# DISTRIBUZIONE ALIMENTAZIONI DC

**Alimentatore Esterno**

MOLEX_39300060

J2

POWER +24V Stepper Motors
Stepper Motor GND
POWER GND
POWER 24V

J3 — JST B10B-XH-A — +24V

J3

+5V — JST B20B-PHDSS

J4

+3.3V

JST B20B-PHDSS

J5

**DC/DC POWER SUPPLY MODULES**

**TENSIONI INGRESSO**

POWER_24V

GND

**TENSIONI USCITA**

PWR_SUPPLY_OUT_12V — **Output +12V 9A**

PWR_SUPPLY_OUT_5V — **Output +5V 5A**

PWR_SUPPLY_OUT_3V3 — **Output +3.3V 5A**

PWR_SUPPLY_OUT_30V — **Output +30V 5A**

12V locale

SH1 / SH2 — JumperPower_NC — **Output +12V 7A**

+12V

J1 — **Alimentazione scheda RLB**

GND

MOLEX 39-28-1023

| | |
|---|---|
| STEPPER_PW | driver Stepper Motors |
| SOL_24V | driver Solenoids |
| +24V | driver DC motor e barre LED |
| STAPLERPW_24V | stapler (scheda esterna) |
| STAPLERCMD_24V | stapler (scheda esterna) |
| DOT_24V | DOT MATRIX (scheda esterna) |
| CIS_24V | CIS (scheda esterna) |

SH3

| | |
|---|---|
| PH_5V | stadio ingresso fotocellule |
| +5V | logica 5v su scheda |
| STAPLER_5V | stapler (scheda esterna) |
| MICR_5V | micr (scheda esterna) |
| DOT_5V | dot matrix (scheda esterna) |

SH4

| | |
|---|---|
| +3.3V | logica 3v3 su scheda |
| CIS_3.3V | CIS (scheda esterna) |

SH5

| | |
|---|---|
| IKJ_30V | inkjet (scheda esterna) |

TP1 TP2 TP3 — Testpoint PAD

TP4 TP5 TP6 — Testpoint PAD

*Oscilloscope GND test points: equally spaced alongside PCB*

J6 — Faston 6-3x0-8-90

*Main connection to metal chassis*

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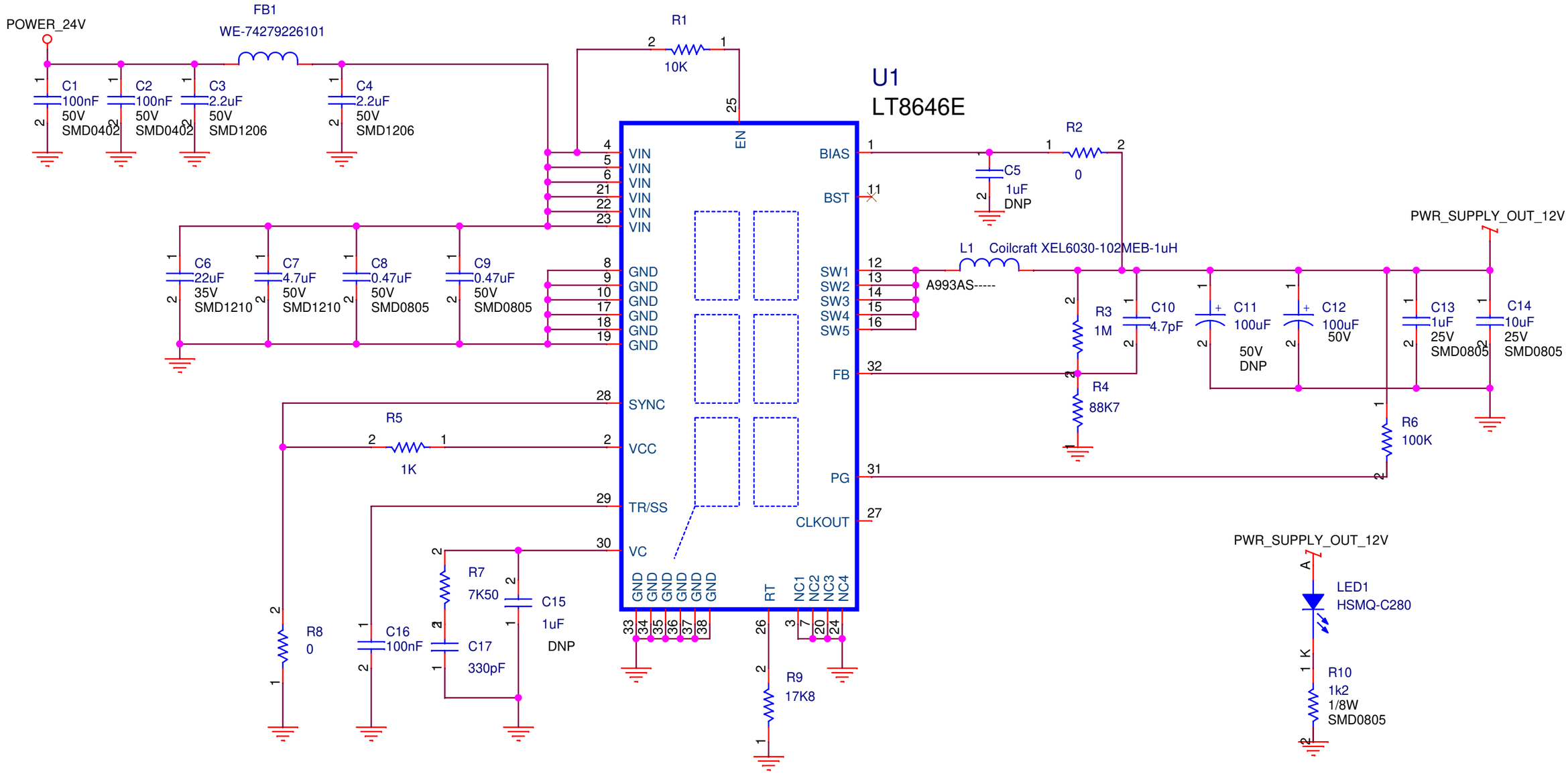
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: CONNETTORE INGRESSO ALIMENTAZIONE DC | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# DC-DC 12V0 out

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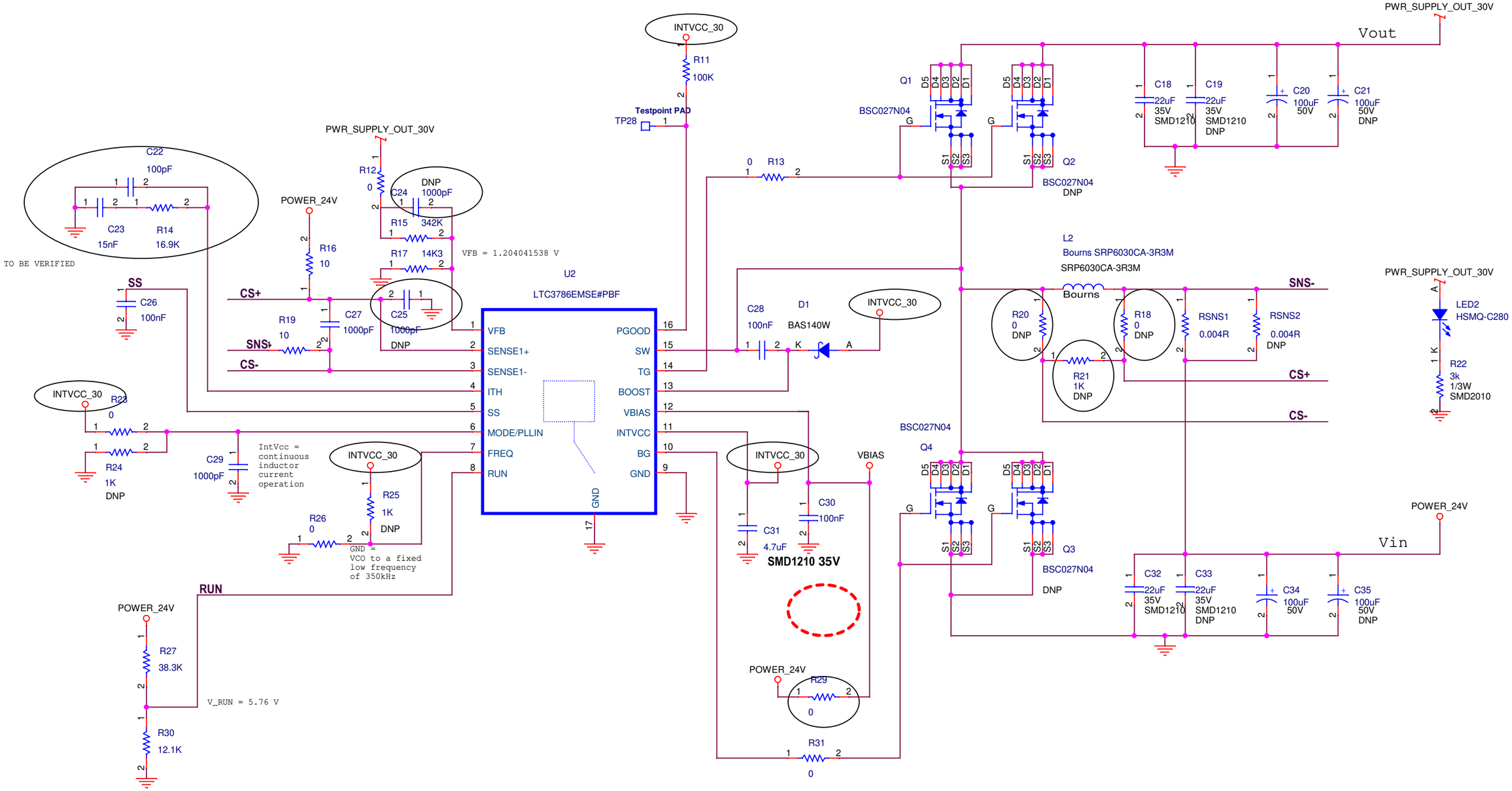
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number OUT +12V | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# DC-DC 30Vout

