GRAPHICS ENGINE

YGV642 VC1H

Cutting-edge GDC with Sprite Architecture

⊗YAMAHA
CREATING 'KANDO' TOGETHER

"Master of Animating"

Fully-featured animations are possible for a simple system enabled by this GDC.
Experience the cutting-edge "easiness yet quality" display technology
accomplished by the Yamaha's proprietary
sprite-based control mechanism and graphics data compression method.
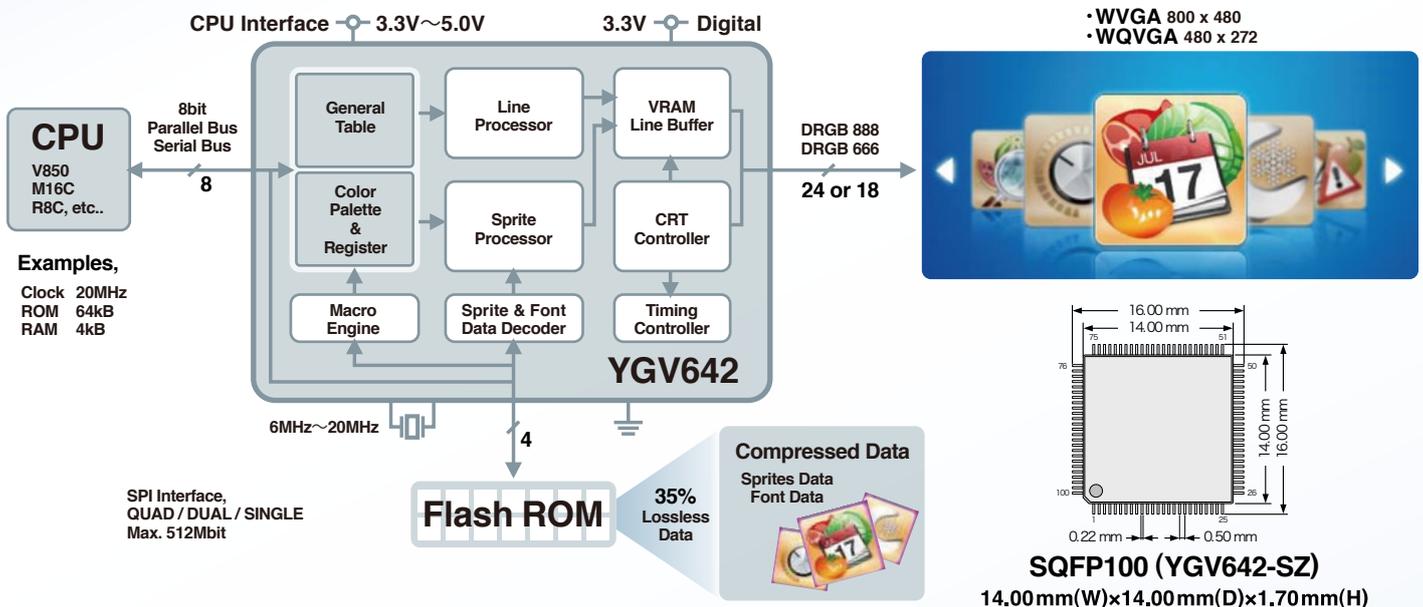Feel the new "norm" for yourself.

APPLICATIONS

▶ **Washing Machines**

▶ **Microwaves**

▶ **Rice Cookers**

▶ **Refrigerators**

▶ **Health-care and Medical Equipment**

▶ **FA equipment**

▶ **Automotives**

Features Summary

▶ **Sprite-based drawing architecture enables to implement GUI with only several bytes of control data.**

▶ **341 Sprites per screen at maximum are displayed simultaneously**

▶ **Animation of ARGB8888 at 60 fps is supported.**

▶ **Graphics data is compressed approximately to 1/3 to reduce memory size drastically.**

▶ **Adobe® Flash® can be used for authoring graphic contents.**

▶ **Up to SVGA (800 x 600) panel is supported.**

APPLICATION DIAGRAM

CPU Interface — 3.3V～5.0V   3.3V — Digital

CPU
V850
M16C
R8C, etc..

