Touch Control Technology (TCT) Evaluation Board

User's Guide

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If this Evaluation Board does not meet the intended specifications as outlined in Tyco Product Specification 108-47010, it may be returned within 30 days from date of delivery for a new replacement.

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1. Scope

This document will describe the set-up of the Touch Control Technology (TCT) Evaluation Board. It will provide the user detailed instructions on how to operate and interface the Evaluation Board to any application. This document will NOT explain the technical details of the technology. For further information refer to the following Tyco documentation:

- Application Specification 114-47010
- Product Specification 108-47010.

Included in this kit you will find:

- TCT Evaluation Board
- 9V DC Wall Mount Power Supply
- TCT Application Specification.

2. Introduction

The TCT Evaluation Board is a double-sided FR-4 board; its user interface consists of

- 15 Keypads
- 2 Independent output connectors for user selectable output formats (Binary or Matrix),
- Slider switch to select Binary or Matrix output format
- 5 LED indicators to display the corresponding Binary or Matrix code
- 1 Earth ground connector
- Variable resistor for sensitivity adjustment.

See Figures 1 and 2 for details.

The following sections will detail the set-up and operation for the TCT Evaluation Board.

3. TCT Evaluation Board At-A-Glance

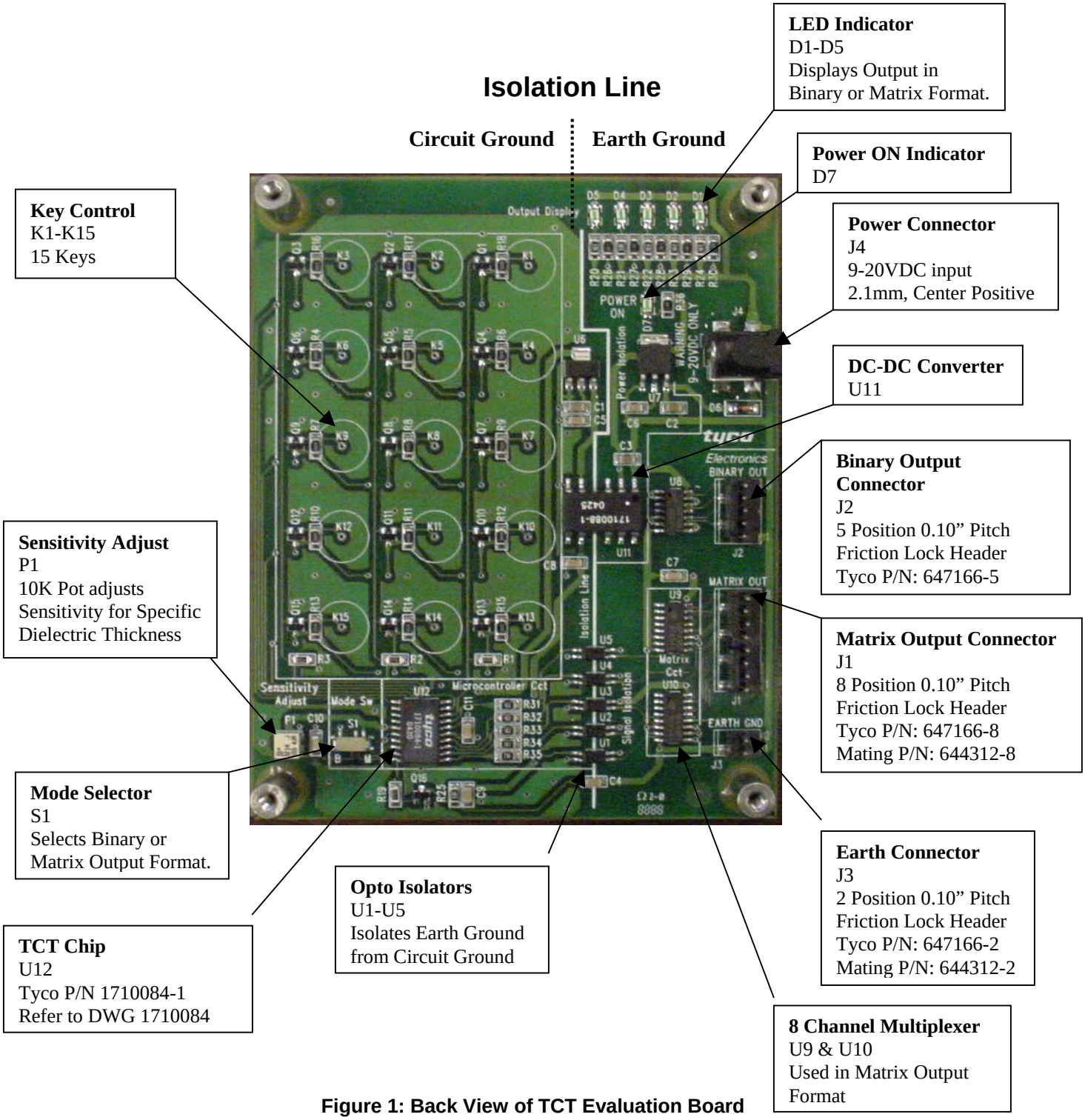


Figure 1: Back View of TCT Evaluation Board

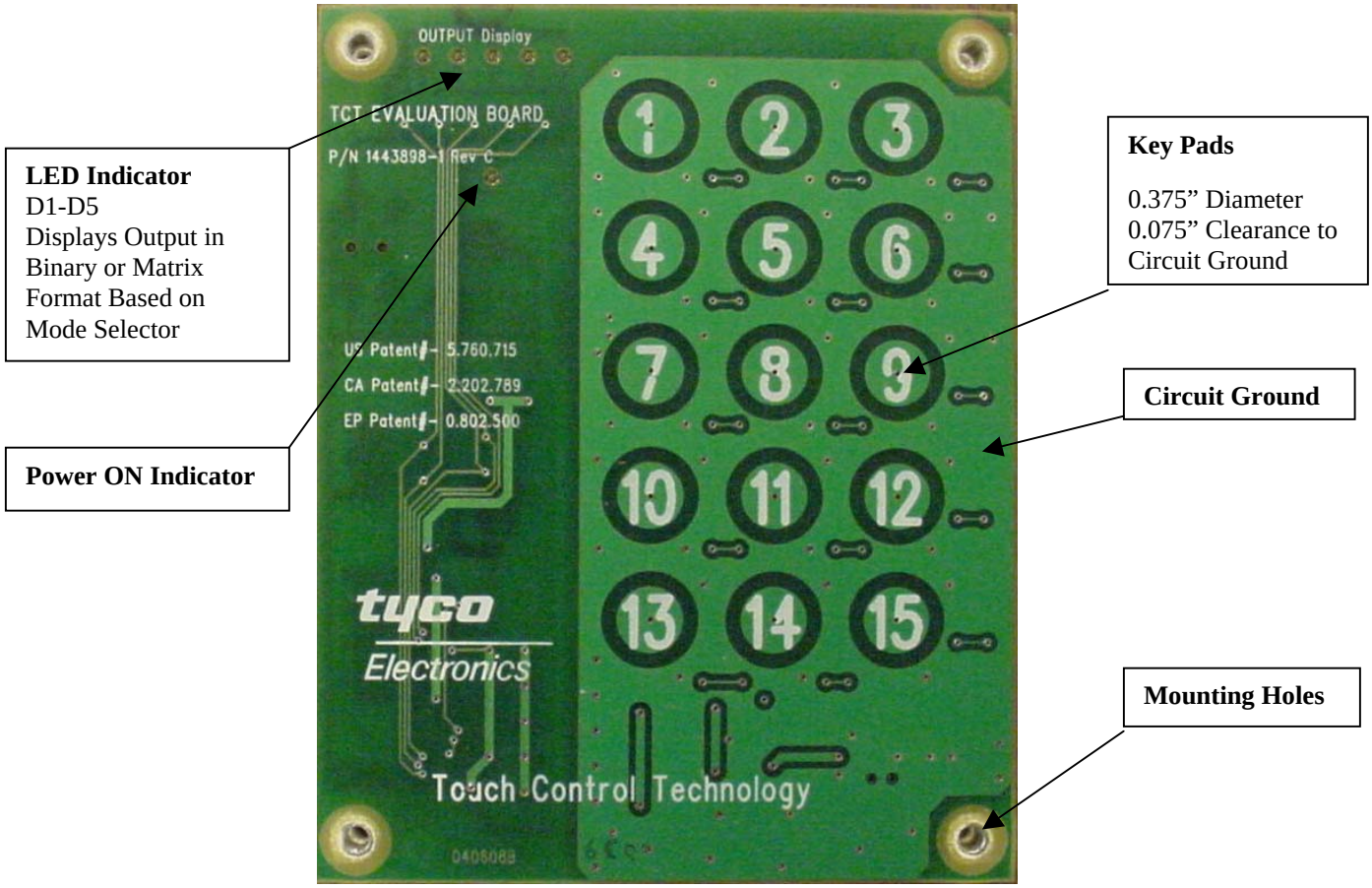


Figure 2: Front View of TCT Evaluation Board

4. TCT Evaluation Board Set-Up

4.1. Earth Ground Loop

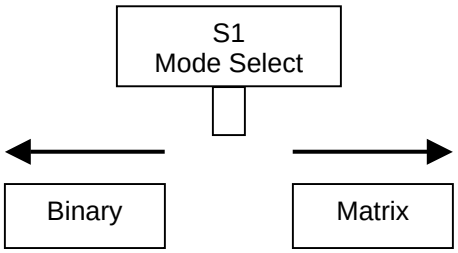
The principle of operation of the TCT is based on transmitting a known generated signal through earth creating a true earth ground loop. For the Evaluation Board to operate properly, Earth Connector J3 must therefore be connected to Earth Ground to complete the Earth Ground loop. The TCT Evaluation Board may not operate properly if Earth Connector J3 is left floating.

IMPORTANT

For the Evaluation Board to operate properly, the Earth Connector J3 **MUST** be tied to Earth Ground, and **NOT** to Circuit Ground.