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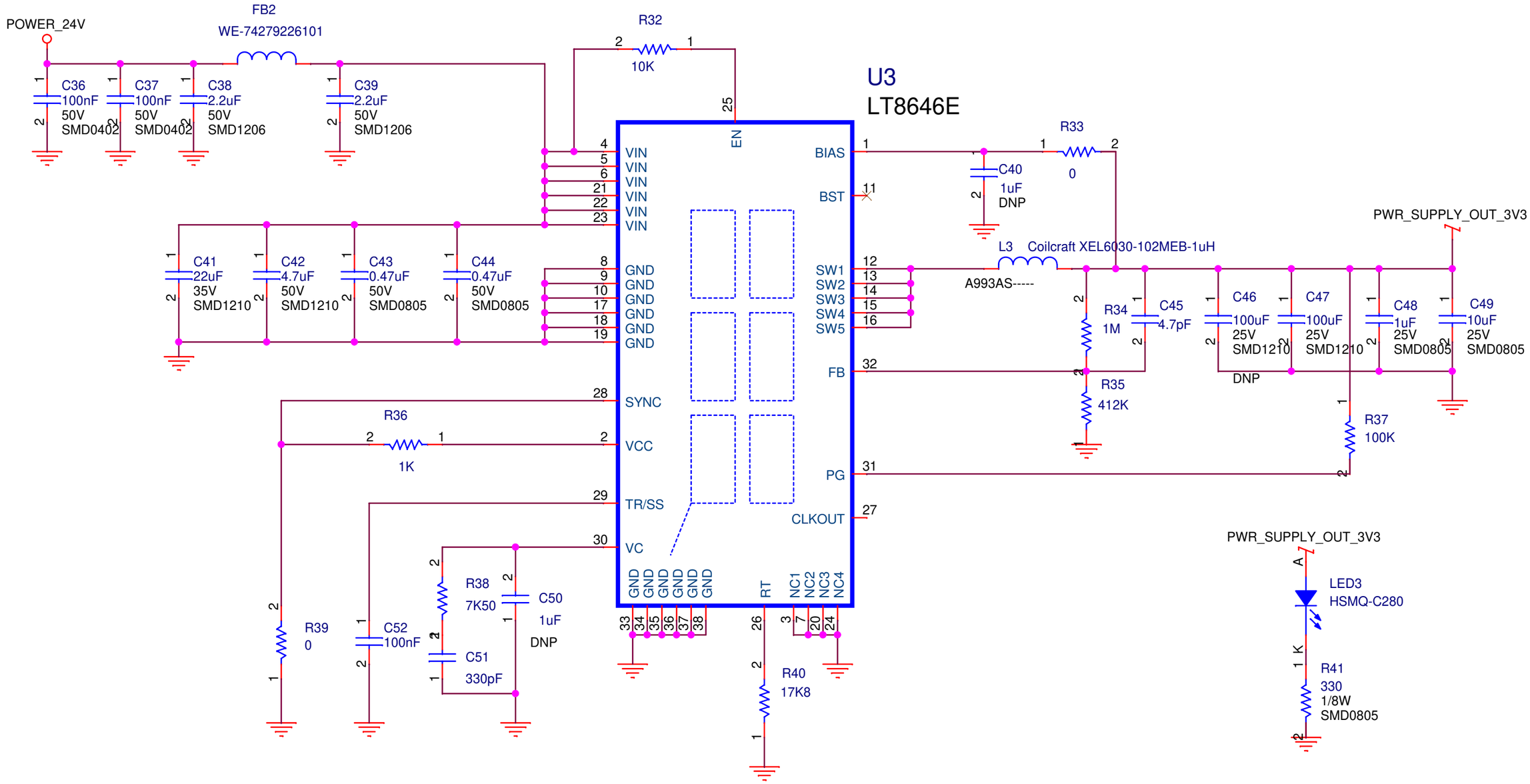
| Title | Rototype - RPB | |
| Size A3 | Document Number OUT +30V | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# DC-DC 3V3out

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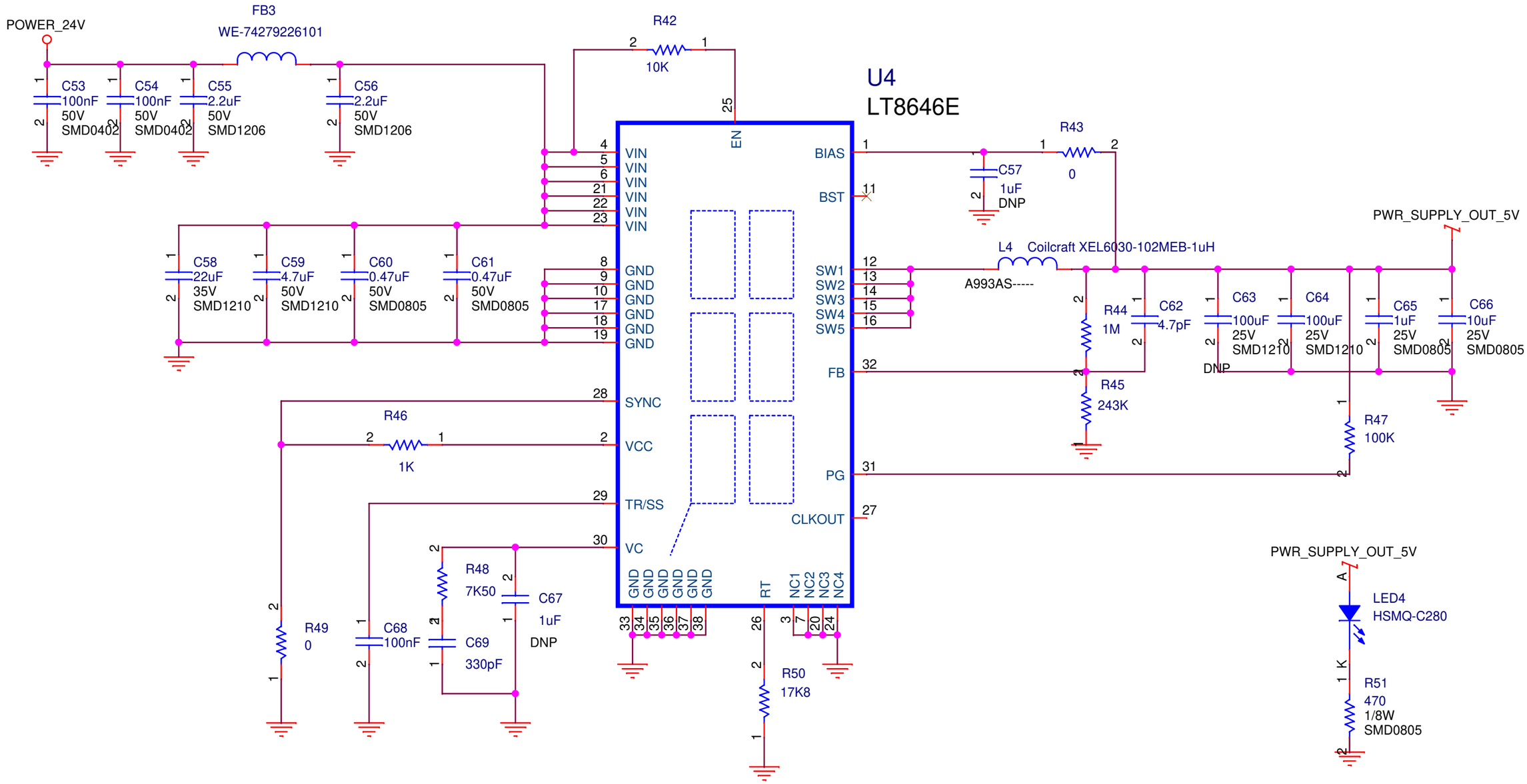
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number OUT +3V3 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# DC-DC 5Vout