8bit
Parallel Bus
Serial Bus
8

Examples,
Clock 20MHz
ROM   64kB
RAM   4kB

General Table
Line Processor
VRAM Line Buffer

Color Palette & Register
Sprite Processor
CRT Controller

Macro Engine
Sprite & Font Data Decoder
Timing Controller

YGV642

6MHz～20MHz

4

SPI Interface,
QUAD / DUAL / SINGLE
Max. 512Mbit

Flash ROM

35%
Lossless
Data

Compressed Data
Sprites Data
Font Data

DRGB 888
DRGB 666
24 or 18

• WVGA 800 x 480
• WQVGA 480 x 272

JUL 17

16.00 mm
14.00 mm
14.00 mm
16.00 mm
75   51
76   50
100   26
1   25
0.22 mm   0.50 mm

SQFP100 (YGV642-SZ)
14.00mm(W)×14.00mm(D)×1.70mm(H)

GRAPHICS ENGINE

Various features for rich expression

Each sprite is associated with a twelve-byte attribute data that defines its position, scaling, transparency, colors, and all the other features. A macro command execution engine is available to control these attribute data making it possible to animate them at 60 fps easily. The macro command engine is triggered by a host CPU as well as macro command stored in Flash ROM to further reduce a host MCU load.

Alpha-Blending Between Layers
Pixel-by-pixel blending controls

Clipping (Masking)
Sprites, Texts, or Lines can be used as masks

Animation
Macro Commands allow complicated animations easily

Authoring Supports
Data authored in Adobe Flash format can be converted for use in Yamaha-supplied authoring tool.

SPRITES
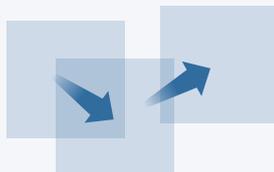
Number of Sprite
Up to 341 per frame

341

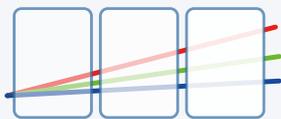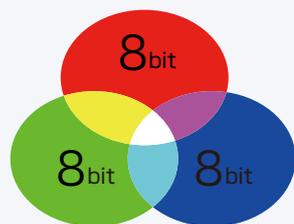### Size
512 dot

8

8

8dot /Step

512 dot

Scaling

Positioning

Alpha-blending
8bit (256 levels)

Color Palettes
1024 colors selectable from;

512 sets of 2-color palette
64 sets of 16-color palette
16 sets of 64-color palette
4 sets of 256-color palette
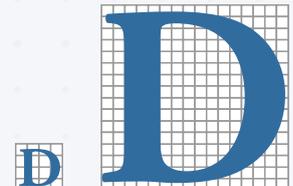Flexible configuration

Colors
Supports 2-, 16-, 64-, 256-color palette out of 24-bit RGB
Or 16-, 18-, 24-bit RGB True color

8bit

8bit   8bit
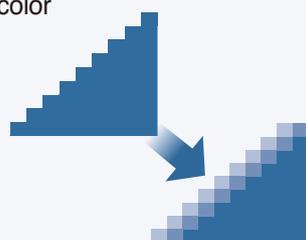
Anti-aliasing

TEXTS

Up to 1,864 fonts per screen
Up to 64 fonts per scan line

ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDE **1,864 letters** WXYZ
ABCDE   WXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ

Font Size
From 1×1 to 64×64 in pixel

D   D

Font Rendering
Supports proportional font and kerning

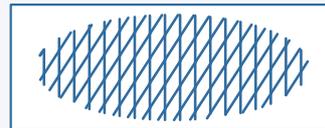Windows-Web Design
↓
Windows-Web Design
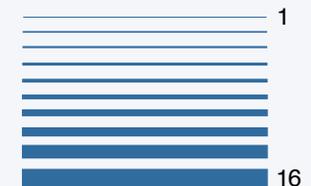
Anti-aliasing Font Data
Support 4bit/pixel format

LINES

Up to 510 lines per screen
Direct draw by specifying its start and end point coordinates

1- to 16-dot width per line

1

16

32,768-color RGB

5bit

5bit   5bit

Anti-aliasing