POD 06: AUTONOMOUS 64x64 RGB LED MATRIX DISPLAY POD (0% PICO • 100% DISCRETE HARDWARE SCAN ENGINE)

DUAL-PORT VRAM MEMORY

Address: 0xE000 - 0xEFFF (4 KB)

AS6C62256 / IDT7132 Dual-Port SRAM

Port A (Relay CPU): Asynchronous read/write access

Port B (Display Engine): Continuous autonomous hardware read

Contention-free arbitration via READY_WAIT handshake

Hot-Pluggable: CPU computes uninterrupted when display is removed!

Pixel Memory Mapping (64x64 x 3-Bit RGB)

4,096 RGB pixels directly memory-mapped

Bit 0: Red • Bit 1: Green • Bit 2: Blue

Fast graphics routines via direct CPU store instructions

Refresh Rate: 120 Hz flicker-free

Bus Interface: 40-Pin CLACK-BUS J_CLACK_STACK

100% THT Components • 0% Raspberry Pi Pico

HARDWARE SCAN ENGINE

Autonomous THT Counter Logic

10/20 MHz THT DIP-8 Crystal Oscillator

74HCT4040 12-Bit Ripple Counter

74HCT161 Synchronous Binary Counter

Generates row addresses (A, B, C, D, E) for 1:32 scan

100% Microcontroller-Free Design!

Signal Timing for HUB75E Protocol

CLK: Pixel shift clock (5 MHz)

LAT: Row latch pulse

OE_n: Output Enable PWM brightness control

Row Multiplexing: 32 double rows (Upper/Lower)

Discrete 74HCT245 bus drivers for pristine signal levels

Autonomous operation without CPU interrupts

WAVESHARE P2 64x64 RGB PANEL

128 x 128 mm • ASIN B0BQYF5NR6

Standard 16-Pin HUB75E Interface

Pins R1, G1, B1: Upper 32 rows (RGB data)

Pins R2, G2, B2: Lower 32 rows (RGB data)

Pins A, B, C, D, E: 5-bit row address lines

Direct connection via J_HUB75 shrouded header

Isolated Panel Power Terminal (TB_DISP_5V)

5V / 3A screw terminal for LED panel

Offloads the CPU backplane power rail

Full brightness and vibrant color reproduction

Frontpanel cutout: 130 x 130 mm

Integrated mounting bracket for Eurocard 3U rack

Zero-Defect Release for CLACK-MAINFRAME

16-BIT DATA BUS (D0..D15) & VRAM ADDRESS DECODER (0xE000 - 0xEFFF)

16-BIT RELAY MAINFRAME (CLACK-MAINFRAME)

POD 06: AUTONOMOUS MATRIX DISPLAY POD

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Standard & Specification: **Eurocard 3U • 40-Pin CLACK-BUS • relaycomputer.org**	Date: **2026-11-04**	Rev / Sheet: **v2.0 (1 / 1)**