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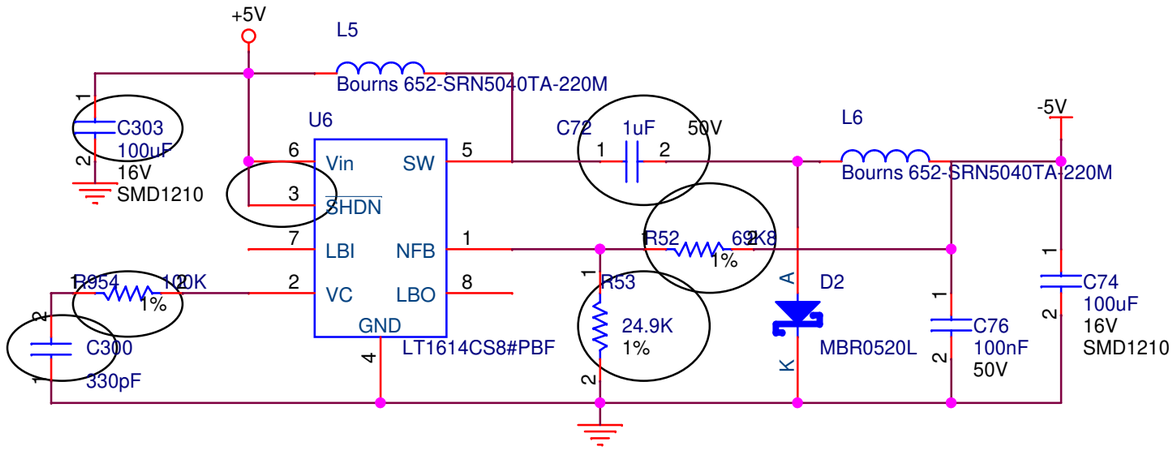
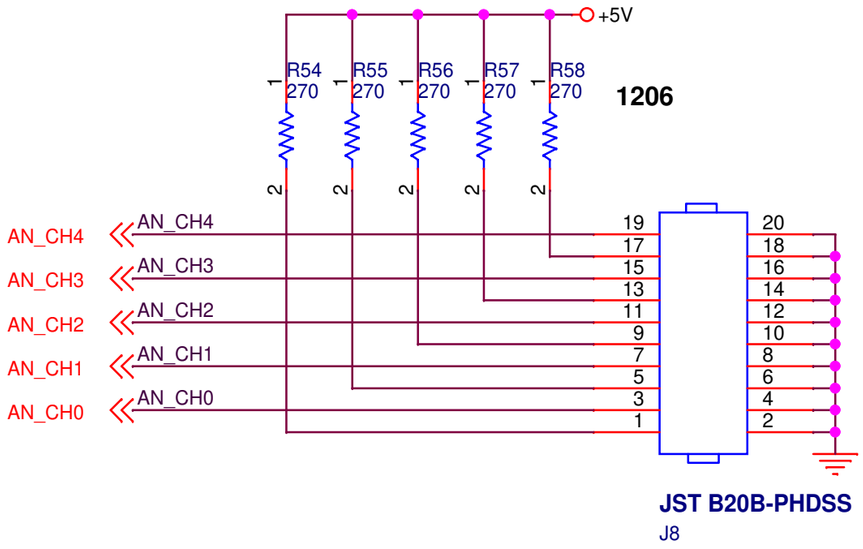
| Title | Rototype - RPB | |
| Size A4 | Document Number OUT +5V | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# ADC alim e conn

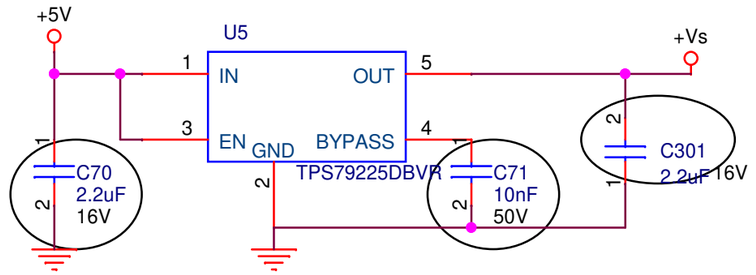
## STADIO ALIMENTAZIONE AMPLIFICATORI CANALI ANALOGICI



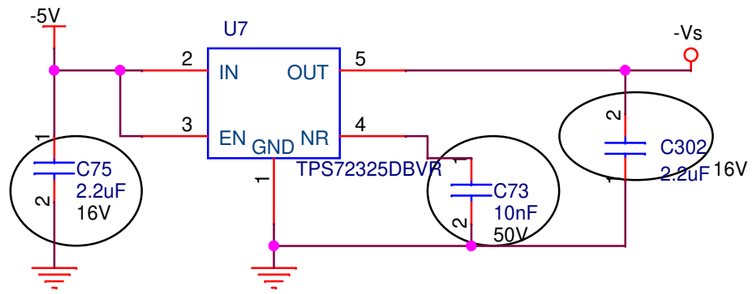



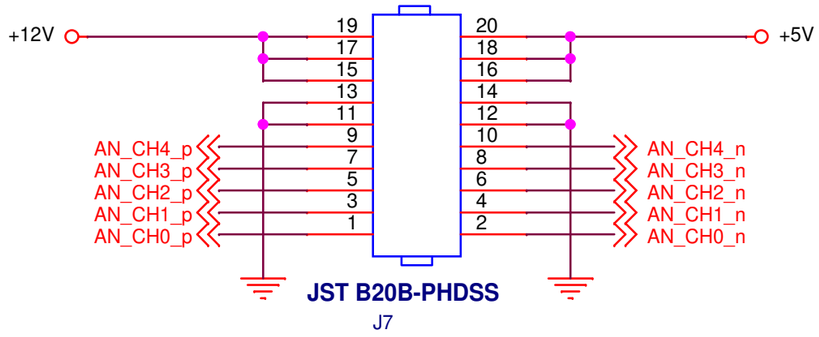

## INGRESSI ANALOGICI SINGLE ENDED

Vs+ : +2V5 @ 100mA




Vs- : -2V5 @ 200mA




## INGRESSI ANALOGICI DIFFERENZIALI

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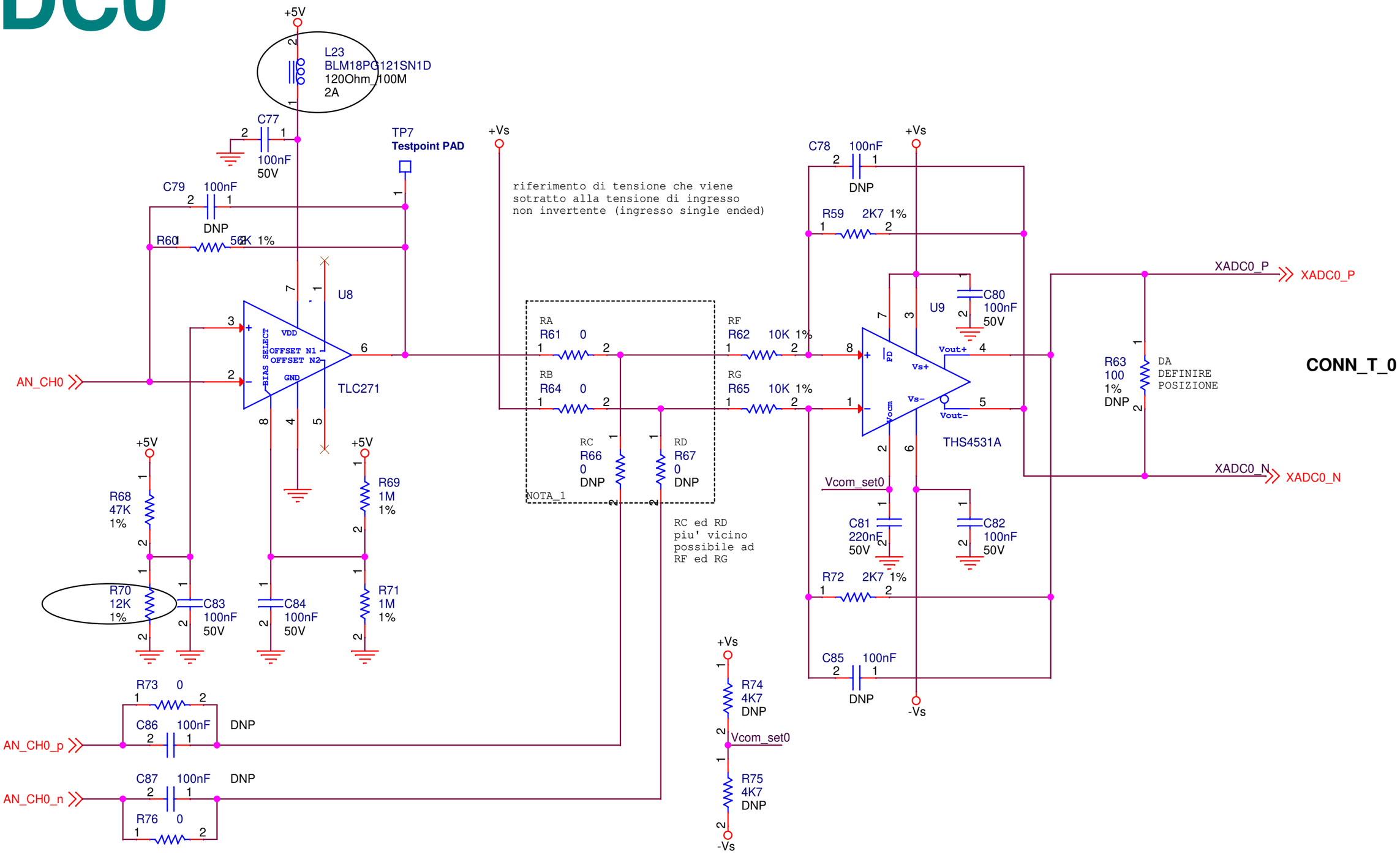
| Title: Rototype - RPB | | | |
| Size: A4 | Document Number: ADC - Alim e conn | | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | | |

