Hardware Manual

StickCAN V850

TESSERA Technology INC.

Date published: June 2008

Rev. 1

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1. Introduction

In this document, features and hardware specifications of CAN evaluation board (StickCAN V850) for V850ES/FG3, 32-bit single-chip microcontroller from NEC, are described.

1.1 Features

- It uses μPD70F3377A (this will be called V850ES/FG3 in this document), 32-bit single-chip microcontroller from NEC.
  V850ES core, ROM, RAM, peripheral circuit, CAN controller are built into V850ES/FG3.
- Fast operation with internal clock: 48MHz
- Flash memory 512Kb and high-speed RAM 32Kb are built into the microcontroller
- It enables to program on flash and debug without additional hardware tools.
- 4 connector interfaces for timer I/O ports and 2 connector interfaces for A/D I/O ports are implemented
- It has μPD78F0730 (complying with USB 2.0) from NEC Electronics as USB interface
- It is very handy as the size is small (W88mm X D23mm X H12mm)

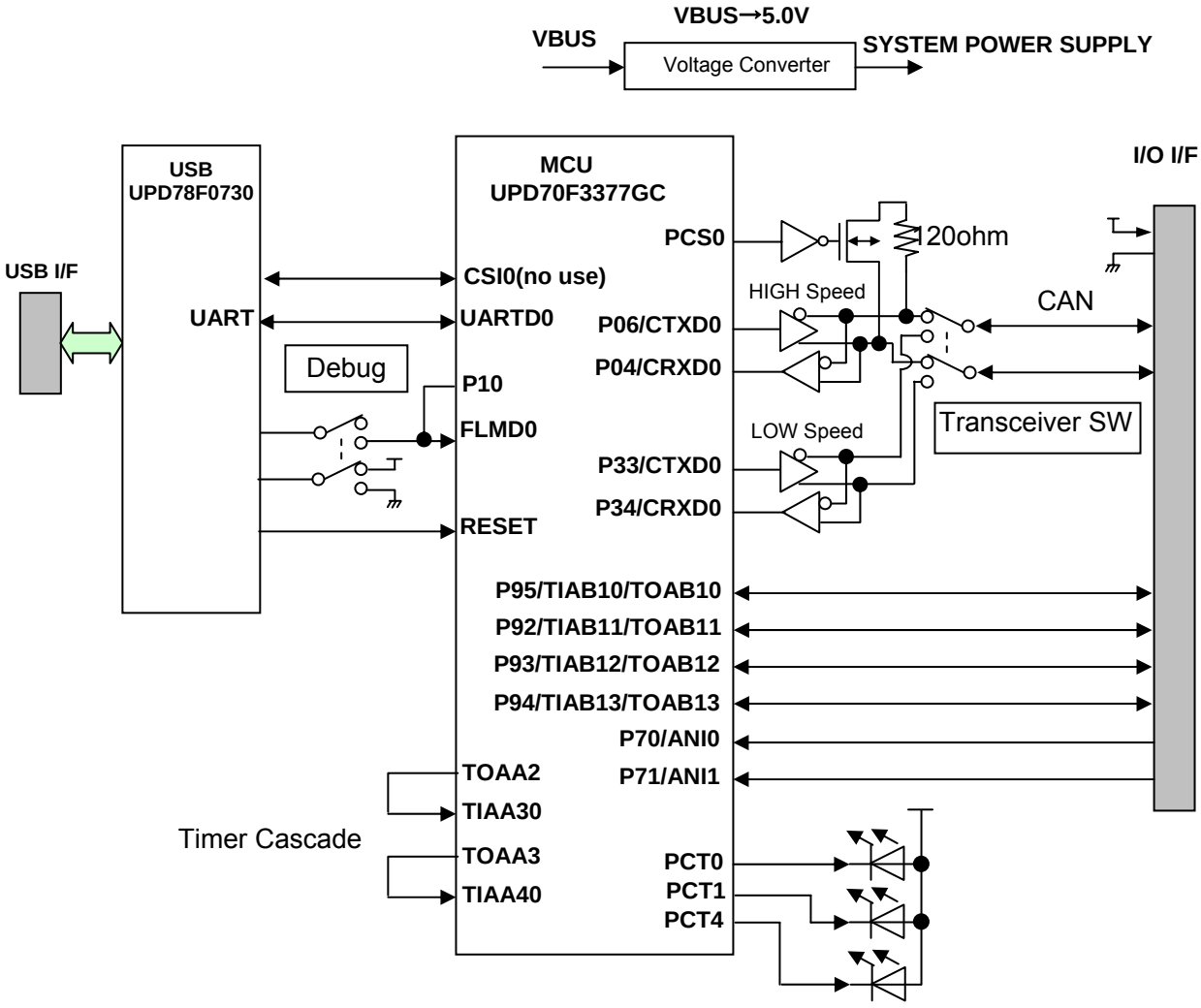
1.2 Hardware Specifications

Microcontroller	μPD70F3377A (V850ES/FG3)
Operation frequency	Main: 48MHz (6MHz x 8 multiplying) Sub: not supported
Interface	USB connector (Type A) Extended interface connector (CN1)
