



Programmable LCD and TFT key switches

What are ScreenKeys?

ScreenKeys are programmable electro-mechanical pushbutton key-switches, and combine a graphical LCD display with multi-color LED backlighting. ScreenKeys change function and display text, graphics and animations under software control.

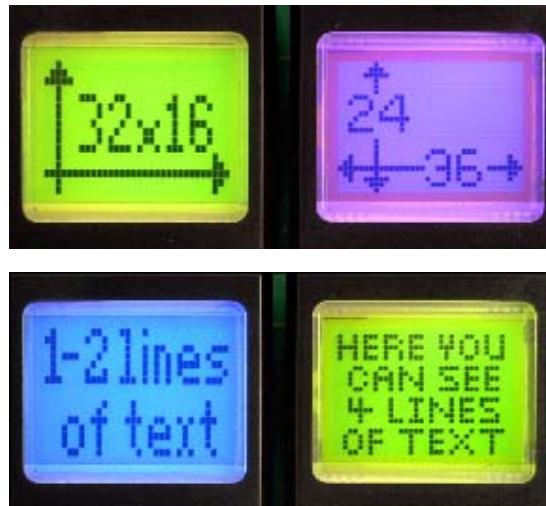
ScreenKeys are intelligent and multi-functional, therefore two ScreenKeys can do the job of a panel of dedicated function keys. The user is presented with pertinent information at the required times, thus minimizing operator confusion and input delays.

ScreenKeys employ many novel and unique features:

- ScreenKeys utilize ASIC technology to allow the external interface to drive the LCD panel and backlight control using just four pins. A separate circuit provides the keyswitch contacts.
- Under software commands, different colors and light intensities may be obtained by mixing the different LED states.
- A unique light guide mechanism allows for highly uniform light diffusion.

ScreenKey Features

- Single-chip ASIC design
- Freely programmable
- Displays text, graphics and animations
- Simple control via 4 connections
- Integrated graphics controller
- Internal refresh display
- Single power supply voltage
- Integrated push-button switch
- Soft-touch or Tactile feedback switch mechanism
- RGB spectrum LED backlighting



Why use ScreenKeys?

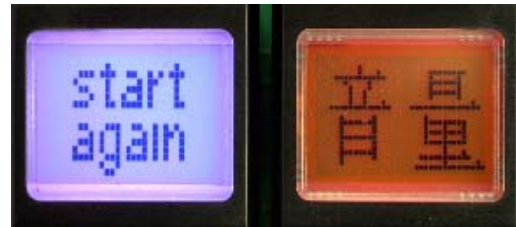
ScreenKeys provide engineers and system designers with the ultimate in programmable LCD keyswitch technology. ScreenKeys have many competitive advantages over illuminated switches and other programmable LCD keyswitches in the market, including:

Design Strengths

- Integrated graphics and LED control in a single ASIC package
- Single-chip ASIC design minimizes potential field failures
- Only 4 pin connections for LCD and LED control
- Stable and established interface command set
- Easy integration into OEM customer designs
- Low spring noise (silent operation)
- Minimal Lateral movement
- -10°C to +70°C Operating temperature
- -20°C to +80°C Storage temperature

Display Characteristics

- Widest LCD viewing angles in the marketplace
- Most uniform backlight illumination in the marketplace
- Best contrast ratio in the marketplace
- Managed consistency in LED brightness and colour levels



Reliability

- Proven and reliable technology with established track record (12+ years)
- All product derivatives in mainstream production
- Extremely high customer satisfaction

Support Tools

- Variety of CPU-development kits available
- Variety of Windows-based software development tools available

ScreenKey Evaluation, Prototyping and Development Kits

A range of support and development tools are available to simplify the evaluation and rapid prototyping of ScreenKey technology.

DemoComII

The DemoComII is a simple microcontroller board with two onboard ScreenKeys, one of each resolution. There are connections to fit another two ScreenKeys. This unit is supplied with working example source code that can be compiled with a freely-downloadable open-source C-compiler. You will need a MCU programmer that supports the Atmel 89C55WD MCU to program and run your own firmware on this board.

OEM-5400

The OEM-5400 is a Windows evaluation system that comes with a panel of 12 ScreenKeys. It connects via a RS232 interface to a host control system. If using a Windows PC as a host controller, we offer a suite of development tools to rapidly develop and deploy ScreenKey solutions. This software suite includes ActiveX/COM tools that range from simple low-level individual ScreenKey control through to a standalone COM server that manages the 12-ScreenKey panel remotely based on a user-defined hierarchical menu system.