# ADC0




NOTA_1
Ingressi sigle ended in corrente ( sensori ottici ) : montare RA e RB e non montare RC ed RD
Ingressi Differenziali : non montare RA ed RB e montare RC ed RD

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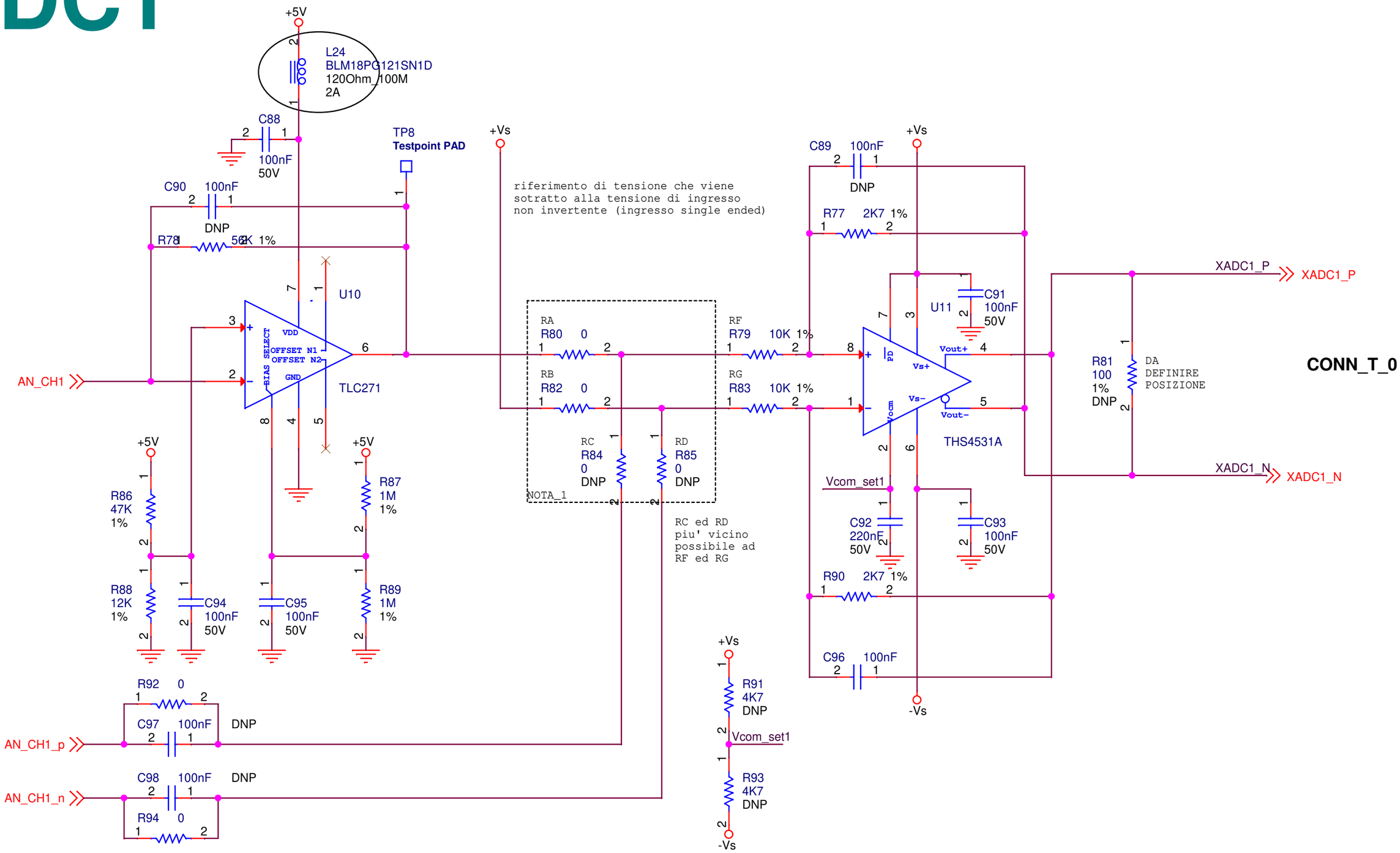
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: ADC0 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# ADC1




NOTA_1
Ingressi sigle ended in corrente ( sensori ottici ) : montare RA e RB e non montare RC ed RD
Ingressi Differenziali : non montare RA ed RB e montare RC ed RD

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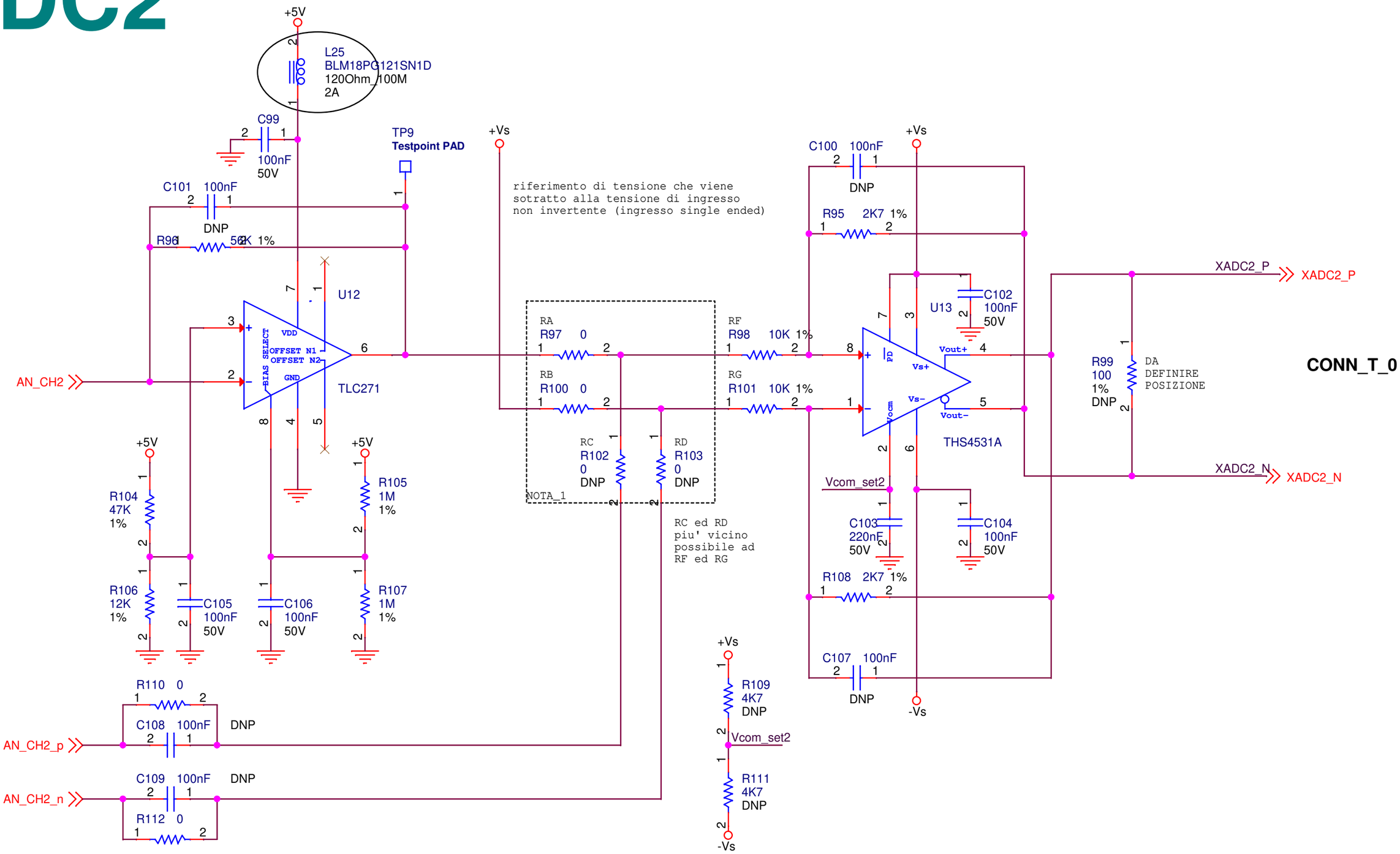
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: ADC1 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# ADC2




NOTA_1
Ingressi sigle ended in corrente ( sensori ottici ) : montare RA e RB e non montare RC ed RD
Ingressi Differenziali : non montare RA ed RB e montare RC ed RD

