With the widespread distribution of navigation equipment and portable phones, a variety of information has come to be available though an internet connection, even in cars. The recent distribution of DVD’s have also greatly expanded the amount of available information, and it is now important to present information to the user in a user-friendly format.

Accordingly, the display device has been replaced with a high resolution VGA (Video Graphics Array), and a touch panel has been implemented as an input device. Now it is possible to operate just by touching the displayed image on the screen directly.

Here we introduce an IC that can display TV screens, while allowing compatibility with touch panel operation and high resolution VGA LCD display devices.
Introduction

2.1 VGA Display Section Configuration

2.2 ASIC Built-in Features

VGA Display ASIC Overview

Image Signal Input to the Display Section

- Composite Video Signals
- EGA-RGB Signals (Resolution: 400 234 / 480 234 dots)
- WVGA-RGB Signals (Resolution: 800 480 dots)

<Diagram>
Description of Circuit Blocks

3.1 VNR (Video Noise Reducer)


Development of ASIC for VGA Display
### 3.2 Y/C Separation Circuit

The Y/C separation circuit is designed to separate the luminance (Y) and chrominance (C) signals. This is crucial for color television systems as it allows the reconstruction of the original image with faithful color representation. The circuit is composed of several stages that perform specific functions to achieve this separation.

#### 3.2.1 Basic Process

The basic process for the Y/C separation involves the use of a high-pass filter and a low-pass filter. The high-pass filter is used to separate the chrominance information, while the low-pass filter retains the luminance information. This separation is critical for maintaining the color integrity of the image.

#### 3.2.2 Measures for Weak Electrical Fields

To handle weak electrical fields, additional circuitry is incorporated into the Y/C separation circuit. This includes protective measures to ensure that the circuit is not affected by external electrical disturbances. These measures are essential for maintaining the performance and reliability of the television system in various environments.

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### 3.3 RGB Decoder

#### 3.3.1 Basic Process

The RGB decoder converts the input signals into red (R), green (G), and blue (B) color signals. This process involves the extraction of color information from the input signal and the generation of specific levels for each primary color. The decoder must accurately interpret the input data to ensure that the final output is visually accurate.

#### 3.3.2 Measures for Weak Electrical Fields

Incorporating measures for weak electrical fields is crucial for the reliable operation of the RGB decoder. This includes the use of shielding and filtering techniques to mitigate the effects of external electrical disturbances. These measures help to maintain the integrity of the color signals and ensure consistent performance across different environments.

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### 3.4 Screen Enlargement/Reduction

#### 3.4.1 Interpolation Method

The interpolation method is used to increase or decrease the size of the image on the screen. This process involves the calculation and estimation of pixel values between existing pixels to achieve the desired screen size. The interpolation method is critical for maintaining image quality when altering the screen size.
Development of ASIC for VGA Display

3.4.2 Image Display

3.5 Resolution Conversion

3.6 LCD Panel Interface

Physical Specifications of the ASIC

Merits of Changing to LSI
Performance Comparison with Products of other Companies

- [Table and details]

Profiles of Writers

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