

Excel Hopper Electrical and Functional Specification



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1. Hardware description PCB 14-0530

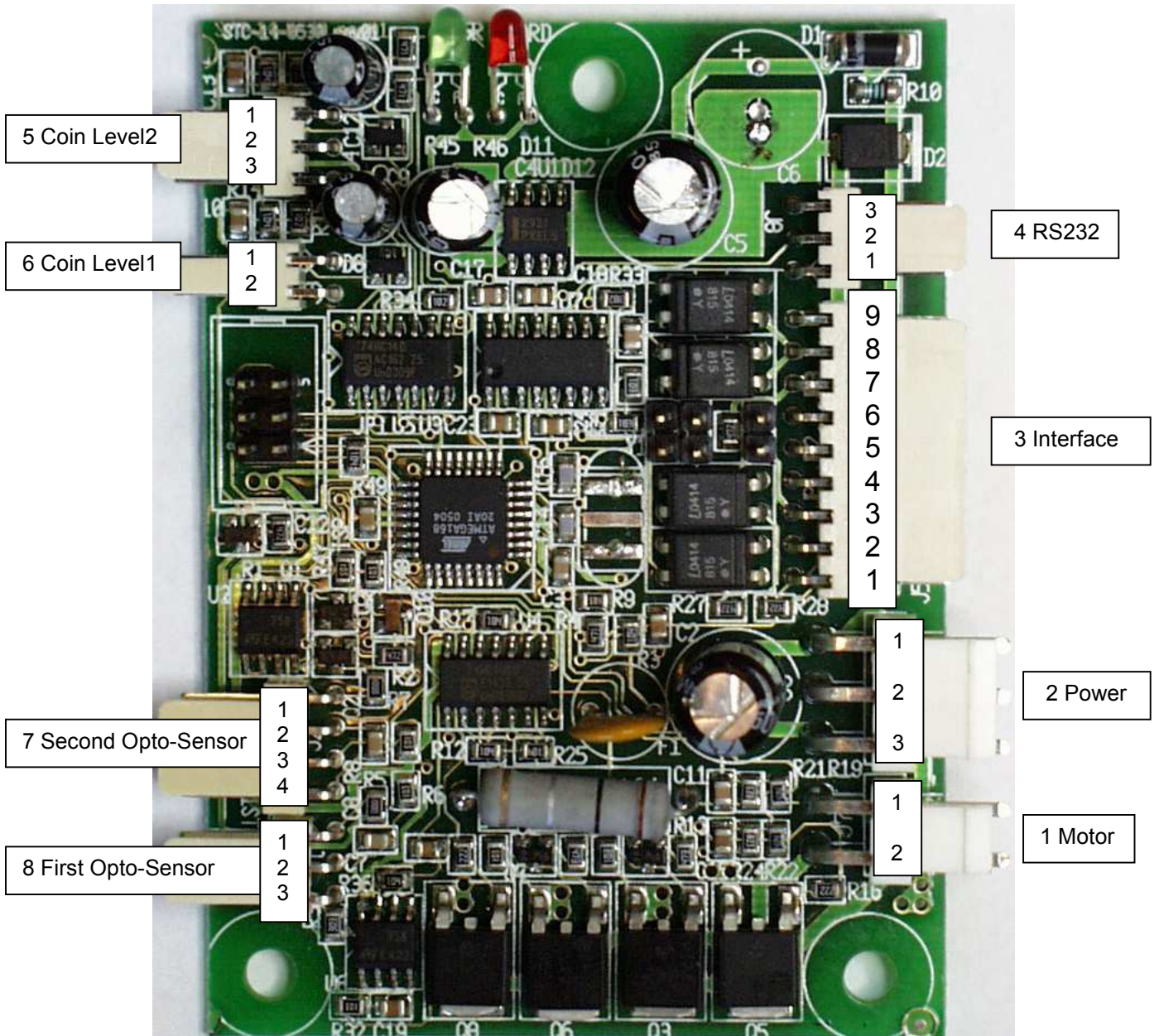


Figure 1: 14-0530 PCB

1.1 Power supply

Voltage for 12V motor hoppers : min 11V and max 27V.
 Voltage for 24V motor hoppers : min 21V and max 27V.
 Continuous current supply : 2.5A
 Peak current supply : 5A

1.2 Connectors

See Figure 1.