CAN	High-speed CAN mode: 1Mbps-60Kbps (built-in transceiver, TJA1050) Terminating resistor 120Ω for high-speed mode is built into the system. Low-speed CAN mode: 125Kbps (built-in transceiver, TJA1054)
Supply voltage	5V (USB power supply) Typ. 300mA

1.3 Product Component List

- StickCAN V850
- Development tools / manual CD-ROM
- Standard CAN interface cable (DSUB 9 pin, female connector type)
- USB extension cable

1.4 Internal Block Diagram

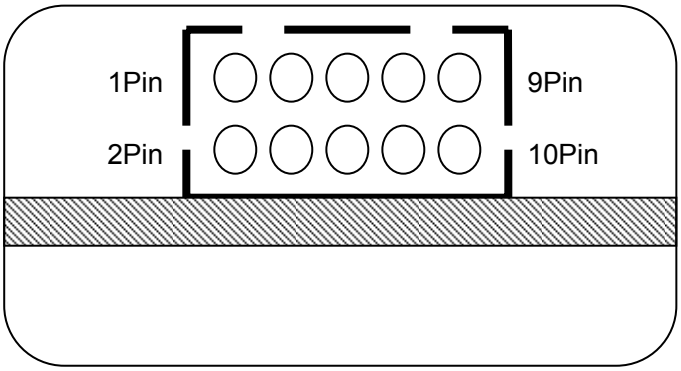


2. Pin Function List

2.1 CN1

Pin function list for extension interface CN1 is shown below.

CN1	Pin Name	Destination	Remarks
1	CANH	CANH	CAN transceiver via switch
2	CANL	CANL	CAN transceiver via switch
3	GND	Internal common ground	GND Reference
4	VDD	Internal power output	5.0V output 100mA can be supplied to external system
5	TM0	P95/TIAB10/TOAB10	V850ES/FG3
6	TM1	P92/TIAB11/TOAB11	V850ES/FG3
7	TM2	P93/TIAB12/TOAB12	V850ES/FG3
8	TM3	P94/TIAB13/TOAB13	V850ES/FG3
9	ANI0	P70/ANI0	V850ES/FG3
10	ANI1	P70/ANI1	V850ES/FG3



J1 connector pin layout, top view

3. Switch, LED, CAN

3.1 SW1 (Debug Switch)

This switch is used when you debug and write on flash with development tool such as ID850QB.

SW1 Settings	
Stand-alone automatic execution	OFF
Debugging and flash writing	ON

SW1 layout, top view

3.2 SW2 (Transceiver Switch)

This switch is used to change the mode between high-speed CAN and low-speed CAN.