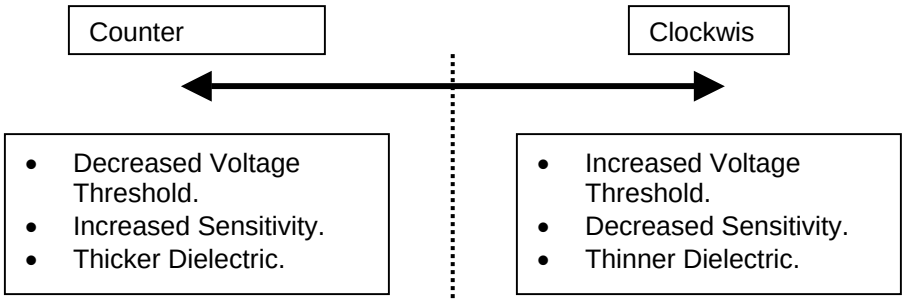
4.2. Mode Selection

TCT is designed to provide 2 output data formats to accommodate Binary or Matrix interface options. Switch S1 determines the output data format. When S1 is moved to the left, Binary mode is set, and to the right, Matrix mode is set. The TCT Evaluation Board cannot provide both formats simultaneously. For Binary and Matrix Truth Tables, refer to Sections 5.1 and 5.2.



4.3. Sensitivity Adjustment

The TCT Evaluation Board is also designed to accommodate various dielectric thicknesses. Potentiometer P1 provides a threshold level corresponding to a specific dielectric thickness. As the dielectric thickness increases, P1 is reduced to lower the threshold level and, therefore, increase the sensitivity of the Keypad.



5. Output Connectors

5.1. Binary Output Connector J2

When the Mode Select switch S1 is moved to the left, it selects the Binary mode. The output at J2 represents the Binary code corresponding to the key press. The Truth Table below shows all the "Touch States", a "No Touch" and an "Error" (multiple key press).