1.2.1 Motor connector

2-pin JST connector that connects to the hopper motor.

1.2.2 Power connector

PCB connector type : JST type B3PS-VH
 Machine connector type: JST type VHR-3N

Pin	Description	Value
1	Power	min 11 – max 27 Volt
2	No contact	
3	Ground	

Table 1: Power connector

Power requirements: I_continuous = 2.5 Amp, I_peak = 5 Amp.

1.2.3 Interface connector

PCB connector type : Molex type 22-05-7098
 Machine connector type: Molex type 22-01-2095, crimp terminal type: 08-50-0032

Pin	Description	Value
1	Level1 sense pin	low level: < 1V, high level: > 4V
2	Level2 sense GND	0V
3	Start input	low level: < 1V, high level: > 4V
4	Mode input	low level: < 1V, high level: > 4V
5	Error output	open collector
6	Coin exit output	open collector, onboard pull-up by shorting JP3
7	Power 12Vdc – 24Vdc	min 11Vdc, max 27Vdc
8	Power Ground	0V power
9	Signal Ground	0V signal ground for opto-isolated inputs

Table 2: Interface connector

1.2.4 RS232 connector

PCB connector type : Molex type 22-05-7038

Machine connector type: Molex type 22-01-2035, crimp terminal type: 08-50-0032

Pin	Description	Value
1	TxD	Output, RS232 level
2	RxD	Input, RS232 level
3	Gnd	Gnd

Table 3: RS232 connector

1.2.5 Coin Level2 connector

PCB connector type : Molex type 22-05-7038

Machine connector type: Molex type 22-01-2035, crimp terminal type: 08-50-0032

Pin	Description	Value
1	level2 sense	Output, < 1V low, > 4V high
2	Gnd	Gnd
3	No contact	

Table 4: Coin Level2 connector

1.2.6 Coin Level1 connector

PCB connector type : Molex type 22-05-7038

Machine connector type: Molex type 22-01-2035, crimp terminal type: 08-50-0032

Pin	Description	Value
1	level1 sense	Output, < 1V low, > 4V high
2	Gnd	Gnd

Table 5: Coin Level1 connector

1.2.7 Second opto-sensor connector

PCB connector type : Molex type 22-05-7038

Machine connector type: Molex type 22-01-2035, crimp terminal type: 08-50-0032

Pin	Description	Value
1	Opto-diode	Output, < 1V low, > 4V high
2	Gnd	Gnd
3	Sense	Input, < 1V low, > 4V high
4	Opto-emitter	Input, < 1V low, > 4V high

Table 6: Second opto-sensor connector

1.2.8 First opto-sensor connector

PCB connector type : Molex type 22-05-7038

Machine connector type: Molex type 22-01-2035, crimp terminal type: 08-50-0032

Pin	Description	Value
1	Opto-diode	Output, < 1V low, > 4V high
2	Gnd	Gnd
3	Opto-emitter	Input, < 1V low, > 4V high

Table 7: First opto-sensor connector

1.3 Jumpers

JP1	JP2	Mode
Shorted	Shorted	Direct drive
Open	Open	Logic drive
Open	Shorted	Reserve

Table 8: JP1 and JP2 Jumper setting

1.4 Indicators

After a power up, the software version number is displayed on the 2 leds:

Green led: First version number

Red led : Second version number

Example : V1.3: Green led flashed 1x, Red led flashes 3 times after a power up.

During normal operation the green led is on when the coin exit output is low, and off when the coin exit output is high.

The red led is on when an error event occurred, and goes off when the error is gone.

2. Suzo Excel functional software specification

Excel Hopper types:

- 14-0530-1: Motor 24V started active high
- 14-0530-2: Motor 24V started active low
- 14-0550-1: Motor 12V started active high
- 14-0550-2: Motor 12V started active low

The hopper can be operated in 2 modes:

1. Direct mode (JP1 and JP2 shorted)
2. Logic mode (JP1 and JP2 open)

2.1 Start Input

- When the hopper is in Direct mode, the hopper will start as soon as power is applied to the hopper, and stop as soon as the power is removed from the hopper.

- When the hopper is in Logic mode, the hopper is started by setting an active high level (model 14-0530-1 and 14-0550-1) of 5 to 24Vdc at the start input, or an active low level (model 14-0530-2 and 14-0550-2) of 0V.