SW2 Settings	
High-speed CAN mode	HIGH
Low-speed CAN mode	LOW

SW2 layout, top view

3.3 LED1-3

These are LED indicators. They can be controlled by port output from V850ES/FG3. Immediately after the reset released, LED turns off as the port mode becomes input mode.

LED1 Lighting Status		
Port	Output Level	LED
PCT0	LOW	Blue light
	HIGH	Off
PCT1	LOW	Blue light
	HIGH	Off
PCT4	LOW	Blue light
	HIGH	Off

LED1-3 layout, top view

3.4 LED4

This is the power LED. When power is supplied to StickCAN V850, the LED lights up.

LED4 Lighting Status	
Status	LED
USB is connected	Blue light
USB is not connected	Off

LED4 layout, top view

3.5 CAN Transceiver Control

CAN transceiver can be controlled by V850ES/FG3 port.
V850ES/FG3 can select one from 2 kinds of CAN (ch0). High-speed transceiver and low-speed transceiver are connected to each port on StickCAN V850. Set for alternate functions for CAN ports depending on the mode (transceiver) in use.
Also, the port that is connected to a transceiver not in use must be set to port mode (select with PMC register).
The mode for transceiver in use and SW2 should be the same setting.

Mode	Port	Port Function Setting	SW2 Setting
High-speed mode	P04/CRXD0	CRXD0	High
	P06/CTXD0	CTXD0	
	P34/CRXD0	P34	
	P33/CTXD0	P33	
Low-speed mode	P04/CRXD0	P04	Low
	P06/CTXD0	P06	
	P34/CRXD0	CRXD0	
	P33/CTXD0	CTXD0	

3.6 CAN Terminating Resistor

This is the terminating resistor 120Ω for high-speed CAN. It can be connected/disconnected by V850ES/FG3 port output. Immediately after the reset released, the terminating resistor is disconnected as the port mode becomes input mode.

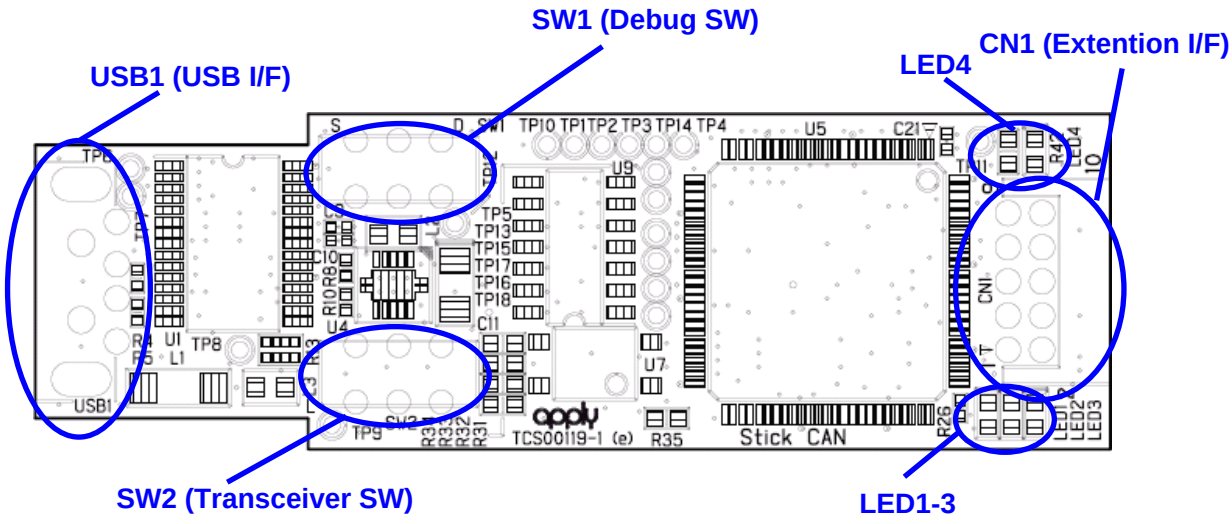
Terminating Resistor Connection Status		
Port	Output Level	Terminating Resistor
PCS0	LOW	Connected
	HIGH	Disconnected

