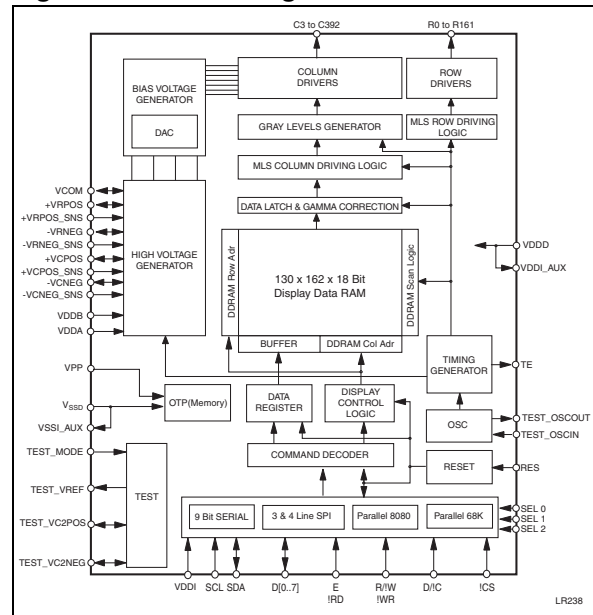# STE2028

162 x 130 RGB single-chip true 262k color LCD controller driver

Data Brief

Features

- 162x130 RGB display matrix
- 385K Bits display data RAM
- 2M color palette
- 262k color mode
- Dual partial display mode
- Partial vertical scrolling
- Programmable number of lines
- N-line inversion
- Programmable frame rate over temperature
- Digitally programmable LCD voltage (up to 1024 steps)
- Digitally programmable LCD voltage compensation over temperature
- Selectable input interface:
  - 68000 & 8080 Parallel interfaces (read and write)
  - 3-lines and 4-lines SPI interface (read and write)
  - 3-lines 9-Bit serial interface (read and write)
- 1 Look-up table for gamma setting
- Fully integrated oscillator requires no external components.
- Fully integrated bias system and voltage generator
- Advanced MLS driving scheme for optimal color images rendering (P=4).
- Designed for chip-on-glass (COG) and chip-on-foil (COF) applications
- Interface supply voltage range from 1.65V to 3.6V
- Logic supply voltage range from 1.65V to 1.95V
- High voltage generator supply voltage range from 2.2V to 3.6V

- Display supply voltage range from 4.5V to 20.8V
- One time programmable (OTP) non volatile embedded memory
- On chip calibration (with OTP Cells) of key configuration parameters
- Specific mode functionality to drive displays smaller than 162x130 (such as 160x128)

Figure 1.   Block diagram

Description

The STE2028 is a low power CMOS LCD controller driver featuring an extremely low current consumption.

Designed to drive a 162 rows by 390 columns or 262k colors graphic display, with MLS (Multi-line-selection) algorithm, the STE2028 provides all the necessary functions in a single chip, including on-chip LCD supply and bias voltage generators, resulting in a minimum of externals components.

For further information contact your local STMicroelectronics sales office.
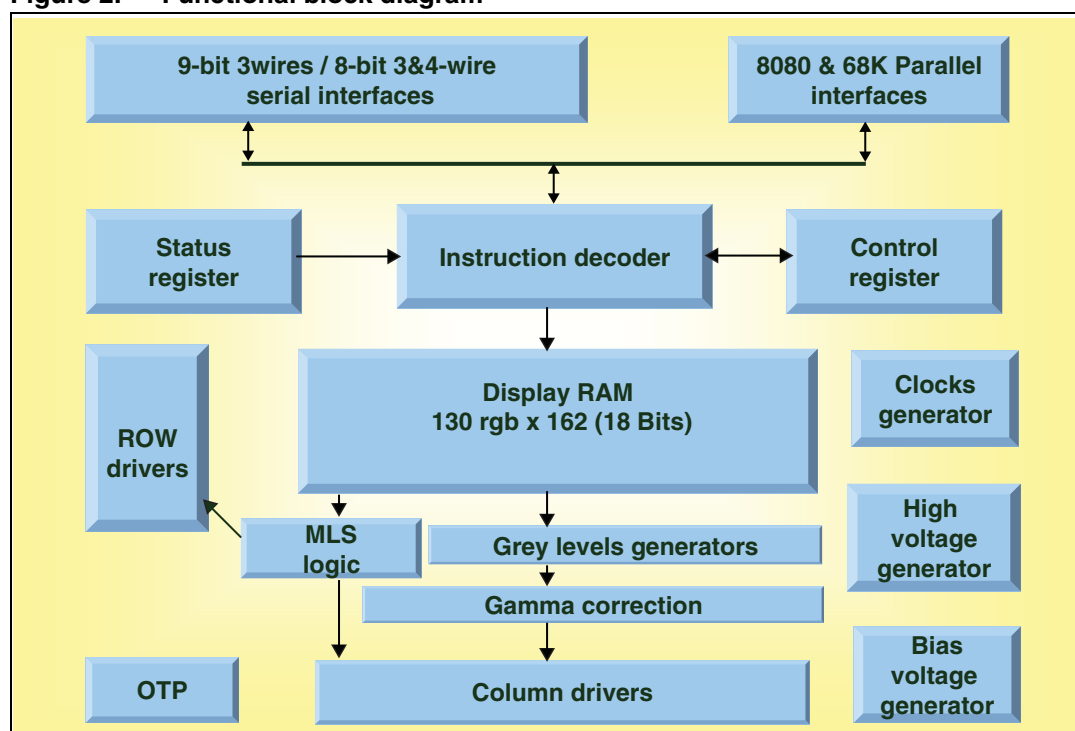
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Description (continued)

The different shades of gray are achieved with algorithms aimed to minimize the refresh rate, current consumption and enable the use of new high speed CSTN (Color-Super Twisted Nematics) fluids. A complete set of digital functions limits the host controller overhead to manage complex display configurations and fast moving images data transfers to driver RAM. STE2028 features five standard interfaces (3-lines Serial, 3-lines SPI, 4-lines SPI, 68000 Parallel & 8080 parallel) for easy of interfacing with the host micro-controller.

Table 1.   Key features and benefits

Features	Benefits
Most integrated solution	Only four external caps
Low power solution	Competitive consumption figures
Fully integrated OTP	Flexible and integrated module maker parameter settings with low area consumption
262k color and 65k color, embedded RAM, 130 RGB x 162	The best solution for low-cost 262k color displays

Figure 2.   Functional block diagram

Note: STMicroelectronics is neither licensed nor authorized to license its customers under one or more patents held by Motif Corporation to use this integrated circuit in the manufacture of liquid crystal display modules. Such license can be obtained by Motif Corporation.

Ordering information

Table 2.   Order codes

Part number	Description
STE2028D3	Bumped dice on waffle pack

Revision history

Table 3.   Document revision history

Date	Revision	Changes
19-Dec-2006	1	Initial release.
18-Jun-2007	2	Added a note on patents held by Motif Corporation and updated the display resolution to 162 x 130.

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