

JDI Demo Application

Overview

The purpose of the JDI demonstration application is to show the LPM014T262C JDI panel in conjunction with the Epson S1C17W15 MCU. The Epson S1C17W15 is a 16-bit low voltage MCU and the LPM014T262C is a 205x148 2-bit per primary rectangular RGB display. Together they offer a possible for a low power color display system.

A potential target market for this display is a combination is to operate as a smart wrist watch / fitness monitor, and this is what formed the basis of the demonstration program.

Details

The demonstration consists of several screens that simulate a smart watch/fitness monitor. A requested requirement is that the demo be tailored such that power measurements can be made at both maximum update and minimum power draw states.

The original demonstration was to consist of three display screens consisting of:

- 1) A “watch mode” where
- 2) A “text mode” where messages stored on the device are displayed
- 3) A “graphic mode” where a simulated stock chart would be displayed.
Due to memory restrictions this mode was removed from the final demonstration.
In place of the graphic mode a stopwatch was added.

Demo Screens

The images below depict the screens of the demonstration followed by a description of each of the modes.

<p>Wed Jul 1, 2015 If opportunity doesnt' 12:04:23  80bpm</p>	<p>Jul 01 all day CANADA DAY ----- Aug 15 all Day BC Day ----- Aug 24 11:00-12:00 Meeting with EPSON ----- Sept 7 all day</p>	<p>12:04.23</p>
<p>Watch Mode</p>	<p>Text Mode</p>	<p>Stopwatch Mode</p>

Watch Mode

Watch mode is intended as the primary view a user would have of the display. The watch mode display is broken into four areas. Starting at the top of the screen there is

Date	The Date field is static and shows just the one date.
Message	The Message area demonstrates text scrolling at the pixel stepping. If you observe the display you will see text scrolling off the display at steps less than a full text character. The default scroll speed is three pixels per step. This value was chosen to give the best overall scroll speed and appearance.
Time	The time area displays time as either hh:mm or as hh:mm:ss. The default time displays only hours and minutes but the output can be toggled between the two modes using key P02.
Activity Level	The activity level simulates physical activity level. In this demonstration the activity level is attached to the minutes display. During odd minutes the heart beats per minute is displayed as 80bpm and the running stick figure moves slower. On even minutes the heart beats per minute is displayed as 120bpm and the running stick figure moves faster.

Message Mode

In message mode a simulated calendar of appointments and dates is displayed.

The text used in this demonstration contains more lines than will fit on one screen. The user will have to cycle through the messages using key P02.

Stopwatch Mode

This mode demonstrates another possible use for a smartwatch as a stopwatch.

Stopwatch functionality was not fully implemented. The actual purpose for this mode was to demonstrate switching the timing system back in the limited capacity of this demonstration system.

Keyboard Controls

This demonstration was written for the Epson SVT17W15 board, which has three buttons, labeled **P00** through **P03**, which can be used to interact with the demonstration.

P00	Pressing this button switches between active state and low power state. When low power mode is entered, if the system is not in watch mode, it will return to watch mode and the text "ZZZ..." will be displayed in the physical activity area at the bottom of the screen to indicate the system is in low power mode.
P01	This button switches between the three simulated smart watch modes. At start up the demonstration is in "watch" mode. Pressing this button once will bring up calendar message mode. A second press will bring up stopwatch mode. A third press will bring the display back to "watch" mode.
P02	In watch mode this button will switch between hh:mm and hh:mm:ss display. In message mode this button will advance through the messages being displayed.

Current Measurement

Low Power

Enter sleep mode by pressing key P00 and observing the message “ZZZ...” at the bottom of the screen. In this mode the MCU is still somewhat active however the RTC and RTC interrupts have been halted and there is no display activity.

High Power

Placing the system in watch mode will cause some of the greatest power drains. In this mode the RTC is started and nearly the entire display is being written to as rapidly as possible.

Demonstration Obstacles

There are a number of restriction the C17 MCU environment places on this demonstration

- First the panel update requirements are time consuming
In particular the panel does not support area updates.
The best that can be done is to toggle vertical lines until the display position is reached, then begin drawing. Once a line is started, each pixel must be toggled out to the panel.
- No dedicated video memory for the processor to read and modify display contents
- With only 64 KB there is very little memory available to hold images, fonts and code.