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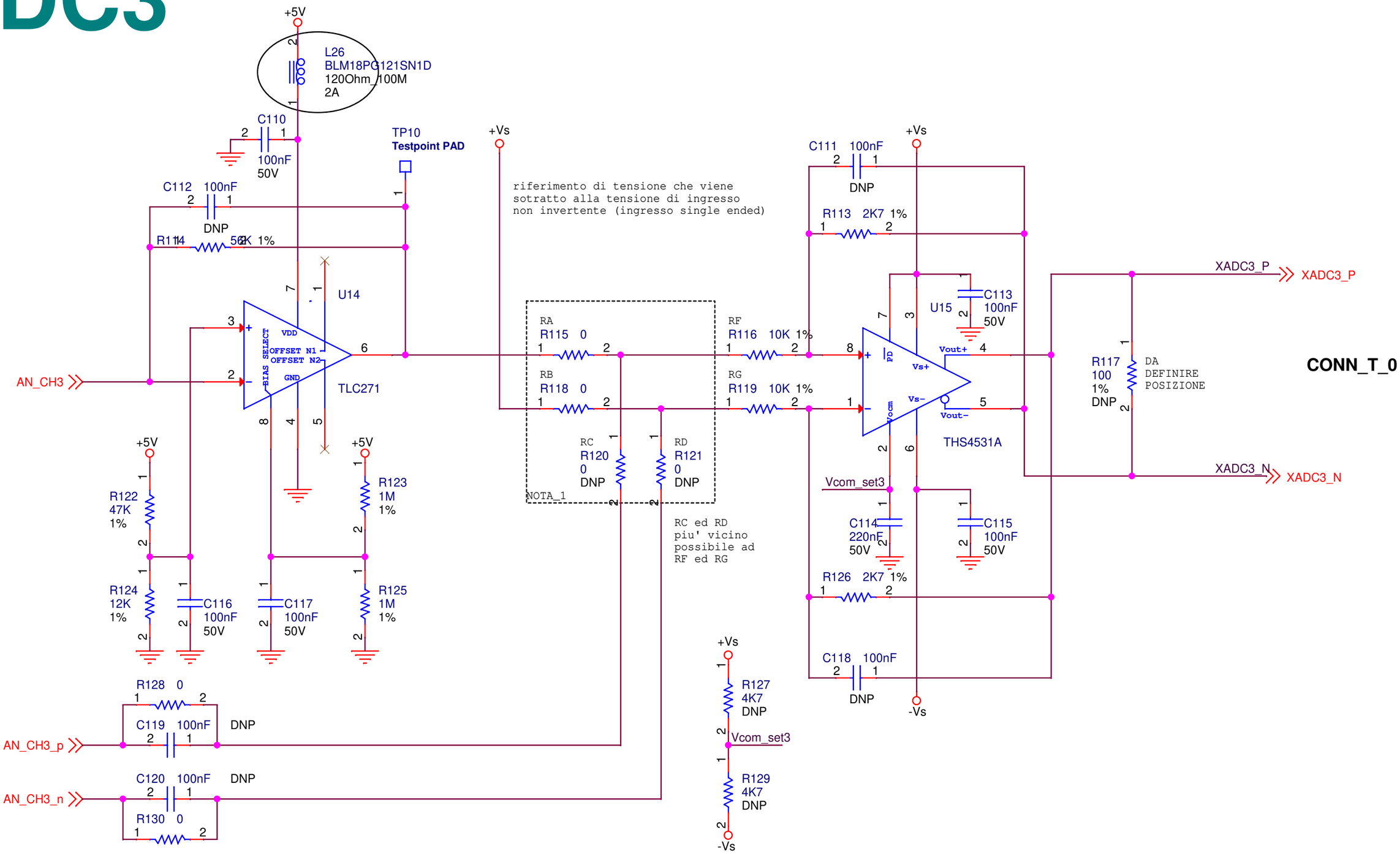
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: ADC2 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# ADC3




NOTA_1
Ingressi sigle ended in corrente ( sensori ottici ) : montare RA e RB e non montare RC ed RD
Ingressi Differenziali : non montare RA ed RB e montare RC ed RD

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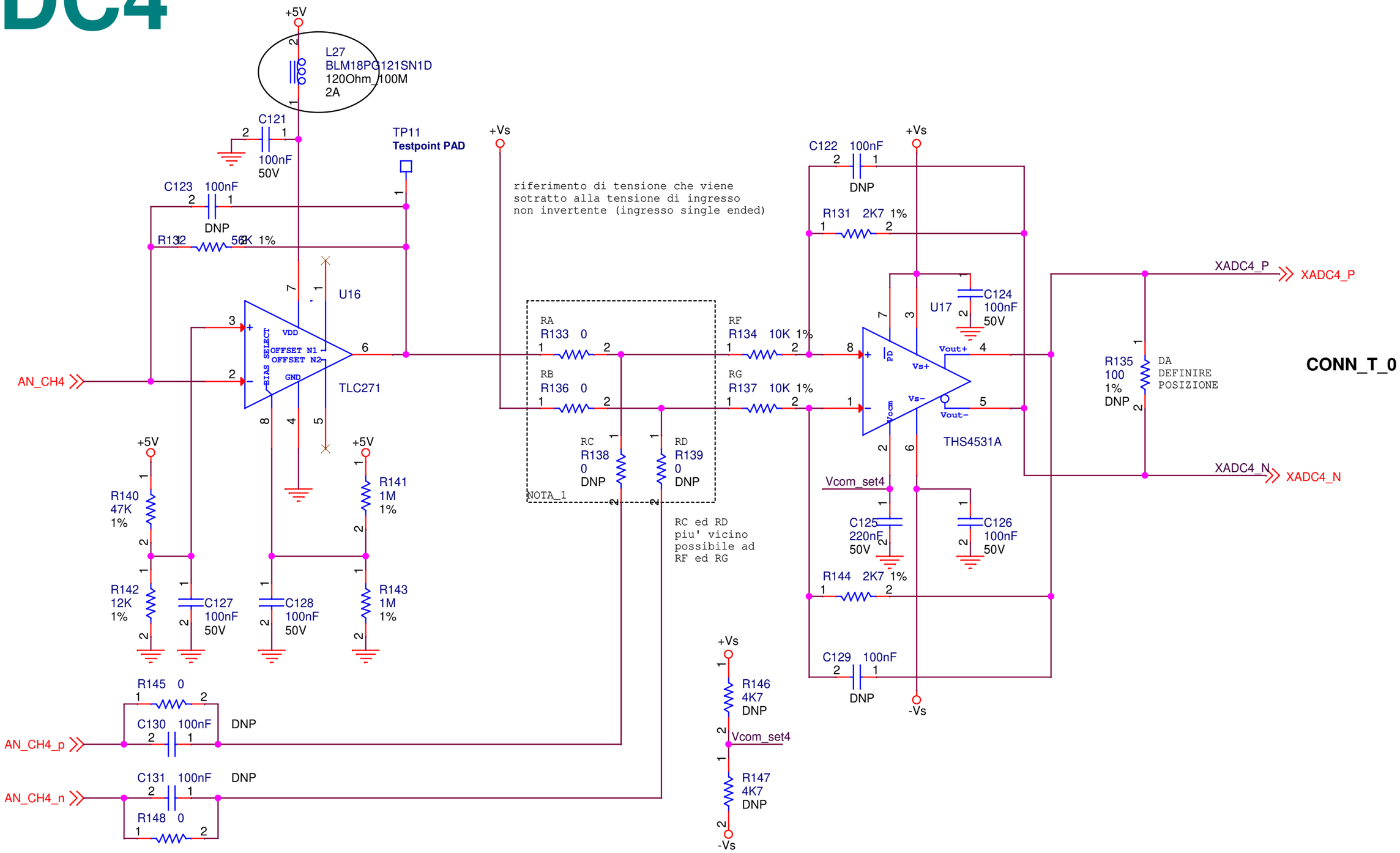
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: ADC3 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# ADC4




NOTA_1
Ingressi sigle ended in corrente ( sensori ottici ) : montare RA e RB e non montare RC ed RD
Ingressi Differenziali : non montare RA ed RB e montare RC ed RD

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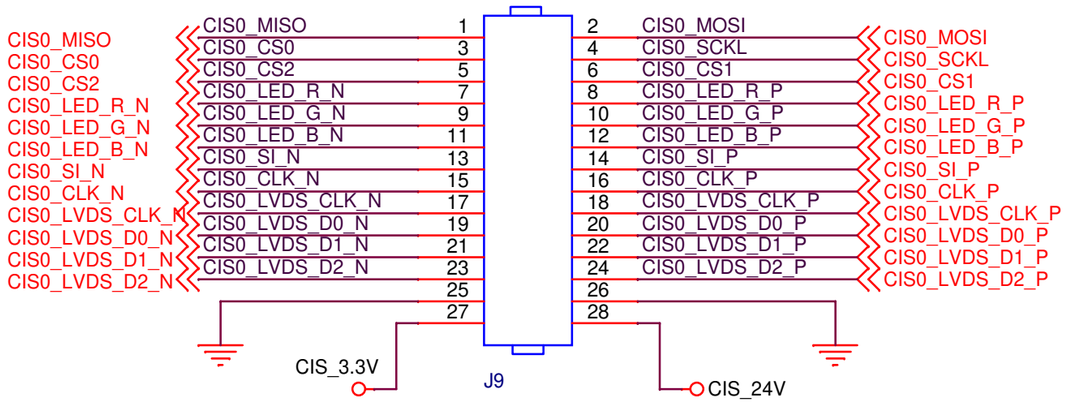
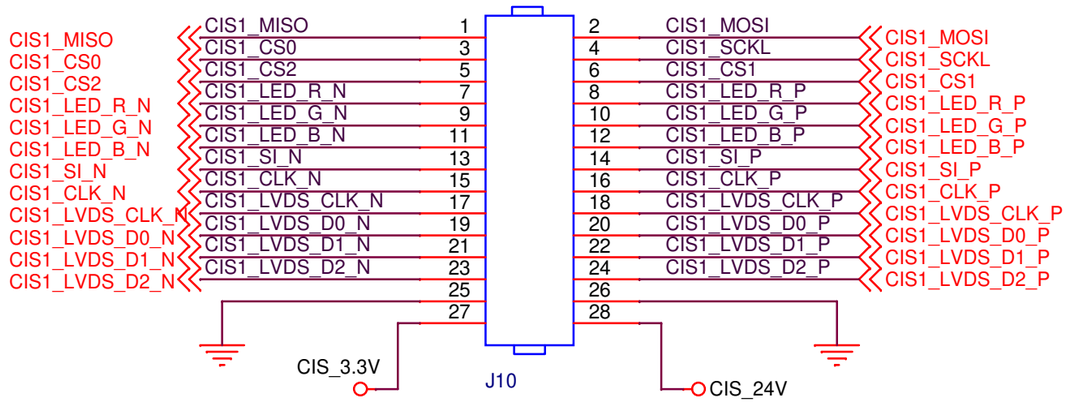
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: ADC4 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# CONNETTORI CIS