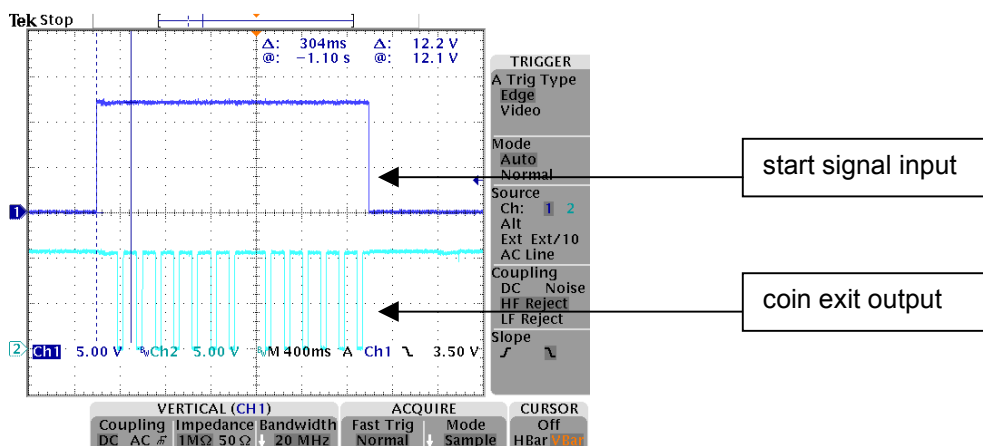


Figure 2: Start signal active high (model 14-0530-1 and 14-0550-1)

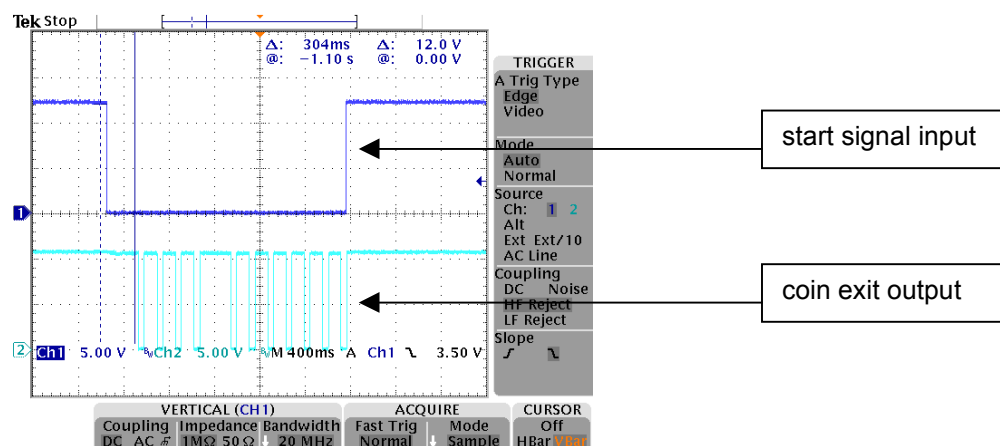


Figure 3: Start signal active low (model 14-0530-2 and 14-0550-2)

- For the 14-0530-2 and 14-0550-2 model, jumper JP3 may be shorted to enable an onboard pullup resistor of 4K7 ohm.
- Note that the start level must be lower than 1 volt in order to change input state from high to low.
- The hopper will not start if the (optional) second sensor is blocked, until the second sensor becomes deblocked.

2.2 First opto coin sensor

- When the first opto is blocked for more than 500ms, the hopper will stop if it was running, and will reverse and restart for 2 seconds to try to unblock the opto-sensor. If after 2 seconds, the opto is still blocked, the hopper will stop and go into error state (red led on). However, the hopper can be re-started again.

