

MSX 16KB CARTRIDGE ROM

DOWNGRADE

REVERSE POWER PROTOCOL

CREATED & DESIGNED BY ANDREA ROBBA (2026)

DOWNGRADE

IDEATO DA ANDREA ROBBA

REVERSE POWER PROTOCOL:

PARTI AL MASSIMO POTENZIALE!

LV.4: VENTAGLIO 4X = 1 PT
LV.3: VENTAGLIO 3X = 10 PT
LV.2: PARALLELO 2X = 100 PT
LV.1: CONCENTRATO = 1000 PT

PRENDI [P] PER DOWNGRADE & X10

OBIETTIVO: 10.000 PUNTI/LIVELLO

PREMI SPAZIO O JOYSTICK

OFFICIAL FLIGHT OPERATIONS & TACTICAL WEAPON MATRIX MANUAL

Standard Operating Procedures, Reverse Energy Physics, Sector Hazards, and
Interface Specifications for MSX Computing Platforms.

DOCUMENT ID

DOC-DG-MSX-2026-EN

COMPATIBLE HARDWARE

MSX1 / MSX2 / MSX2+ / turbo R

DISPLAY ENGINE

TM59918A Screen 2 (256x192)

AUDIO ENGINE

AY-3-8910 Chiptune (128-Step PSG)

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SYSTEM ARCHITECTURE SPECIFICATIONS

DOWNGRADE is built from the ground up to exploit the full architecture of first-generation MSX computers (MSX1), utilizing advanced programming techniques inspired by landmark MSX vertical scrollers like *Freedom Fighter*.

VDP GRAPHICS ENGINE (TMS9918A)

- **Display Mode:** Graphics Mode 2 (Screen 2), 256 × 192 pixel resolution.
- **VRAM Structure:** 16 Kilobytes organized into 3 identical 2KB character banks across the Pattern Generator Table (PGT) and Color Table (CT).
- **Framerate Synchronization:** Perfect zero-lag 50/60 Hz synchronization locked to the BIOS vertical blank timer (JIFFY at 0FC9Eh).
- **Sprite Multiplexing:** Alternating forward/backward priority sort across the Sprite Attribute Table (1B00h) to eliminate sprite flicker.

AUDIO & STORAGE SUBSYSTEM

- **Sound Synthesis:** General Instrument AY-3-8910 Programmable Sound Generator (PSG) operating at 1.78977 MHz.
- **Chiptune Tracker:** Custom 128-step sound tracker engine with independent dual-voice melodies, basslines, and envelope-shaped drum kits.
- **Memory Architecture:** Exactly 16,384 bytes (16KB) ROM mapped to address space 4000h - 7FFFh.
- **Web Integration:** Embedded base64 bytecode cartridge running natively inside modern WebMSX emulators.

PERSISTENT WEAPON TIER PROTOCOL

Unlike early shooter prototypes where weapon status reverted upon stage completion, DOWNGRADE implements the **Persistent Weapon Tier Protocol**. The weapon power level achieved in a sector (`W:[1..4]`) is carried over directly into subsequent sectors, allowing expert pilots to start advanced stages with lethal, high-scoring concentrated beams.

MISSION DOSSIER: OPERATION DREADFALL

In the deep reaches of the Cygnus Perseus arm, an automated alien dread fleet known as the Citadel Armada has established a planetary interdiction grid. Humanity's frontline defense command has deployed its lone prototype starfighter, the **SF-01 "Hyperion"**, equipped with an experimental Dark-Matter Singularity Hyper-Core.

THE REVERSE POWER PARADOX

Upon launching into combat, the experimental reactor immediately suffers a supercritical thermal lock. All four plasma emitter conduits lock open at maximum 1,000% capacity (Tier 4 Quad Fan).

The Physical Dilemma: At full dispersion, 99.9% of the reactor's kinetic output is lost as ambient thermal dissipation into the void. Firing wide fan spreads destroys minor interceptors with ease, but produces almost zero concentrated jump-telemetry data—rewarding a meager **1 POINT per kill**.

To initiate the **Hyperspace Warp Jump** and escape to the next sector, the ship's computer requires **10,000 points of high-density jump data**. Continuing to fire at maximum power will cause core collapse long before the 10,000-point threshold can be attained!

THE REVERSE POWER PROTOCOL (RPP)

To prevent catastrophic meltdown and rapidly generate warp coordinates, the pilot must execute the **Reverse Power Protocol**. By collecting cryogenic **Power-Down Pods [P]**, the ship intentionally clamps its emitter array, stepping down the weapon matrix:

STEP-DOWN CONDENSATION

Each captured **[P] Pod** down-clocks the cannon array: from 4-way fan down to 3-way, then 2-way parallel, and finally to a single razor-thin singularity lance.