DemoComII – Microcontroller Prototyping & Development Kit

The ScreenKey DemoComII is a development kit for embedded software and hardware design engineers. It enables them to familiarise themselves with ScreenKeys and to learn how the ScreenKey interface and command set operates.

The DemoComII Microcontroller Development Kit includes:

- DemoComII microcontroller board
- 9Vdc power supply
- CD ROM with firmware source code, schematic diagram, application note and support tools



The kit is designed around the Atmel 89C55WD microcontroller (8051 core) and includes two onboard ScreenKeys – one of each resolution (32x16 and 36x24). It is delivered with pre-programmed firmware that demonstrates the ability to display text, graphics and backlight colours on ScreenKeys. A full schematic diagram is provided for this hardware. A parallel-to-serial converter is used to clock data out to the ScreenKey. This design greatly simplifies the driving software and enables fast update of the ScreenKey LCD.

Note: This hardware design is recommended as a preferred method to interface to ScreenKeys. The firmware source code for this application is provided with the kit. This code demonstrates how to implement the different ScreenKey interface commands. It also shows how to implement a text-to-graphic conversion and demonstrates how to display graphics on a ScreenKey, etc. The low-level core of this code may be used to facilitate rapid application development by reusing the low-level and hardware-specific functions.

The firmware source code for this kit is written for the Keil 'C' cross-compiler. A size limited version of this compiler may be downloaded directly from the Keil website (www.keil.com). It is very straightforward to translate this source code to operate with another cross-compiler. The source code and schematic are easily translated for other microcontroller families.

The kit is offered in two different configurations:

- LC16/LC24 ScreenKeys (i.e. RG only)
- RGB16/RGB24 ScreenKeys (i.e. RGB keys only)

Connection points provide the ability to add another two ScreenKeys (of any type).

OEM-5400 Development Kit

The OEM-5400 Development Kit is the ideal starting point for Product and System Designers who want to fully integrate ScreenKey technology into their own product designs. The OEM-5400 Development Kit includes one panel of 12 ScreenKeys (3x4 matrix configuration). The unit operates via standard serial RS-232 interface.

Component parts:

For rapid evaluation and prototyping, the OEM-5400 Development Kit comprises of the following:

- OEM-5400 CPU Controller Board
- 5V DC Power Supply Unit
- Data/Power Cabling
- Windows Software Suite (CD-Rom)
- 1 panel of 12 ScreenKeys (3x4 matrix configuration)

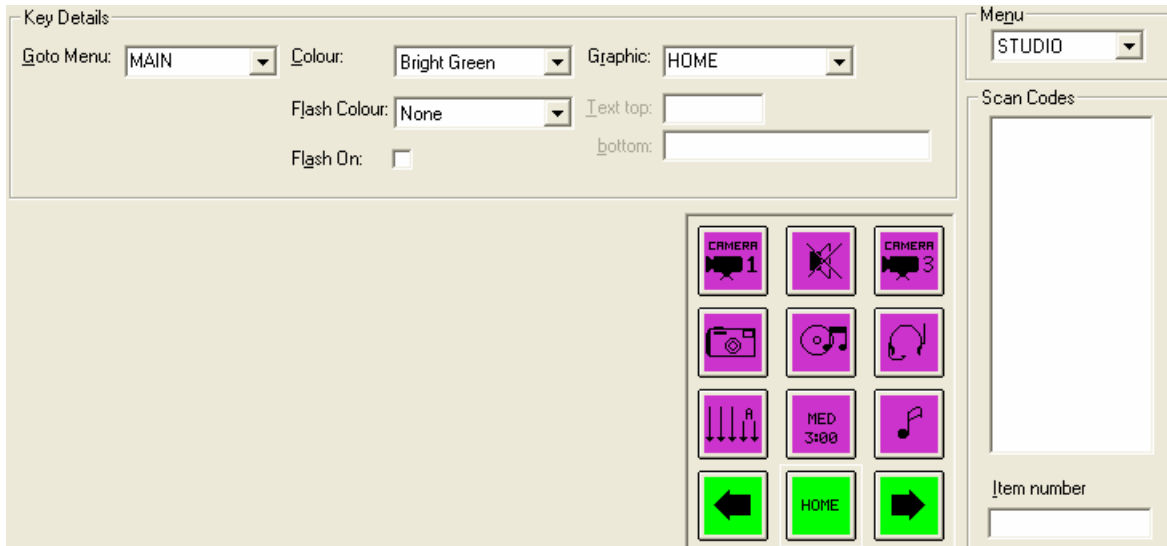


Windows Software Suite

A range of software drivers for Windows platforms that simplify the use of the OEM-5400 Development Kit are freely available to download from our website at www.screenkeys.com.

