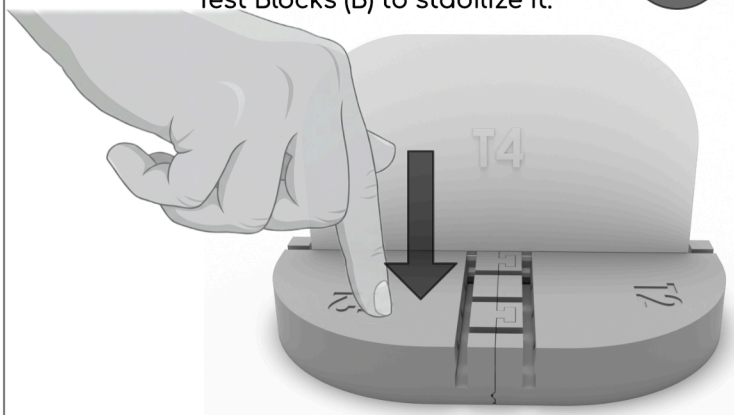
3



Disassembly

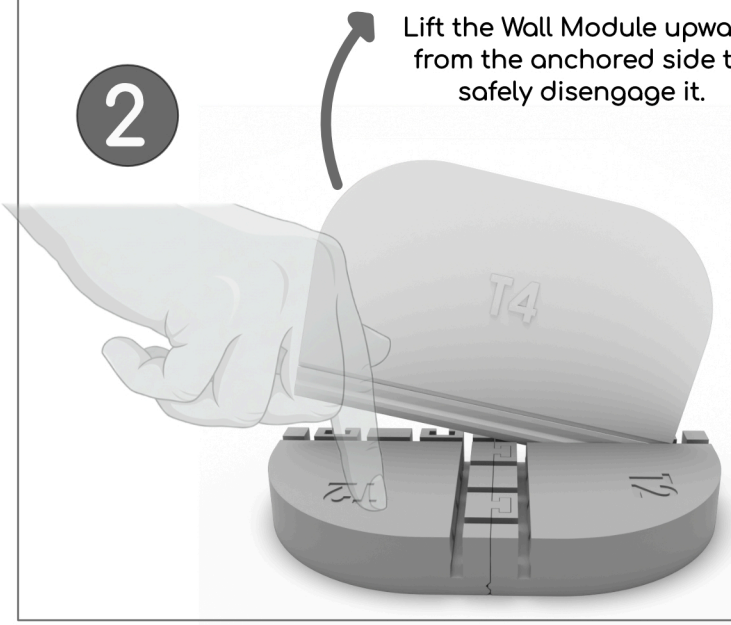
Firmly press and hold one side of the Test Blocks (B) to stabilize it.

1



Lift the Wall Module upward from the anchored side to safely disengage it.

2



Please note

The Rail Inserts (W) in this kit are simplified components for testing the fit and slide along the track. In the Modunizer system, the Walls and Dividers lock into place and do not slide.

The fit of the Test Block (B) and the Rail Insert (W) are strictly isolated. For example, if a T3 Rail Insert provides your ideal fit, it will perform identically whether it is mounted to a T1 or T4 Test Block.

© 2026 NexModulo Lab

Results

1. The Fit Test

Validation: The modules must remain securely locked, even when inverted and shaken vigorously. They should only separate through your intentional disengagement.

2. Mechanical Break-In

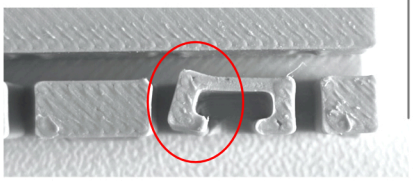
Smoothness: You can continuously assemble and disassemble the parts. Tighter tolerances (like T1) will feel rigid initially, but after a few cycles, the joints will naturally smooth out. This makes subsequent disassemblies fluid and relatively easy compared to the first attempt.

3. Troubleshooting Fractures & Permanent Locks

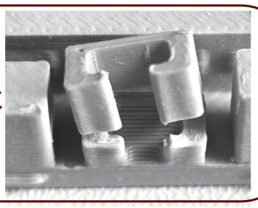
- **Loose Rail Inserts:** If the lock feels weak or lacks a secure "snap," test a different layer height. (0.2mm to 0.05mm)

- If a Receptacle (F) fractures during disassembly, or if the parts will not separate, review the following:

Over-twisting



Forcing a tight fit



Improper Motion: Never bend the parts vertically or over-twist them laterally. The twisting motion must be minimal, applied in small increments, and just enough to release the lock.

Excessive Force: Forcing an excessively tight tolerance can result in the parts becoming permanently assembled. We strictly advise against this. If it feels impossible to assemble smoothly, choose a looser profile.

Hardware & Material: We recommend standard, out-of-the-box slicer settings unless your specific setup requires custom tuning. If parts continue to break or fail, try testing a different filament or adjusting your slicer settings.

© 2026 NexModulo Lab

Precision is not an accident, it is engineered.

With this baseline established, your hardware is now perfectly fluent in the **Modunizer™** architecture.

The digital design and **your physical reality** are now perfectly aligned.

Every block, wall, and border you fabricate from this moment forward will integrate seamlessly your build. You now hold four mechanical profile required to build without limits, scale without friction, and organize without compromise.

The foundation is set. It is time to build **your masterpiece**.

NexModulo Lab

Even at this massive scale, this visualization represents
just a portion of the complete **Modunizer™ ecosystem**.



© 2026 NexModulo Lab