

# Micro Control Systems

APPLICATION NOTE

APP-038

## Improving Noise Immunity in MCS-8 Optrex LCD Displays

### Revision History

Date	Author	Description
09/22/06	Ron Andersen	Created Application Note

## Introduction

Over the years MCS has used LCD's (Liquid Crystal Displays) manufactured by a variety of companies. Since 2003 we have used LCD's manufactured by Optrex, a leading LCD manufacturer well known for its quality and performance. At our factory we thoroughly test new LCD's for reliability and performance in our test fixtures designed to simulate real world conditions.

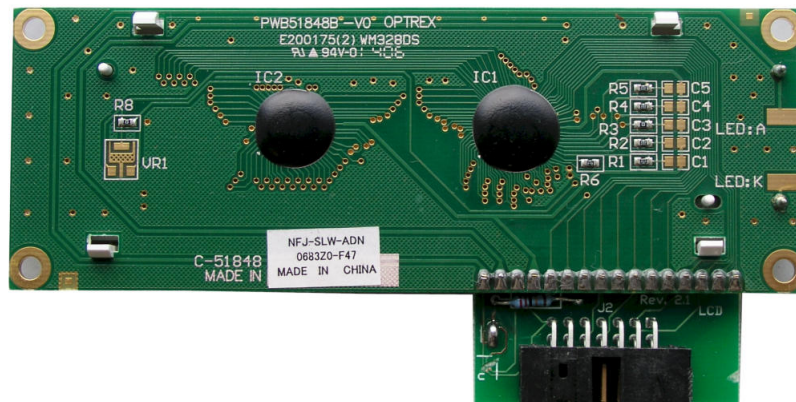
At the beginning of 2006 Optrex discontinued the line of LCD's we were using in our MCS-8 products and replaced it with a newer version. Upon receiving the new version we tested it and found it to be a superior product, especially in readability under different lighting conditions and its ability to display characters at high ambient temperatures.

However, some customers have informed us that they have been seeing problems with these new LCD's. In these cases the display sometimes shows strange characters and may only display characters on the top line of the display with the bottom line being blank. Turning off control power to our controller and then turning power back on, or simply pressing the reset button, clears the problem for an indefinite period of time.

After researching the issue and consulting with Optrex, the manufacturer of the LCD, we determined that this problem was related to electrical noise. Following recommendations from Optrex we found that by adding a small filter capacitor directly to the back of the LCD board we could eliminate the problem. Thus the purpose of this application note is to show you how to perform this simple modification.

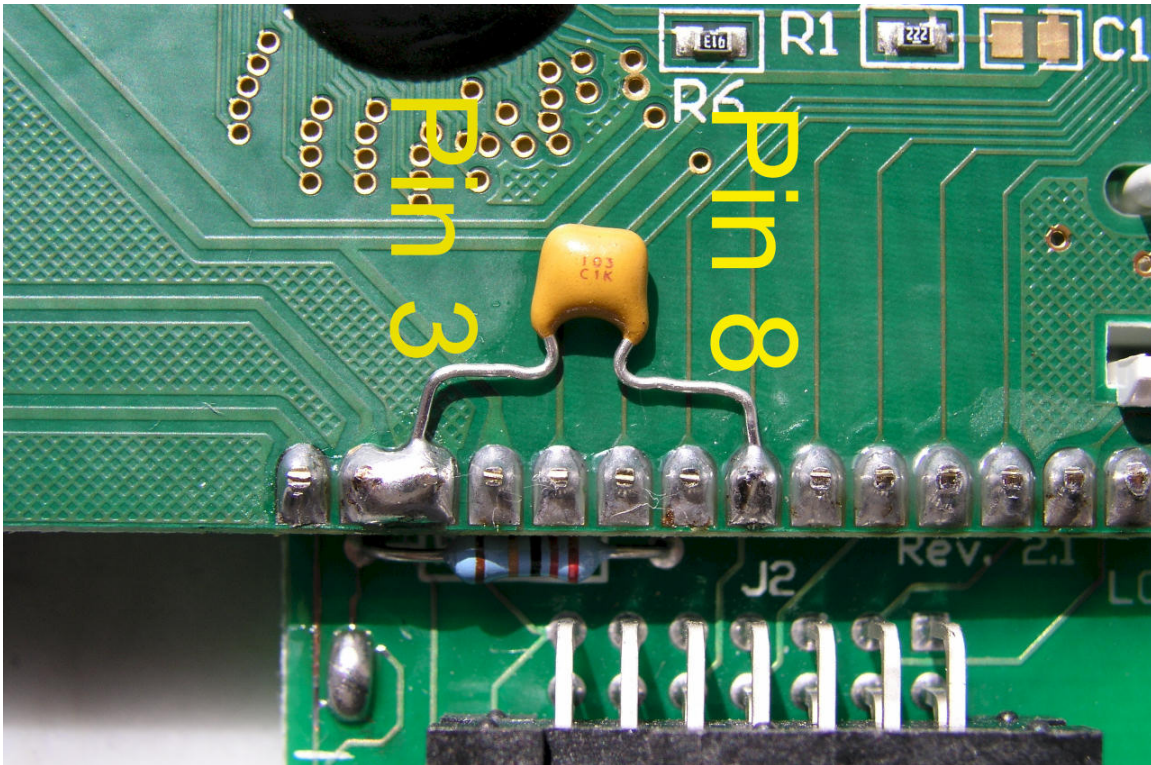
## Identifying the LCD and adding the filter capacitor

Before adding the filter capacitor you should verify the part number of the LCD to make sure that it is the display in question. Refer to the picture below:



To perform the modification, refer to the picture below and follow these steps:

1. Remove power to the MCS-8 micro controller board.
2. Gain access to the LCD board and remove if necessary.
3. Solder a **0.01mf 50v** capacitor between pins **3** and **8** on the LCD board. (Note that a solder bridge may exist between pins 2 and 3 on some boards. This is normal.)
4. Remount LCD board if necessary.
5. Restore power to the MCS-8 micro controller board.



You can find this capacitor at most electronic parts stores or you can contact us directly and we will be glad to send you out this part (MCS Part # 21-036) free of charge.

Please note that all MCS-8 products manufactured from the third week of September 2006 onward have this capacitor already installed.