As the beam narrows, beam coherence increases exponentially! The score value awarded per interception multiplies tenfold with every downgrade step: **1 PT → 10 PTS → 100 PTS → 1,000 PTS!**

TACTICAL RISK VS. REWARD

At Tier 1 (Singularity Lance), destroying just **10 enemies** awards the full 10,000 points needed to complete the entire sector!

However, the pilot loses all lateral defensive coverage. Survival requires flawless precision aiming, intense forward aggression, and hair-trigger evasion against incoming plasma volleys.

PILOT FLIGHT CONTROLS

The SF-01 flight computer responds to both standard MSX keyboard inputs and standard 2-button MSX joysticks connected to Port 1 or Port 2:

MANEUVER / ACTION	KEYBOARD INPUT	MSX JOYSTICK	OPERATIONAL FUNCTION
Flight Navigation	Arrow Keys	Directional Stick / D-Pad	Full 8-axis omnidirectional movement across the combat sector.
Primary Fire	Spacebar	Trigger A / Button 1	Continuous rapid-fire plasma cannon discharge.
Launch Mission	Spacebar	Trigger A / Button 1	Initiates flight deployment from the Title Screen.
Tactical Menu Return	M Key	—	Instantly returns to Title Menu from Game Over or Victory screens.

HEADS-UP DISPLAY (HUD) TELEMETRY

SC:00480LV:1SH:3W:[4]

Real-time tactical HUD during Sector 1 Cygnus Void engagement

HUD REGISTER BREAKDOWN

- SC:00480 (Score Accumulator):**
Displays cumulative mission score. Reaching **10,000 points** in any sector immediately initiates the Sector Clear sequence.
- LV:1 (Sector Indicator):**
Indicates the active operational zone (Sector 1 through Sector 5).
- SH:3 (Shield / Hull Reserves):**
Number of reserve starfighters remaining before total mission failure.
- W:[4] (Weapon Matrix Status):**
Active weapon tier (4, 3, 2, or 1). Dynamically color-coded: Cyan [4], Green [3], Gold [2], Red [1].

CRITICAL SYSTEM DIRECTIVE: MENU RETURN VIA 'M' KEY

When an engagement concludes—whether resulting in ship destruction (Game Over) or total sector conquest (Victory)—the tactical link displays the prompt `PREMI [M] PER IL MENU`. Pressing the **M** key resets the system and returns to the Title Screen.

REVERSE WEAPON MATRIX ANALYSIS

The weapon matrix governs the dispersion angle, projectile count, and telemetry yield of the SF-01's cannons. Below is the comparative breakdown of all four weapon tiers:



TIER	DESIGNATION	DISPERSION	SCORE / KILL	TACTICAL COMBAT EVALUATION
LV.4	Overcharged Quad Fan	4x Wide Spray	1 POINT	Maximum screen coverage. Intercepts multiple enemy lines simultaneously, but requires 10,000 kills to clear the sector.
LV.3	Triple Vulcan Array	3x Medium Fan	10 POINTS	Balanced defensive coverage with 10x increased data collection. Excellent against staggered drone formations.
LV.2	Twin Parallel Ion	2x Forward Axial	100 POINTS	Concentrated dual stream. Pierces heavily armored hulls with rapid lethality. 100 kills clears the sector.
LV.1	Singularity Core Lance	1x Ultra-Dense Beam	1,000 POINTS	Absolute energy concentration. Obliterates targets instantly. Only 10 kills required to clear the sector!

THE REVERSE SCORING MECHANIC

Every enemy craft destroyed awards a base score determined solely by the active weapon tier. While an uninitiated pilot might feel safer with the wide 4-shot spread, high-level combat doctrine demands down-clocking to Level 2 or Level 1 as early as possible.

COLLECTING COOLING PODS IPI

Floating octagonal **[P] Pods** appear periodically during combat. Touching a pod instantly engages the next lower tier (e.g., Level 4 → Level 3), triggering an audio confirmation chime and increasing score gain tenfold.

PLANETARY DEFENSE GRID: THE MOVING LASER BARRIER

The Citadel Armada has deployed automated high-voltage laser barriers that sweep downward across the screen. This lethal obstacle presents one of the most critical flight hazards in deep space.



LASER BARRIER SPECIFICATIONS

- **Plasma Core:** High-density energy beam rendered in pure incandescent white (0F1h) with cyan/blue gradient discharge arcs.
- **Reinforced Emitter Cones:** Specially insulated magnetic tips (Tile 11h and 12h) bounding the safe corridor.
- **Vertical Descent:** Sweeps steadily from top to bottom at regular intervals, forcing immediate pilot reaction.
- **Lethal Contact:** Any contact between the SF-01 hull and the active laser beam results in instantaneous structural vaporization!