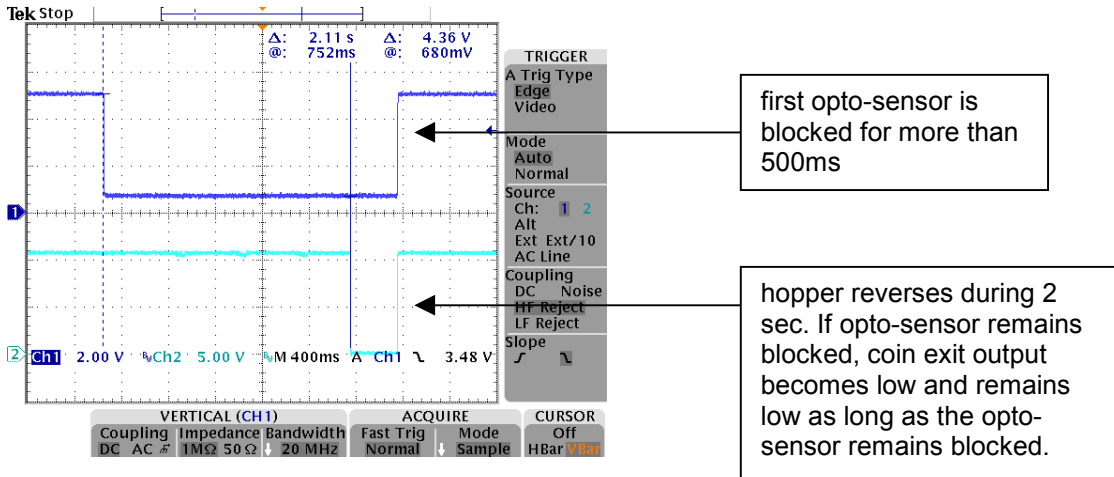


Figure 4: Coin exit output when first opto-sensor is blocked

2.3 Coin Exit Output

- If a coin passes the 1st opto sensor (active low signal), a fixed active low pulse of 50 ms is put on the coin exit output.

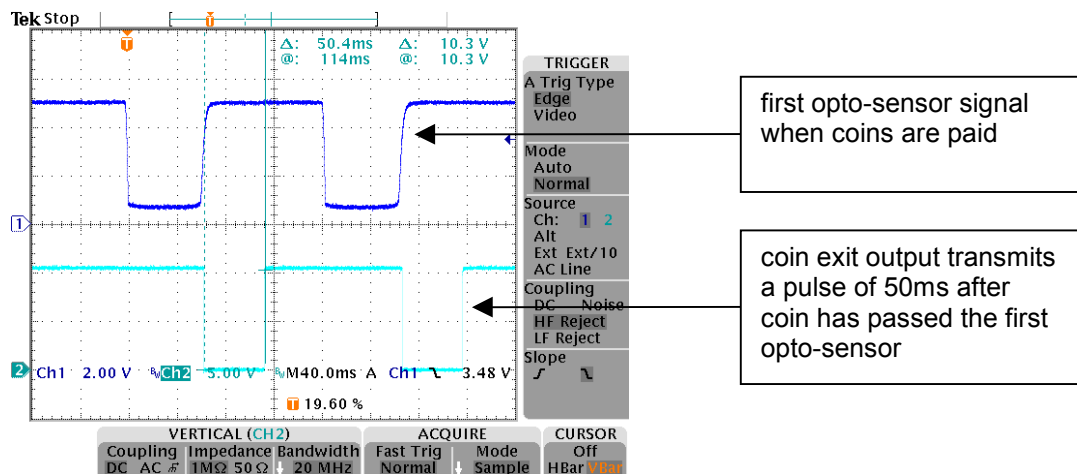


Figure 5: A fixed pulse of 50ms is output at the coin exit output if a coin passes the first opto

- If the hopper is stopped with a coin in the first opto, the hopper will reverse momentarily so that the coin is thrown back into the cup. No coin exit signal is transmitted in this situation.

2.4 Second Opto option

When a 2nd coin opto sensor (article nr.14-1190) is attached to the excel hopper, more security is added to the hopper.

- When the excel hopper is blocked for more than 120 ms at the coin exit port, the second opto will be blocked also, and the hopper will stop.
- If the 2nd opto-sensor becomes deblocked within 2 seconds, the hopper will continue to payout.
- If the 2nd opto-sensor is blocked for more than 2 seconds, the hopper will stop and go into error state and a COIN_JAM_PULSE is send to the error output.
- If more than 3 coins are in between the 1st opto sensor and the 2nd opto-sensor, the hopper will stop, until the second opto-sensor detects the passing of a coin.
- The hopper can not be re-started if the 2nd opto is blocked for more than 2 seconds. As soon as the second-opto is clear again, the hopper can be restarted again.

