



## SUCCESS STORY.

### Embedded Software Kit Development For Appliance Upgrade

#### About the Client

- US subsidiary of a global leader in home appliances with presence in over 150 countries and global brand recognition
- Headquartered in Europe but North America consumer division accounts for over 50% of sales
- Leader in kitchen appliances including food preparation, storage and dishwashing
- Full line advanced appliance manufacturer serving luxury, premium and mass markets

#### Business Challenge

Many of client's products had LCD display systems with memory cards to store text and multimedia files which were to be displayed on the screen. Embedded software programs, provided by 4D Systems Company, were used to communicate between display units and system processors and also handle data transfer to memory cards installed in the LCD devices.

In order to update its service features, client needed to update the LCD display units of older appliances with new content but these appliances had embedded systems in which memory cards were not removable.

The client approached Silicus to develop an embedded software kit that would help technicians update the LCD displays on appliances through a micro USB port, without having to dismantle appliances at the customers' homes.

#### Silicus Solution

##### SOLUTION WAS PROVIDED IN THE FOLLOWING STEPS:

- Silicus gained access to the appliance LCD's serial port through a USB port
- Using 4D systems' development environment, code was written in 4DGL language, which is similar to embedded C. Given that the SD card in the LCD device and could not to be dismantled, Silicus had to convert the file in order to transfer media files from LCD to SD card. Media files were converted to bits with 2 bytes per pixel (in the machine itself). The break up was:  
Video>Images>Pixels>Bits
- Silicus then flashed this code written in 4DLG into LCD device through the 4D system
- VB program in the machine was activated to pick each image from the machine and send it to LCD
- At the LCD, internal code which was already flashed in 4DGL picked each image and sent it to the SD card

## Technologies Used



LANGUAGE  
VB, 4DGL, Embedded C



IDE  
Visual Studio (for VB) and 4D  
system (for 4DGL)

## Client Benefits

### FASTER FIRMWARE UPGRADES

The embedded software kit significantly accelerated firmware upgrade time eliminating the need to remove the LCD display from the assembly

### REDUCED UPGRADE COSTS

Connecting client LCD's serial port to Silicus machine's USB port was way simpler and cheaper than what dismantling the whole LCD device would have been. Silicus efficiently writing the source code in 4DGL also played a big role in this

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