



RENESAS CONTEST 2003

ENTRY H3215

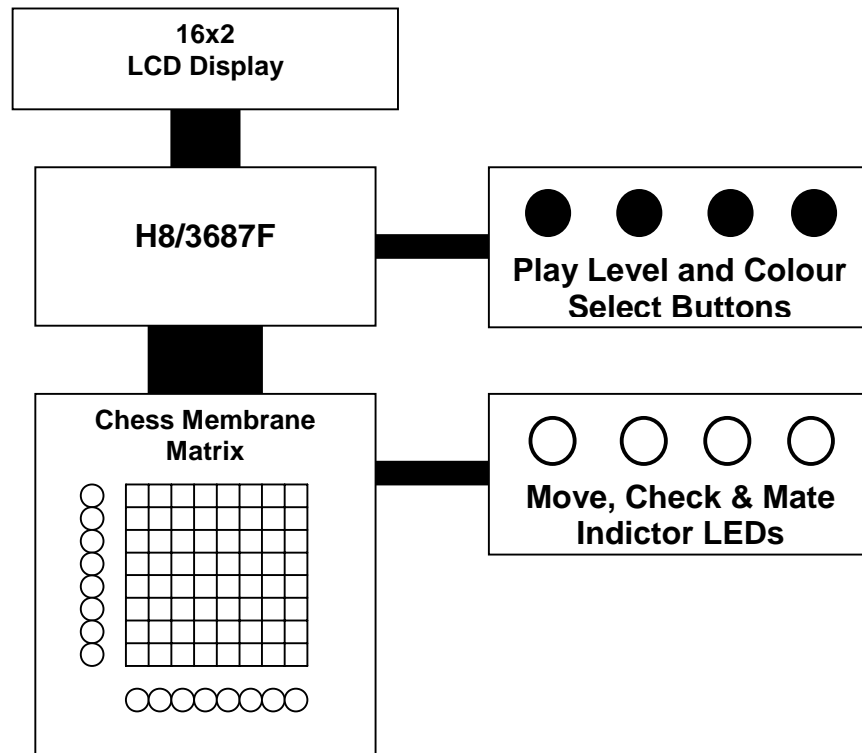
CHESS CHALLENGER

ABSTRACT

This project utilises the Renesas H8/3687F as the central processing unit in an electronic chessboard. The chessboard itself consists of a matrix of pressure sensors with LEDs along the rows and columns. The H8/3687F interfaces to the chessboard matrix, and scans it to detect the movement of pieces from a human opponent.

A chess algorithm then devises counter moves, which are indicated using the row and column LEDs. The chess algorithm is capable of playing at four difficulty levels, corresponding to the number of moves ahead it is processing.

1. BLOCK DIAGRAM



Software

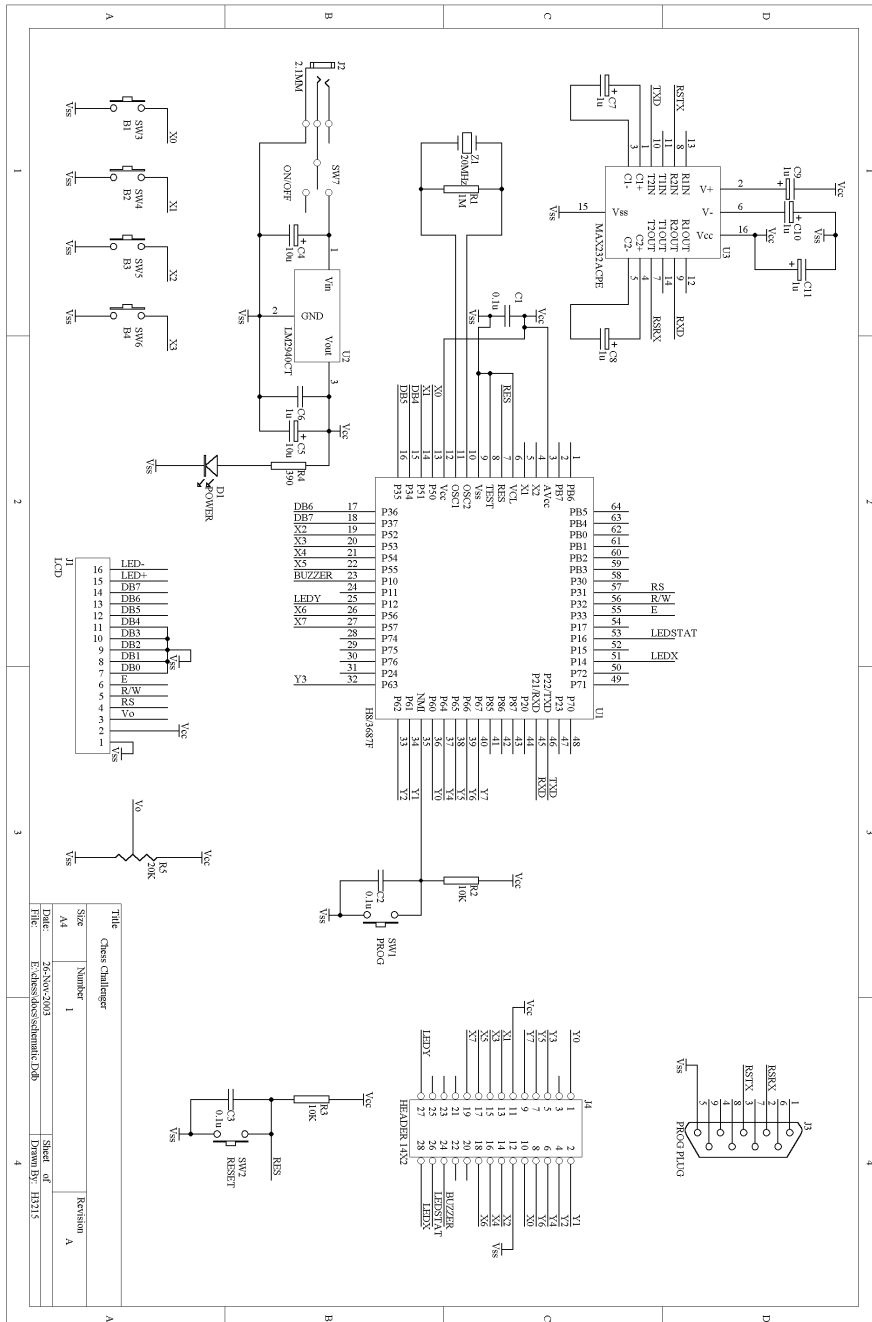
The chess game software is written in C, and has a simple main loop that can be summarised using the following pseudo code:

```
Get Computer Difficulty Level (1-4)
Get Human Side (Black or White)
Set Up Board
While Not Mate
    Display Game Status
    Get A Valid Human Move
    Update Chessboard
    Determine Computer Move
    If Computer Move Made Then
        Update Chessboard
        If Human King is in Check And King Cannot Move Then
            Mate
        End If
    Else
        Mate
        Display Game Status
    End If
End While
Restart
```

The chessboard is represented within a data array consisting of 32 bytes, where pieces are mapped into nibbles thus resulting in 64 squares. Each square can consist of a value representing a Pawn, Rook, Knight, Bishop, King, Queen or Empty and whether the piece belongs to Black or White.

The data structure in the chess game contains the variables used for the algorithm to determine the computer's move.

2. SCHEMATICS



3. PICTURE



Figure 1. Chess challenger showing black in check