2.5 Error Output

If an error event occurs, a pulse is transmitted on the error output. The following error pulse signals are defined:

- Coin jam at second opto: COIN_JAM_PULSE (250 ms)
- Coin overpay at second opto: COIN_PAID_TILT (300ms)
- Run away detected at second opto: RUN_AWAY_TILT (350ms)
- Power down event: POWER_DOWN_TILT (500 ms)

A 10% variation in the timing is possible.

Note that only the first error signal is transmitted in case more errors have occurred in a hopper (no more than 1 error pulse is transmitted at the same time).

- If the first opto-sensor is blocked for more than 500ms, the hopper reverses 3 times trying to unblock the sensor. If the opto remains blocked, the error output becomes low and remains low as long as the first opto is blocked with a minimum time of COIN_JAM_PULSE (250 ms).

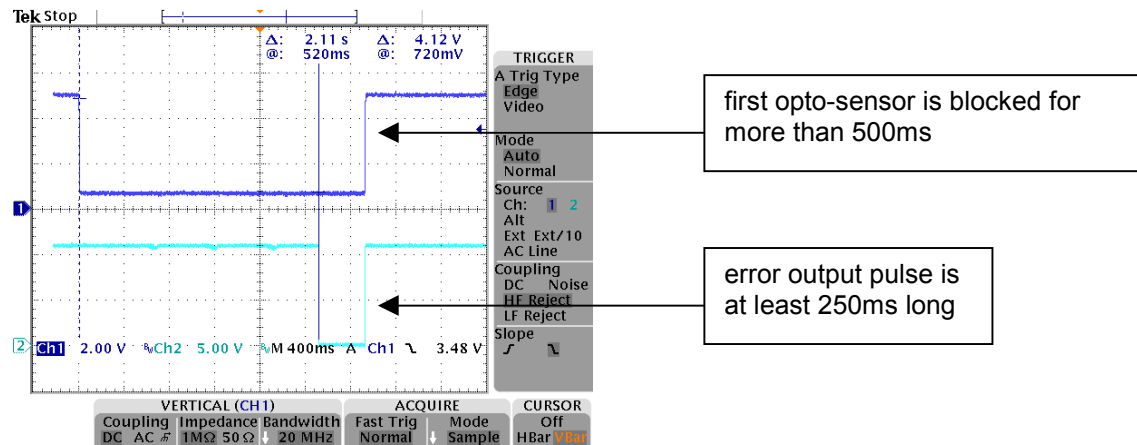


Figure 6: Error output when first opto-sensor is blocked

2.6 Anti-Jam operation

- If the hopper becomes blocked, the hopper will stop and and shake the pin wheel for 2 times (100ms reverse followed by 200ms forward followed by 200ms reverse), and then the hopper will try to start payout again. After 10 seconds of continuously anti-jamming, the hopper will stop and cool-down for 5 seconds and then try again.

2.7 Power down

A power down event occurs when the power voltage level drops below:

- 8V for a 12V (PCB 14-0550) board.
- 15V for a 24V (PCB 14-0530) board.

The motor will stop in all modes as soon as a power down event (50 ms after power threshold) is detected.

2.8 Power up

A power up event occurs when the power voltage level rises above:

- 10V for a 12V (PCB 14-0550) board.
- 20V for a 24V (PCB 14-0530) board.

The motor will restart in all modes as soon as a power up event is detected, and the start signal is still present.

- Coin exit (blue line) and Error (green line) should be high after power up.