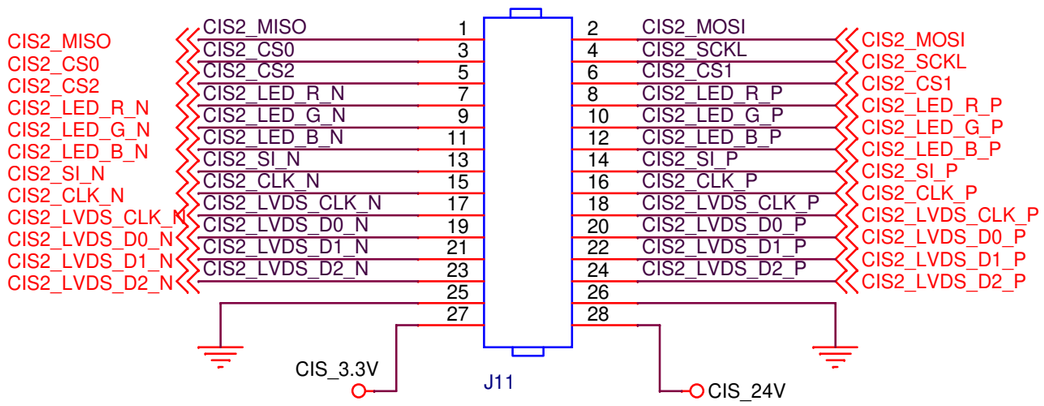
**JST B28B-PHDSS**



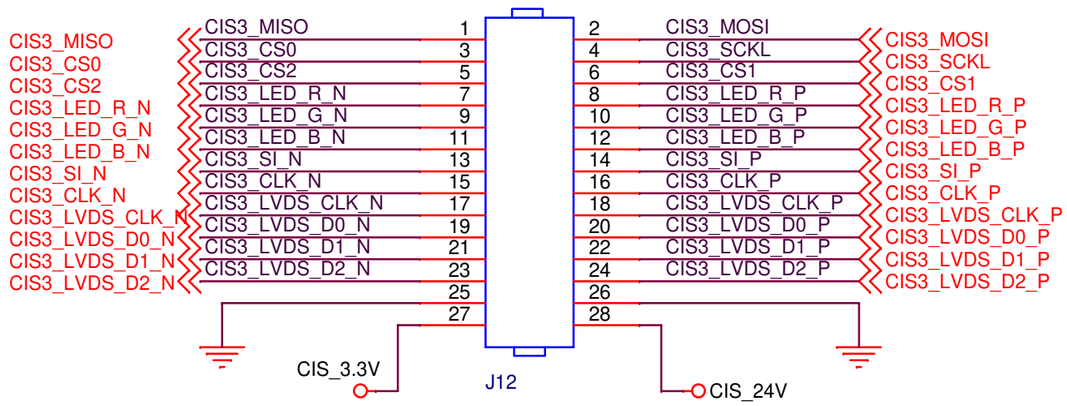

**JST B28B-PHDSS**




**JST B28B-PHDSS**




**JST B28B-PHDSS**

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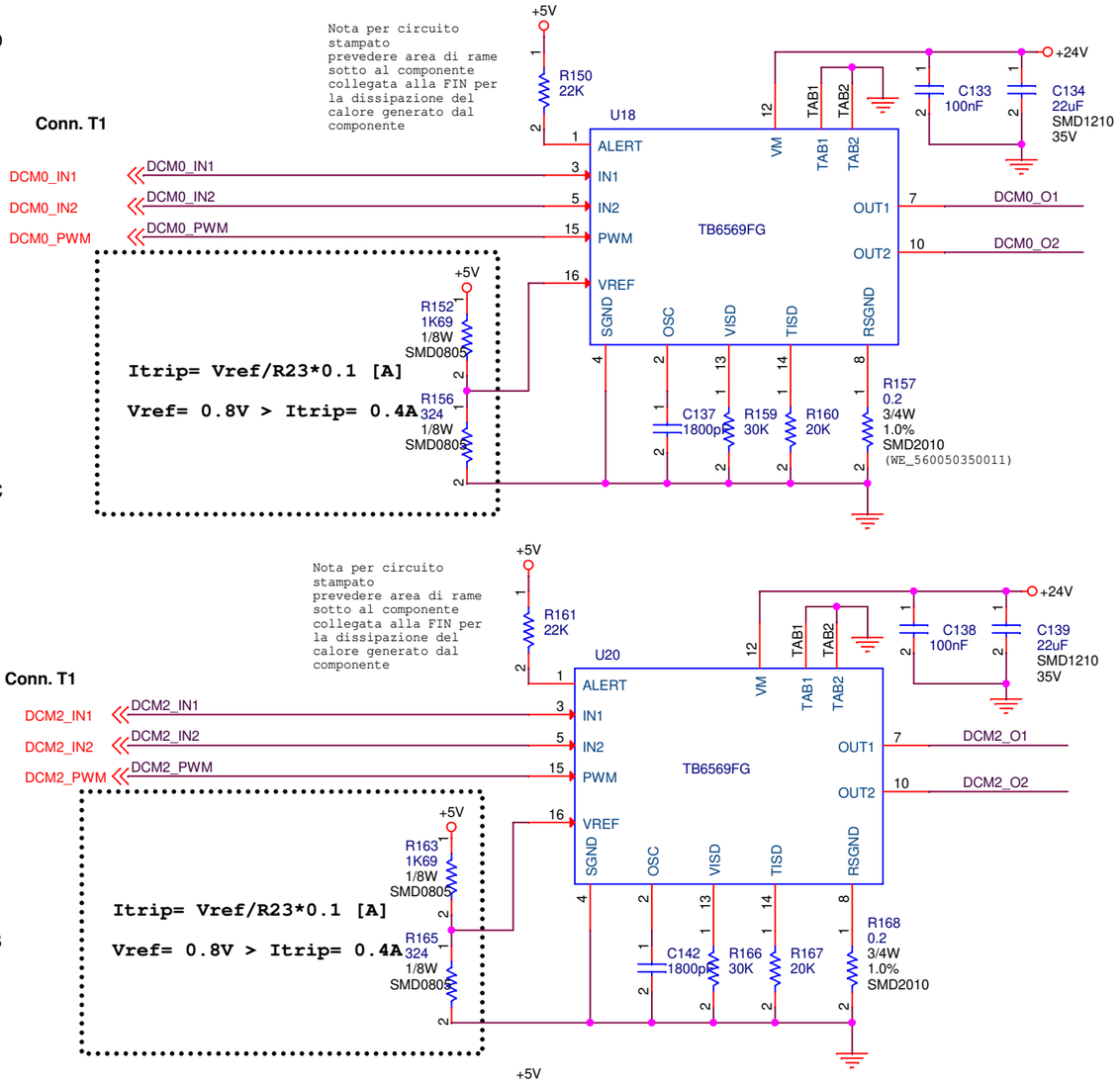
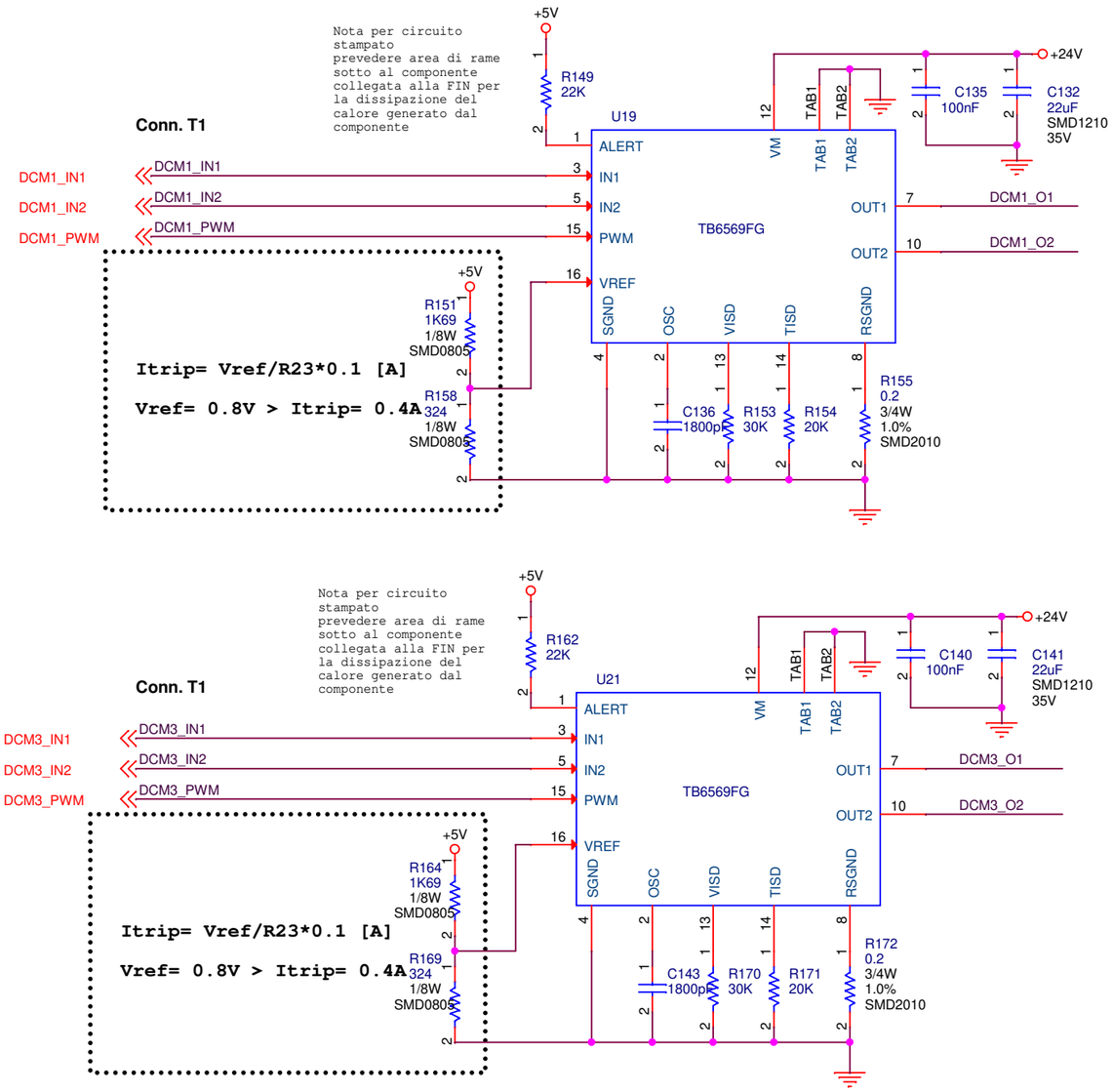
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: CONNETTORI CIS | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# MOTORE DC