THE SAFE CORRIDOR PASSAGE & BACKGROUND INTEGRITY

Every descending laser barrier features a calibrated **Safe Corridor Gap** spanning 6 character columns (48 pixels wide). The flight computer has been updated to preserve all sensor integrity:

- **Zero Background Loss:** As the barrier advances, underlying background stars, nebulae, and asteroids are completely preserved and shine through the open corridor.
- **Corridor Alignment:** The SF-01 has a 16-pixel wingspan. Pilots must align within the 48-pixel gap to safely slip through the descending barrier.

HULL INTEGRITY & QUANTUM RESPAWN PROTOCOL



DETONATION DYNAMICS & RECOVERY

Upon lethal impact with enemy plasma or contact with laser barriers, the hyper-core triggers a 45-frame detonation sequence:

- **Phase 1 (Frames 0-14):** Incandescent white thermal flash with superheated core collapse.
- **Phase 2 (Frames 15-29):** Expanding fiery red shockwave scattering yellow structural debris.
- **Phase 3 (Frames 30-44):** Dispersing gray combustion smoke and lingering embers.
- **PSG Shockwave Audio:** Low sub-bass frequency sweep paired with resonant noise burst.
- **Quantum Shield Respawn:** Reserve craft phases in with 60 frames (1s) of blinking invulnerability.

HOSTILE RECONNAISSANCE INTEL

SCOUT INTERCEPTOR

High-velocity dart drones designed for swift harassment. They deploy in flanking formations, diving toward the lower screen. Vulnerable to all weapon tiers. Dynamically colored per sector for maximum contrast against colored space.

TITAN DREADNOUGHT

Heavy armored gunships equipped with twin plasma batteries. They discharge pulsating energy spheres and absorb significant damage. Extremely dangerous in tight corridors. Palette shifts per sector to guarantee crystal-clear visibility.

SECTOR DIRECTORY & NAVIGATION LOG

SECTOR	ENVIRONMENT	ATMOSPHERE & CONTRAST PALETTE	TACTICAL HAZARDS
SECTOR 1	Cygnus Void	Deep Void Blue background (#04). Gold Interceptors, Crimson Dreadnoughts.	Initial scout reconnaissance waves; light barrier sweeps.
SECTOR 2	Asteroid Drift	Dark Crimson deep belt (#06). Cyan Interceptors, Emerald Dreadnoughts.	Heavy collision hazards; narrow evasion corridors.
SECTOR 3	Solar Flare	Emerald radiation aura (#0C). Crimson Interceptors, Gold Dreadnoughts.	Rapid drone waves; frequent laser barrier deployments.
SECTOR 4	Crystal Nebula	Magenta cosmic dust (#0D). Cyan Interceptors, Gold Dreadnoughts.	Cross-firing enemy gunships; high-density plasma traps.
SECTOR 5	Dread Citadel	Imperial Navy Indigo (#04). Gold Interceptors, Crimson Dreadnoughts.	Maximum enemy fleet saturation; relentless barrier sweeps.

THE CRYOGENIC POD [P]

The octagonal [P] Pod is your greatest ally. Rather than an upgrade, it represents core-cooling condensation. Prioritize capturing every [P] pod that drifts into your flight path!

STAGE CLEARANCE & WARP TRANSITION



THE 10,000-POINT JUMP SEQUENCE

Once 10,000 points are recorded, the stage instantly freezes:

- All active enemies and hostile ordnance are cleared.
- A celebratory polyphonic PSG victory fanfare sounds.
- The ship executes an automatic forward warp jump.
- **Weapon Level Preserved:** You enter the next sector retaining your exact weapon tier!

ACE PILOT TACTICAL DOCTRINE

THE "BLITZ DOWNGRADE" STRATEGY

Do not linger at Tier 4. Aggressively intercept the first three **[P] Pods** to reach Tier 1 within the opening seconds. At 1,000 points per kill, destroying just 10 enemy ships triggers an instant Hyperspace Jump!

BARRIER GAP ANTICIPATION

When a barrier appears at the top of the radar, do not stay centered. Immediately identify the safe corridor gap and position the SF-01 directly beneath it while firing upward through the gap to destroy incoming enemies.

ENGINEERING & HISTORICAL CREDITS

Original Game Concept, Architecture & MSX Assembly Implementation by

ANDREA ROBBA (2026)

Dedicated to the enduring legacy of 8-bit MSX computing, the TMS9918A Video Display Processor, and the AY-3-8910 Programmable Sound Generator.