Tyco Friction Lock Header P/N: 647166-5
Tyco Friction Lock Header Mate P/N: 644312-5

KEY	J2 OUTPUT PINS				
	1	5	4	3	2
1	Ground	0	0	0	1
2	Ground	0	0	1	0
3	Ground	0	0	1	1
4	Ground	0	1	0	0
5	Ground	0	1	0	1
6	Ground	0	1	1	0
7	Ground	0	1	1	1
8	Ground	1	0	0	0
9	Ground	1	0	0	1
10	Ground	1	0	1	0
11	Ground	1	0	1	1
12	Ground	1	1	0	0
13	Ground	1	1	0	1
14	Ground	1	1	1	0
15	Ground	1	1	1	1
No Key / Error	Ground	0	0	0	0

Table 1: Binary Output Truth Table

5.2. Matrix Output Connector J1

Usually Matrix output is preferred when direct interface to a membrane keyboard is required. Moving the Mode Select switch S1 to the right sets the TCT Evaluation Board to Matrix output. The Truth Table below illustrates the output at J1.

Tyco Friction Lock Header P/N: 647166-8
Tyco Friction Lock Header Mate P/N: 644312-8

KEY	J1 OUTPUT PINS							
	1 Row5	**2** Row4	**3** Row3	**4** Row2	**5** Row1	**6** Col3	**7** Col2	**8** Col1
1	0	0	0	0	1	0	0	1
2	0	0	0	0	1	0	1	0
3	0	0	0	0	1	1	0	0
4	0	0	0	1	0	0	0	1
5	0	0	0	1	0	0	1	0
6	0	0	0	1	0	1	0	0
7	0	0	1	0	0	0	0	1
8	0	0	1	0	0	0	1	0
9	0	0	1	0	0	1	0	0
10	0	1	0	0	0	0	0	1
11	0	1	0	0	0	0	1	0
12	0	1	0	0	0	1	0	0
13	1	0	0	0	0	0	0	1
14	1	0	0	0	0	0	1	0
15	1	0	0	0	0	1	0	0
No Key / Error	0	0	0	0	0	0	0	0

Table 2: Matrix Output Truth Table

5.3. Earth Ground Connector J3

Both pins of this connector must be connected to Earth Ground.

Tyco Friction Lock Header P/N: 647166-2
Tyco Friction Lock Header Mate P/N: 644312-2

5.4. Power Supply Connector J4

2.1mm, Center Positive.

6. Board Layout Recommendation

The figure below illustrates the keypad geometry. For best results, maintain the same dimensions. During layout of the board, special considerations have to be taken into account, especially the Circuit Ground plane and Earth Ground plane cannot be placed on opposite sides of the Board. The known generated signal injected into the Earth Ground will couple to the Circuit Ground.