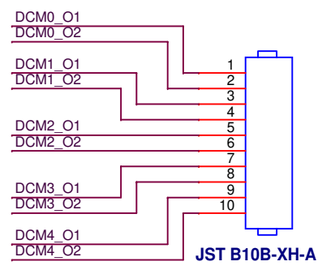










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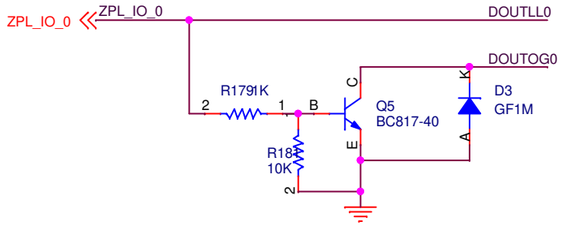
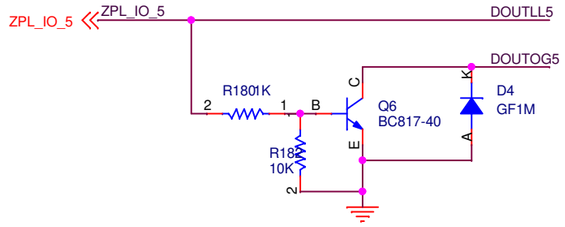
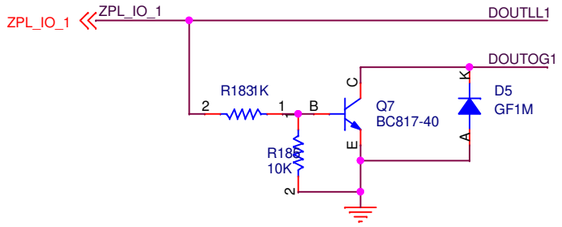
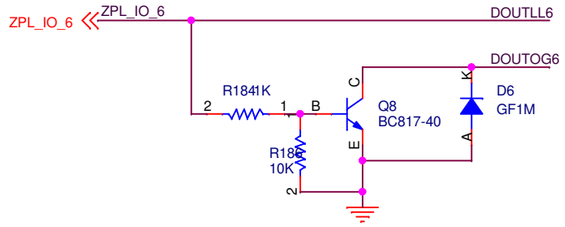
| Title | Rototype - RPB | |
| Size A3 | Document Number MOTORI DC | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