4. Power Supply

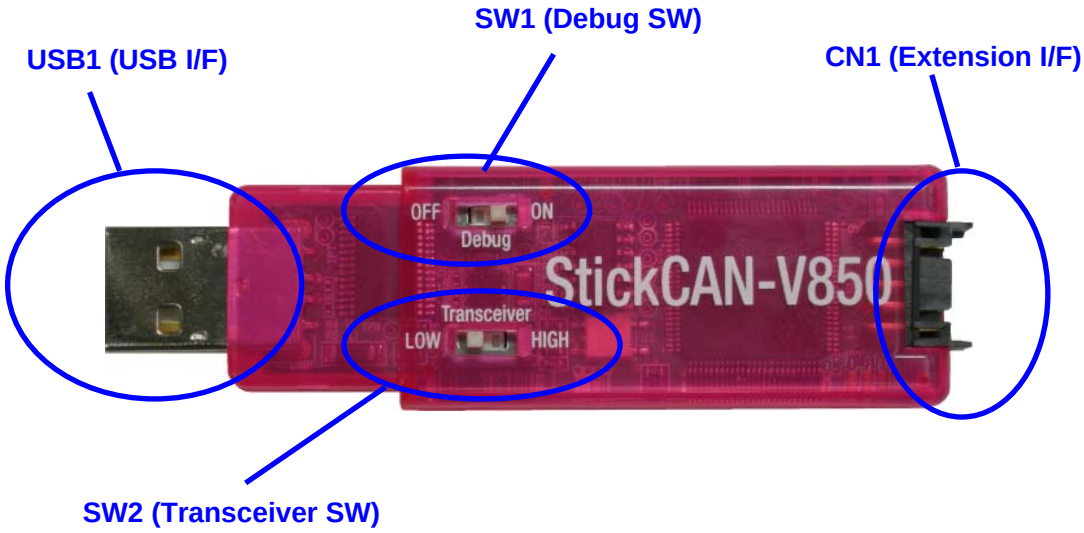
The power of this product is only supplied by USB power. Even if it does not use GUI such case like stand-alone automatic execution, it should be connected to USB port of PC or self-powered USB hub. It generates 5.0V from the supplied power from USB in StickCAN V850. When you interface with each port of extended interface (CN1), the power voltage should be standardized with 5.0V. In addition, the current that StickCAN V850 (CN1-4 pin) can supplies is maximum of 100mA.