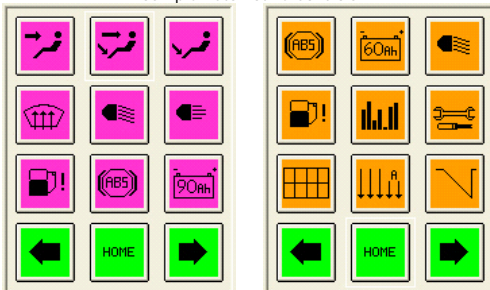
ActiveX tools provide the developer with the ability to control ScreenKeys at a low-level up to a high-level hierarchical menu system.

A Windows-based Editor allows users to design a complete user-interface (including graphics, text, colours and interactivity) independent to the ActiveX Control.

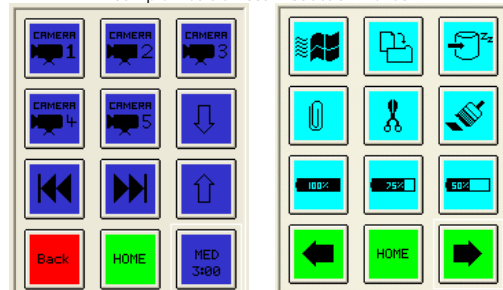


SAC Editor

Sample Automotive Controls



Sample Media / Post-Production Menus



ScreenKey options

ScreenKeys are available in any combination of the following options:

LCD pixel resolution options:

- 36*24 LCD pixel resolution with two brightness levels
- 32*16 LCD pixel resolution with two brightness levels

LED Backlighting options:

- Red/Green (RG) LED Backlighting
- Red/Green/Blue (RGB) LED Backlighting

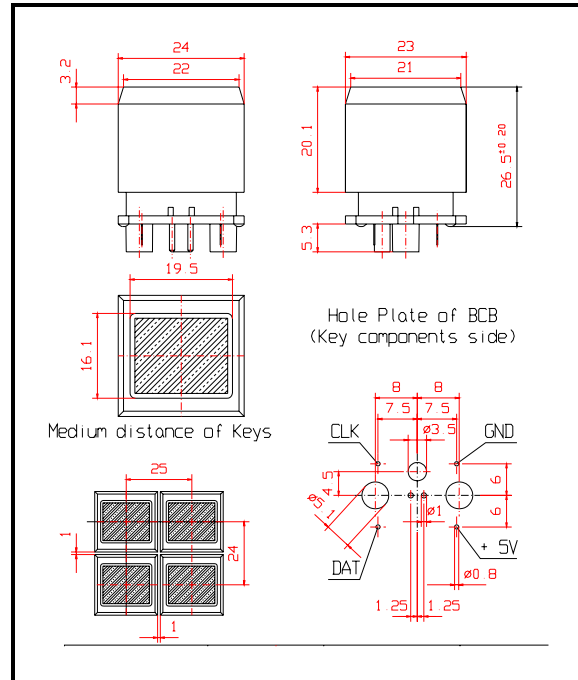
Switch Mechanism:

- Soft-touch (Standard)
- Tactile Feedback

Keycap colour options:

- Black Keycap housing
- Grey Keycap housing

Dimensions and Pinouts



Interfaces

ScreenKeys are controlled by a synchronous serial data transmission. This controls the multiplex frequency, the background lighting and the pixel matrix in the display. The clock is used for the internal control of the ASIC (data transfer, LCD refresh, etc).