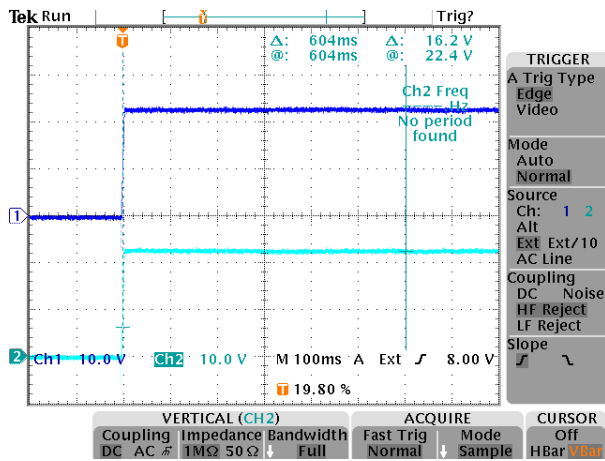
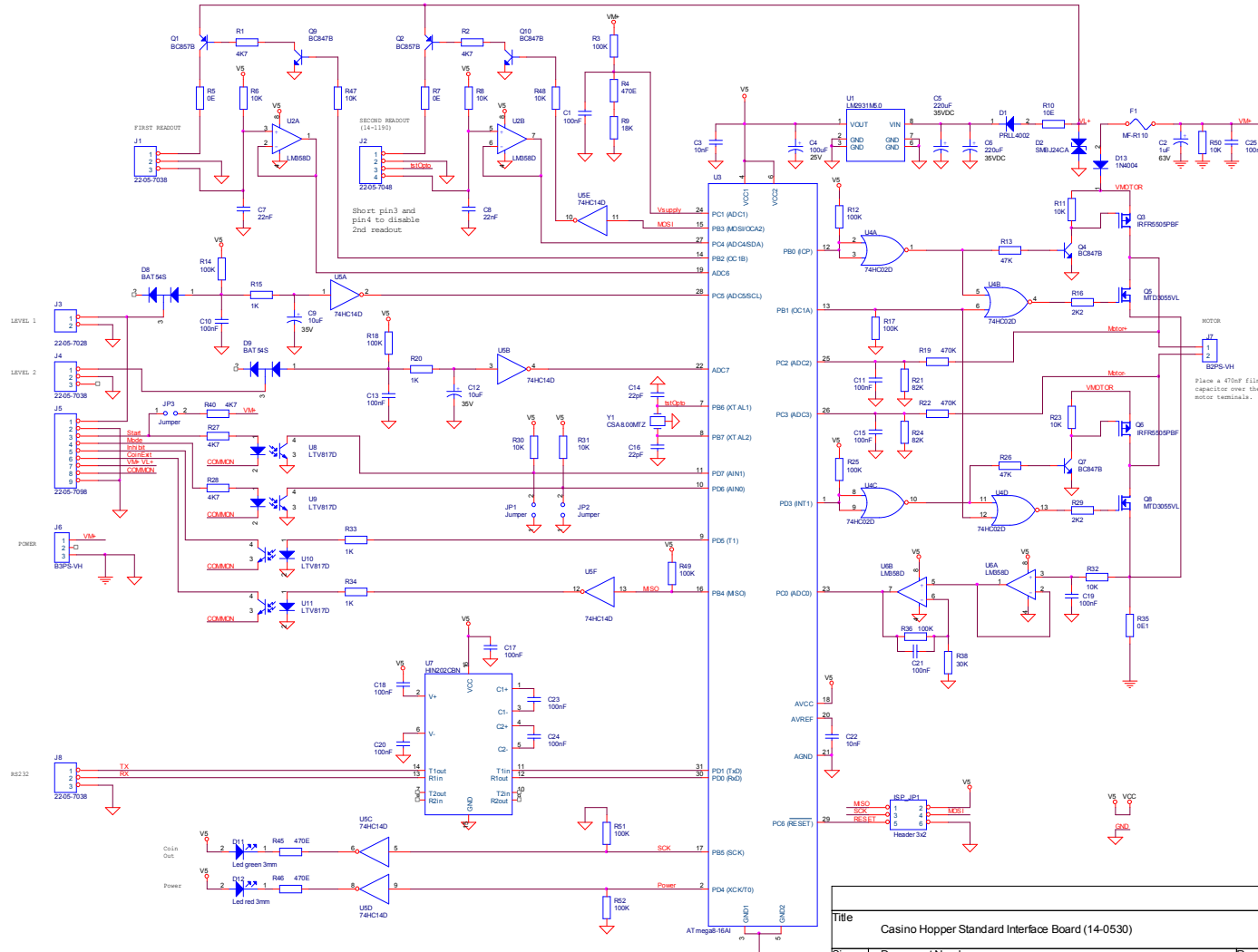


Figure 7: Coin exit output and Error output after power up

Schematic Diagram PCB 14-0530 Rev0.3

Place transient suppressor diodes (P6KE6.8) at the level sensor pins. Farnell 166-601.



Title		
Casino Hopper Standard Interface Board (14-0530)		
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