5. StickCAN V850 Information

5.1 Function Layout



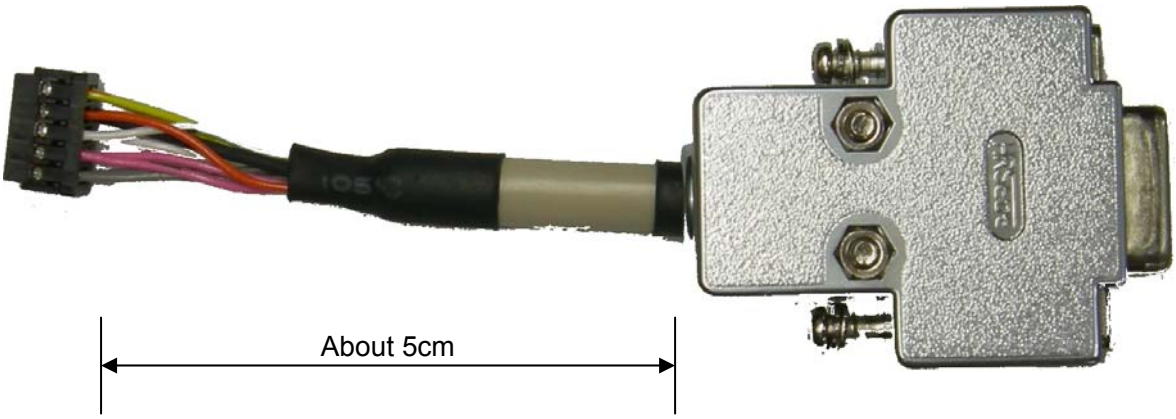
Top view



Top view

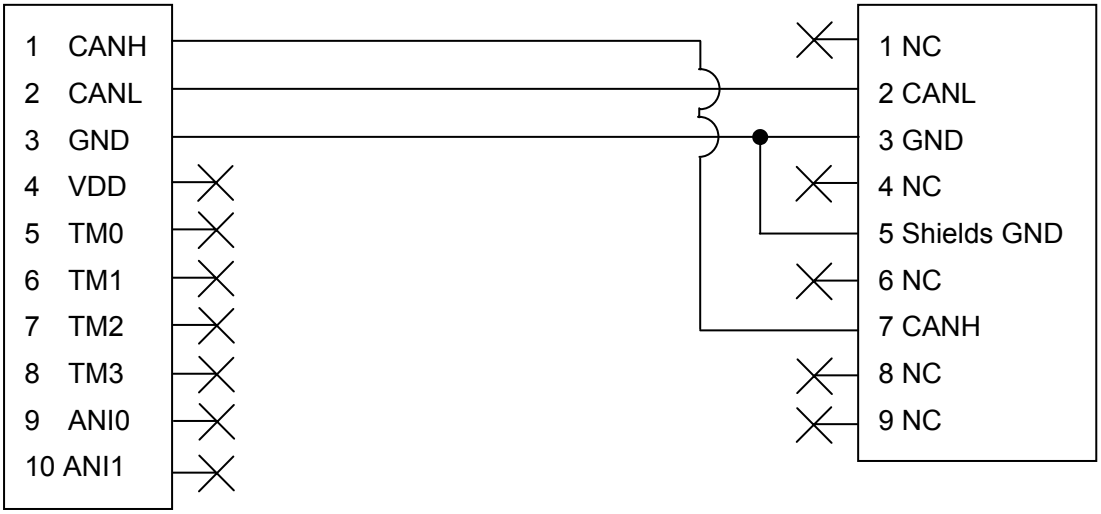
5.2 Standard CAN Interface Cable Specifications

This is the connection cable between StickCAN V850 and CAN bus. It has wire connections that are needed for CAN communication.



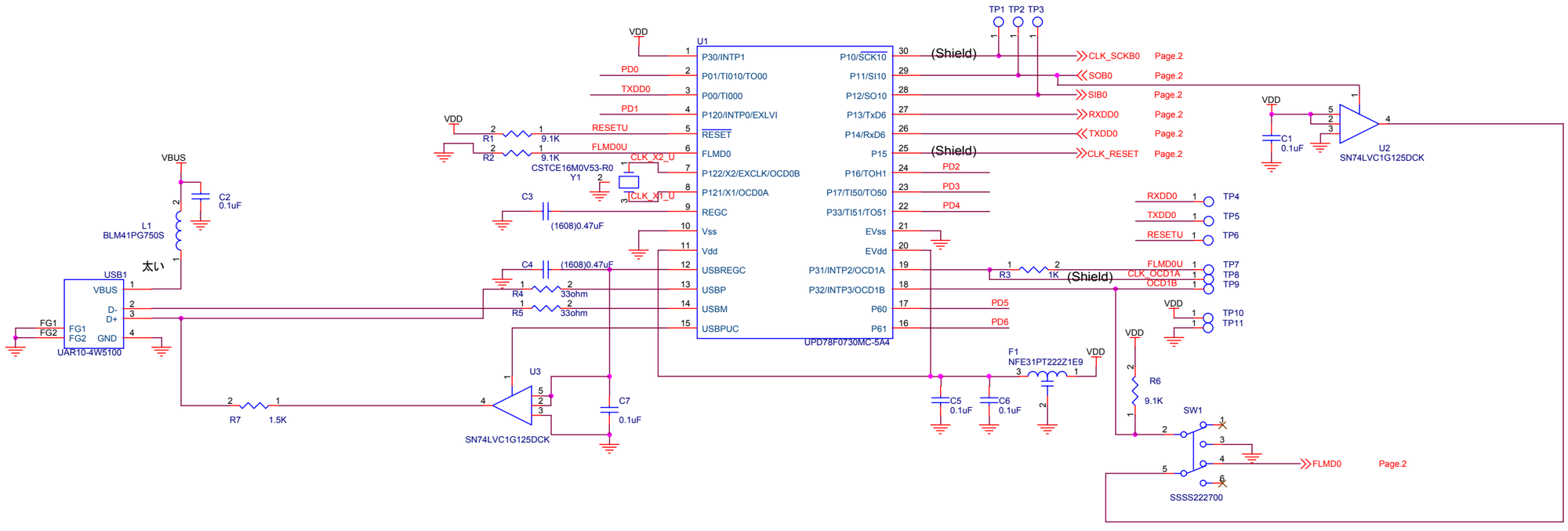
Stick CAN V850 Connector
DF11-10DS-2C (Maker: Hirose Electric)