Technical Specifications

Description	Values
Dimensions	24.0 x 23.0 x 26.5 mm + / - 0,2 mm (L x W x H)
Screen Size	19.5 x 16.1 mm + / - 0.1 mm (X x Y)
LCD Resolutions	36 x 24 and 32 x 16
Interface	synchronous serial data transmission
Operating voltage	4.9v - 5.0v
Current Consumption	RG: max. 87mA, typ. 43mA RGB: max. 67mA, typ. 37mA
LED Backlighting	Base Colours: Red, Green, Blue Composed Colours: Purple, Turquoise, White, Pink, Yellow
Data Rate	50KHz up to 4MHz
Keyswitch Life time	Soft-touch: >1 million cycles Tactile: >3 million cycles
Keyswitch types	Soft-touch or Tactile switch mechanisms
Contact Resistance	<200 Ohm
Humidity	max. 80 % relative at 40° Celsius
Operating Temperature	-10° to +70° Celsius
Storage Temperature	-20° to +80° Celsius
Manually solderable at	350° Celsius, 3.5 seconds
Wave solderable at	260° Celsius, 10 seconds
RoHS Compliant	Yes

ScreenKey Product Range and Order information

Order Number:	Product Description:	Technical Description:
TFT128	TFT 128*128 ScreenKey	TFT 128*128 full color, 65,536 colors per pixel, SPI interface, 7 lines, 9 characters per line (internal font), up to 10 fps refresh, field replaceable, low profile.
P125-1b	LC 16.2 Black ScreenKeys	32x16 pixel resolution; Red/Green LED backlighting; Soft-Touch switch mechanism; Black keycap
P126-1b	LC 24.2 Black ScreenKeys	36x24 pixel resolution; Red/Green LED backlighting; Soft-Touch switch mechanism; Black keycap
T125-1b	LC 16.2 Tactile Black ScreenKeys	32x16 pixel resolution; Red/Green LED backlighting; Tactile switch mechanism; Black keycap
T126-1b	LC 24.2 Tactile Black ScreenKeys	36x24 pixel resolution; Red/Green LED backlighting; Tactile switch mechanism; Black keycap
RGB16	RGB 16 Black ScreenKeys	32x16 pixel resolution; Red/Green/Blue LED backlighting; Soft-Touch switch mechanism; Black keycap
RGB24	RGB 24 Black ScreenKeys	36x24 pixel resolution; Red/Green/Blue LED backlighting; Soft-Touch switch mechanism; Black keycap
RGB16T	RGB 16 Tactile Black ScreenKeys	32x16 pixel resolution; Red/Green/Blue LED backlighting; Tactile switch mechanism; Black keycap
RGB24T	RGB 24 Tactile Black ScreenKeys	36x24 pixel resolution; Red/Green/Blue LED backlighting; Tactile switch mechanism; Black keycap
P239-1	LC 16.2 Display	32x16 pixel resolution; Red/Green LED backlighting; display only
P239-2	LC 24.2 Display	36x24 pixel resolution; Red/Green LED backlighting; display only
DemoCom (RG)	RG DemoCom Microcontroller Development Kit	ScreenKey demonstration unit / Microcontroller Development Kit (RG ScreenKeys)
DemoCom (RGB)	RGB DemoCom Microcontroller Development Kit	ScreenKey demonstration unit / Microcontroller Development Kit (RGB ScreenKeys)
OEM-5400 (RG)	OEM-5400 Windows Development Kit	Windows Development Kit with panel of 12 x RG ScreenKeys (3x4 matrix)
OEM-5400 (RGB)	OEM-5400 Windows Development Kit	Windows Development Kit with panel of 12 x RGB ScreenKeys (3x4 matrix)

Where are ScreenKeys used?

Markets that benefit from the dynamic functionality of ScreenKey technology include: Aerospace, Media and Broadcasting production, Telecommunications devices, Point-of-Sale, Audio/Video production, Gaming/Vending, Military Systems, Automotive, Industrial Control, Process Control, Financial Services/Stock Trading, Air Traffic Control, Medical Electronics, or any application that employs a Man-Machine interface.

Audio/Video Production Equipment



DJ Control Systems



Lighting Control Systems



Media & Post Production



Automotive Industry



Financial Services / Stock Trading



Point-of-Sale Consoles



Naval Systems



Military & Aerospace Systems



Industrial & Process Control



Medical Systems & Equipment



Measurement & Instrumentation



Telecommunications



Air Traffic Control



Transport Information Systems





SK Interfaces Ltd,
Unit 11, Keypoint Business Park,
42 Rosemount Park Drive,
Ballycoolin Road,
Dublin 11,
Ireland.

Tel: +353 (0)1 8855 075
Fax: +353 (0)1 8855 095
Email: salesteam@screenkeys.com

Information includes Product Range, Technical Datasheets, User Manuals, Software Downloads and supporting documentation can be downloaded from our website at: www.screenkeys.com