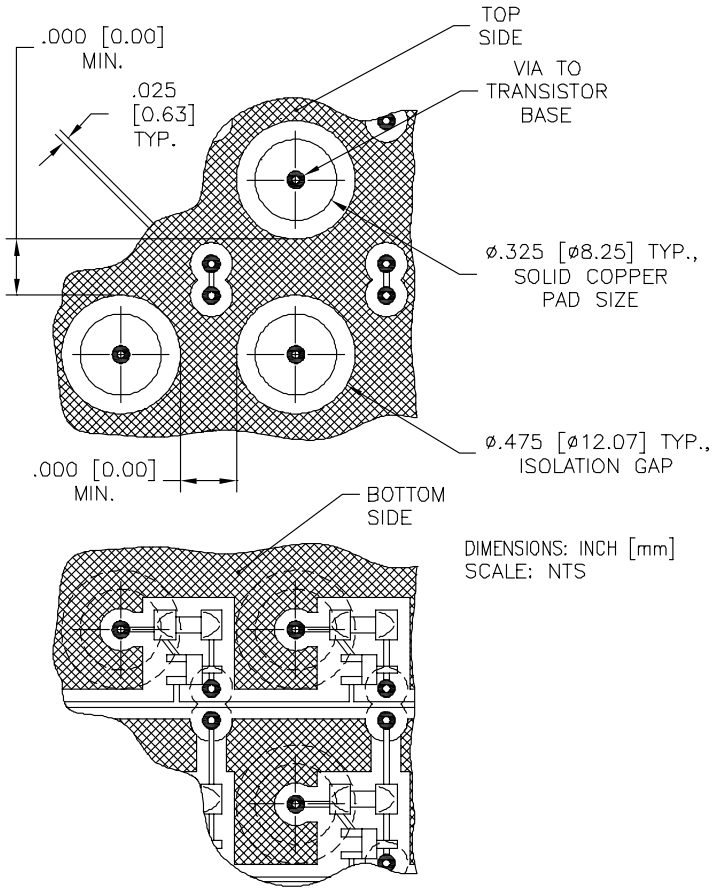


Figure 3: PCB Layout Recommended Dimensions

7. Schematic

The schematic contained in this Section illustrates a general 15 key application and is provided as an example. Care should be taken when designing for specific applications.

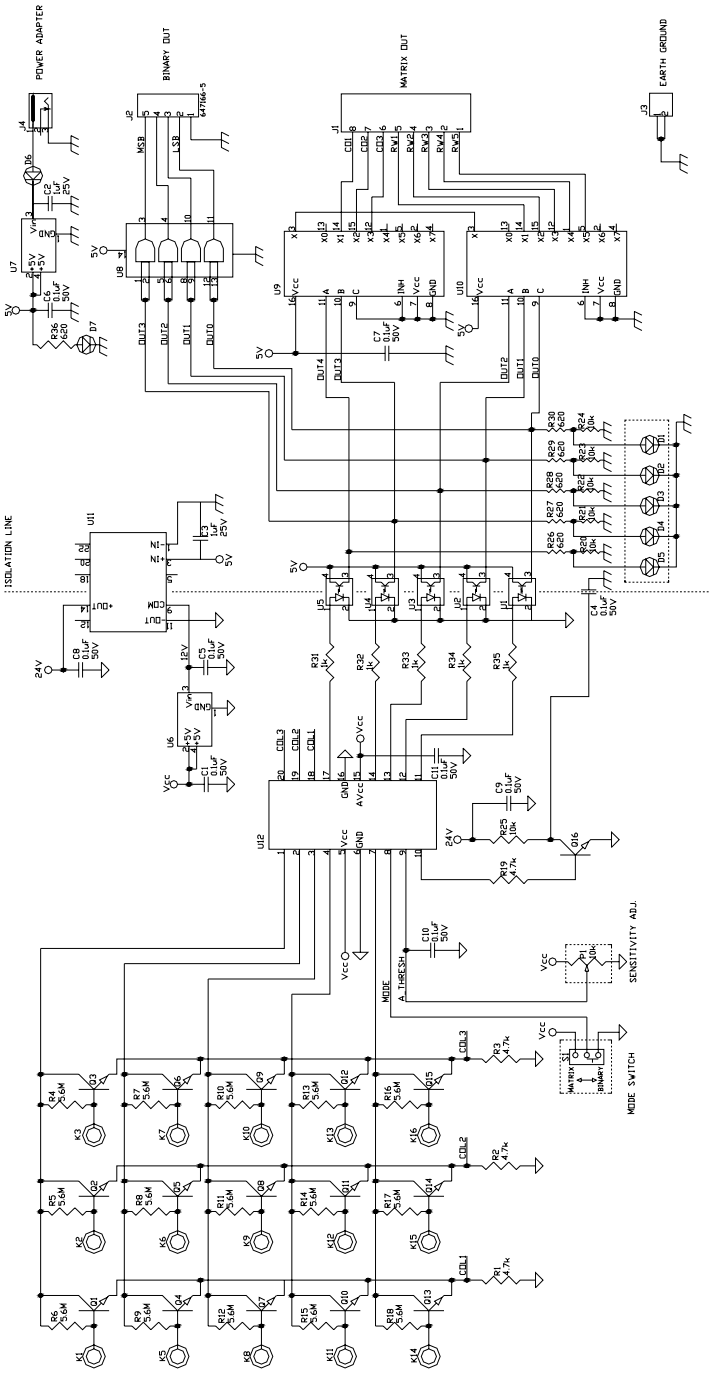


Figure 4: TCT Evaluation Board Schematic