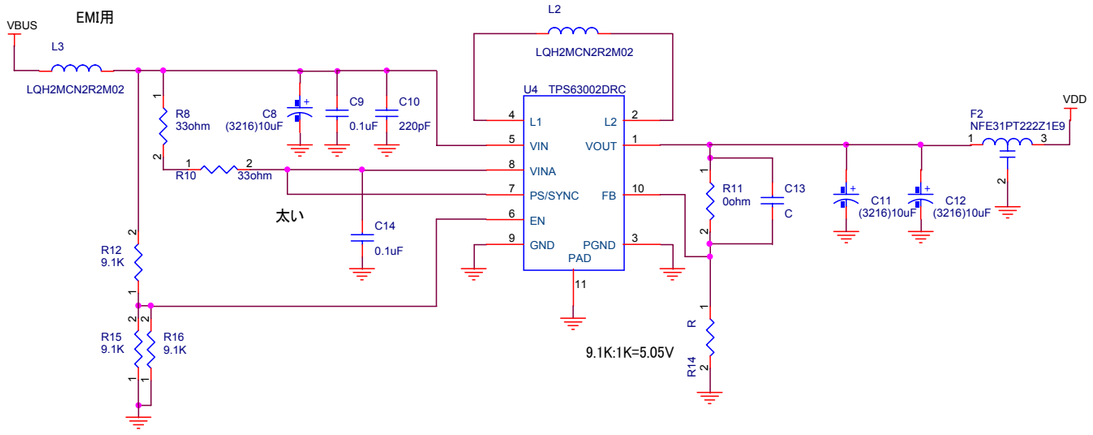
CAN Bus Dsub 9 pin Connector
17DE-13090-C (Maker: DDK)

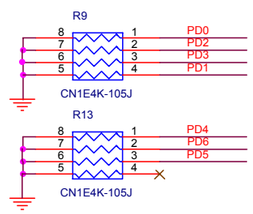


Standard CAN Interface Cable Wire Connections

6. Circuit Diagram







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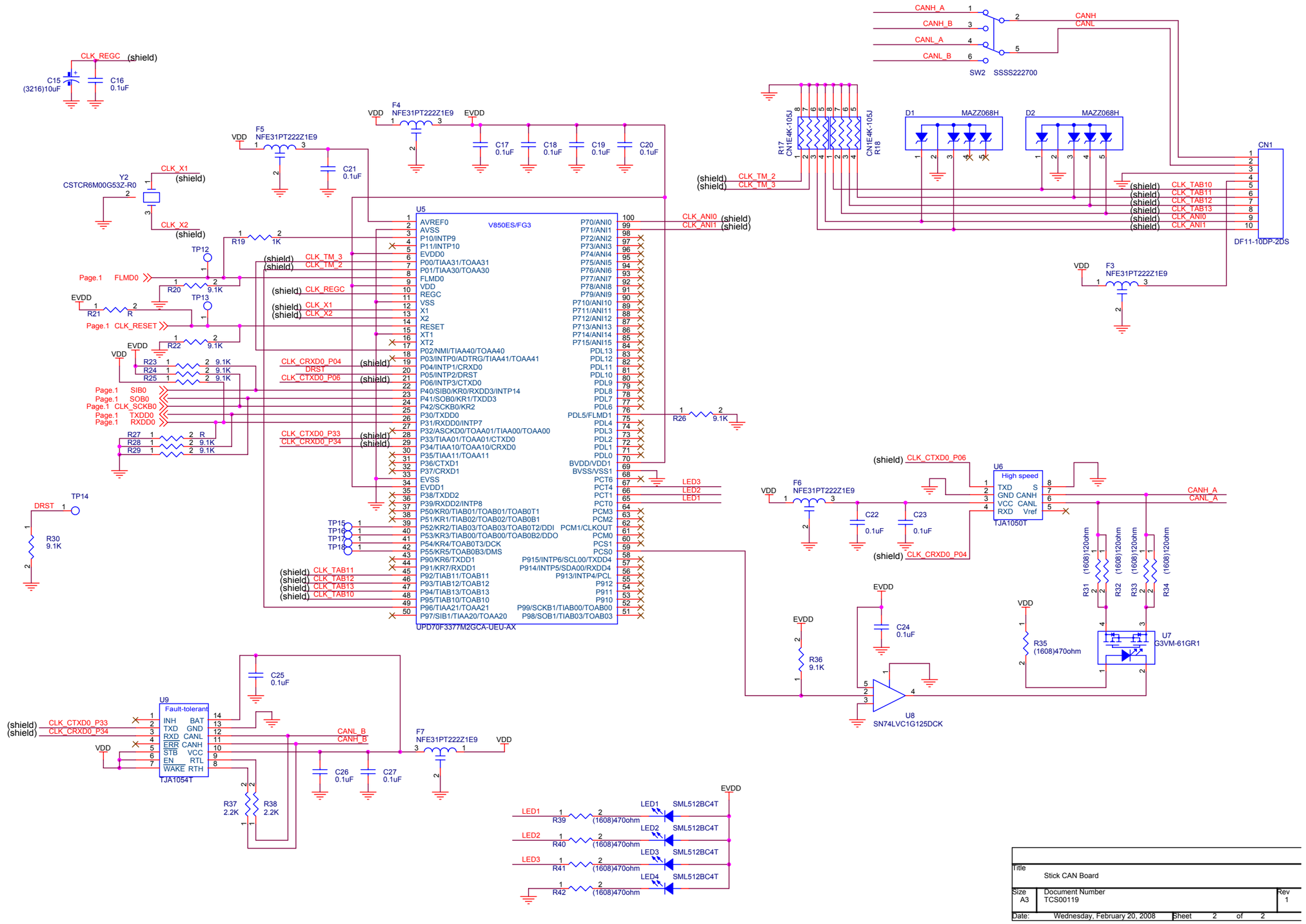
Size A3	Document Number TCS00119		Rev 1
Date: Wednesday, February 20, 2008	Sheet 1 of 2		


U5
V850ES/FG3
UPD70F3377M2GCA-UEU-AX
U6
High speed
TJA1050T
U7
G3VM-61GR1
U8
SN74LVC1G125DCK
U9
Fault-tolerant
TJA1054T
CN1
DF11-10DP-2DS
SW2 SSSS222700
D1 MAZZ068H
D2 MAZZ068H
Y2 CSTCR6M00G53Z-R0
F3 NFE31PT222Z1E9
F4 NFE31PT222Z1E9
F5 NFE31PT222Z1E9
F6 NFE31PT222Z1E9
F7 NFE31PT222Z1E9
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Title
Stick CAN Board
Size A3
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