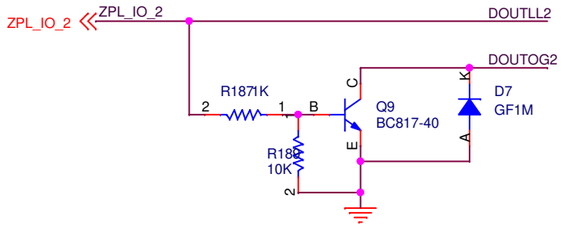
# DIGITAL OUTPUTS

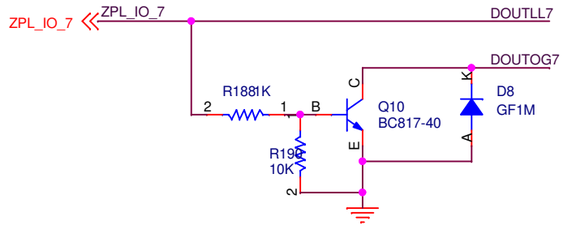


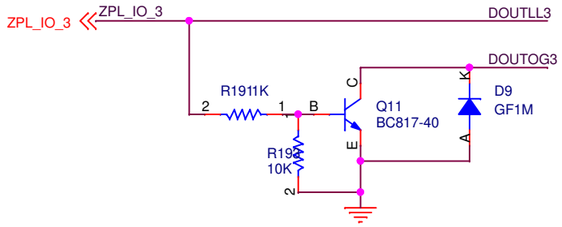



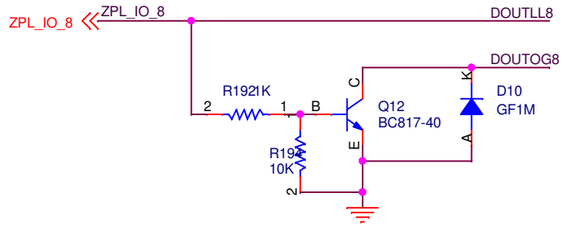



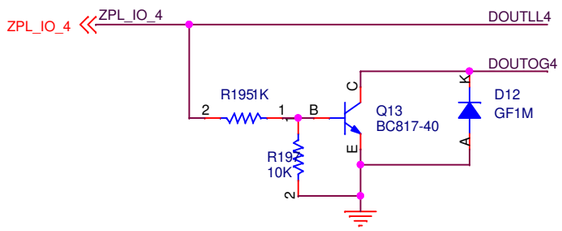



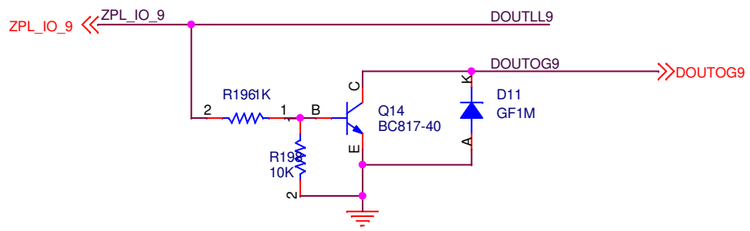



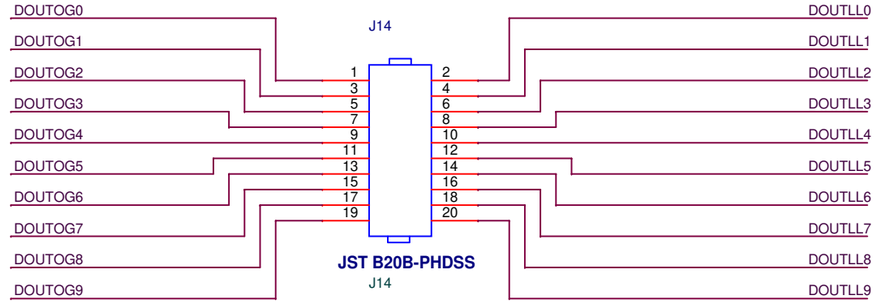



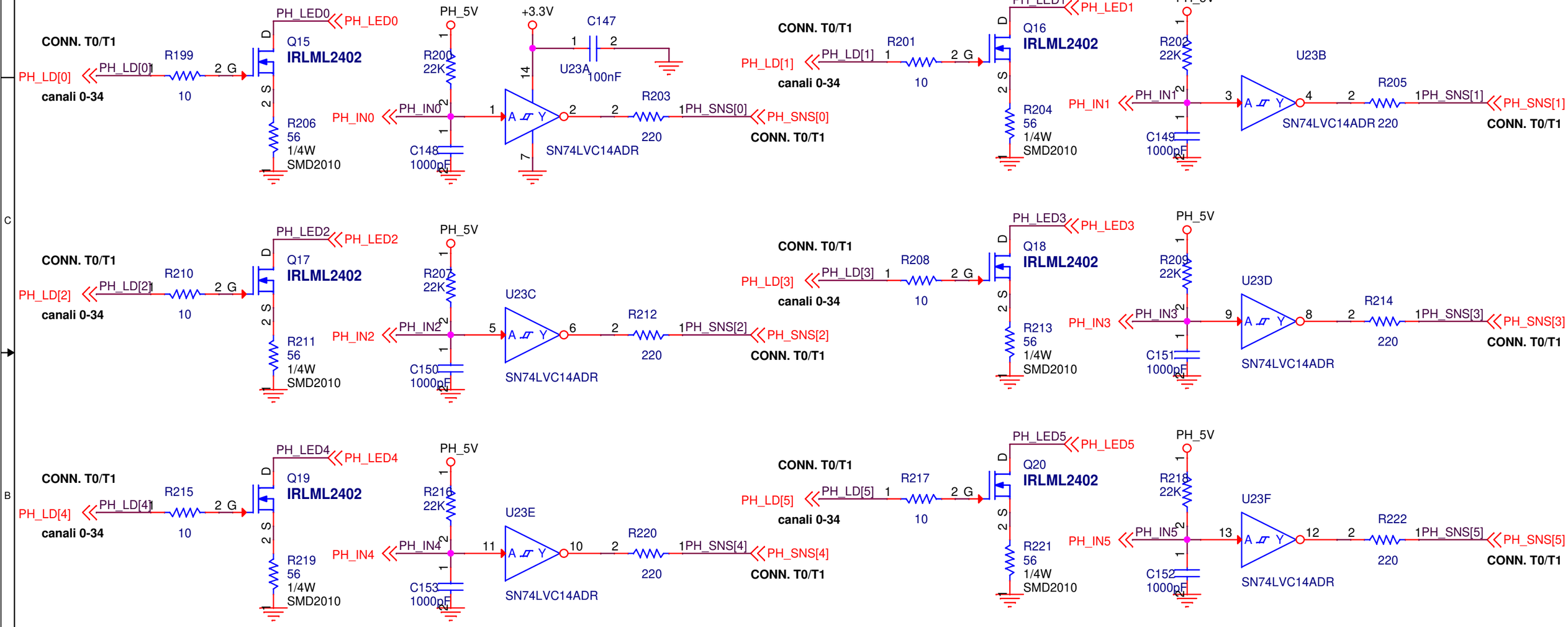




**DOUTOG9 e' riportato anche sul connettore STAPLER quindi utilizzabile in alternativa sui due connettori**

| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A3 | Document Number: DIGITAL OUTPUTS | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# INGRESSI DIGITALI 0..5

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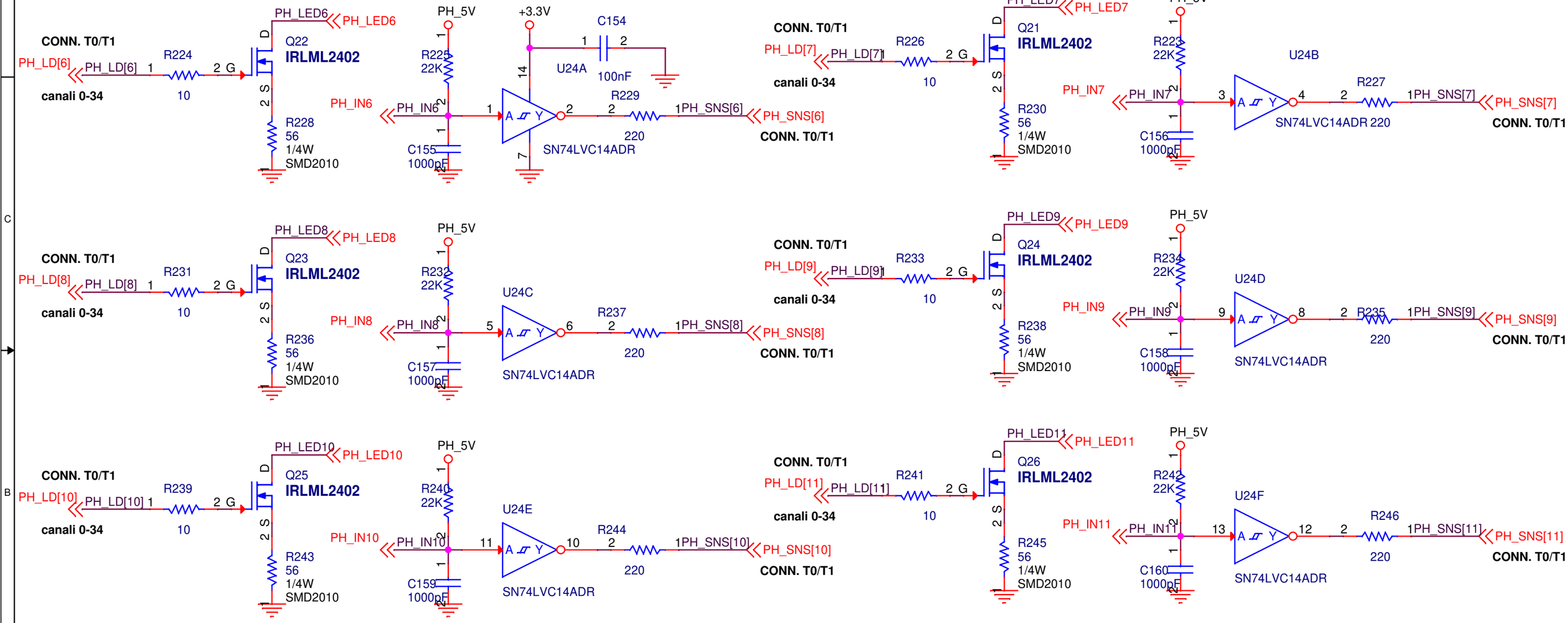
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number DIGITAL PHOTO channel 0..5 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# INGRESSI DIGITALI 6..11

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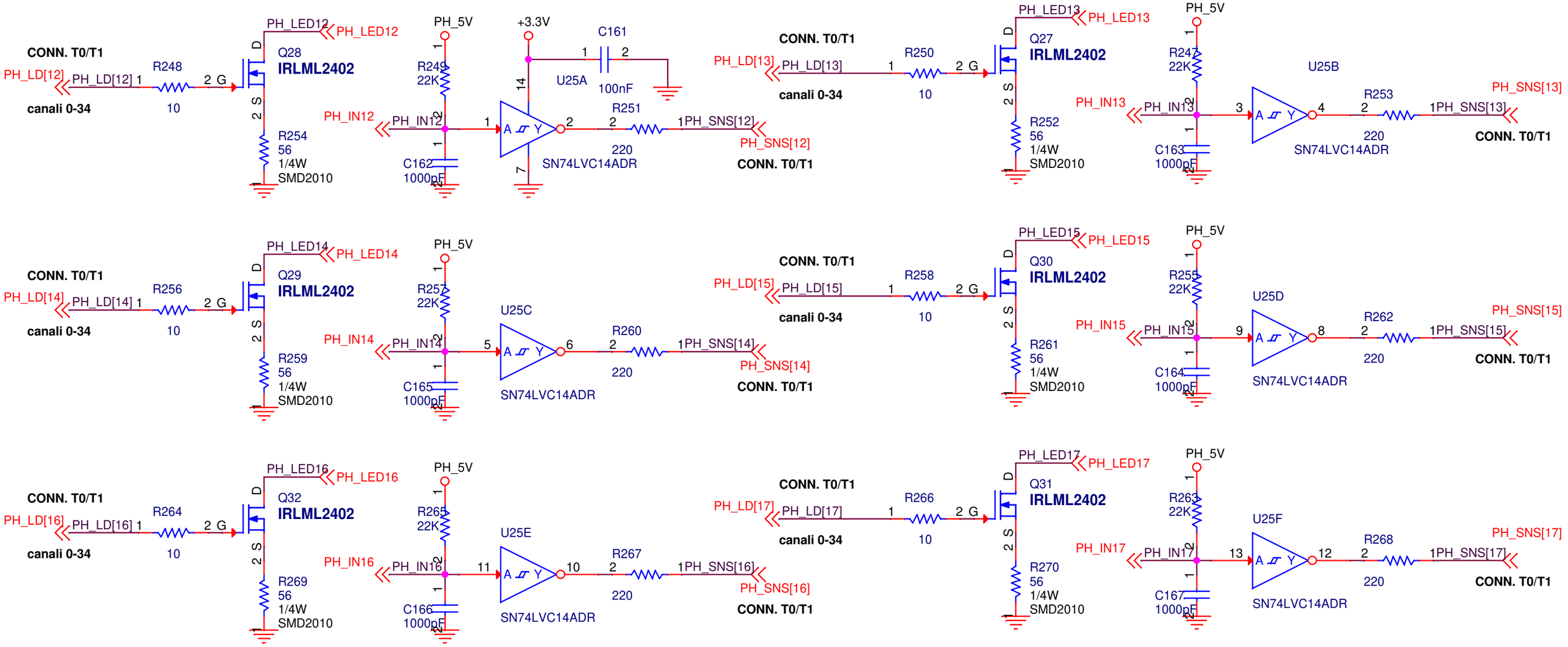
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: DIGITAL PHOTO channel 6..11 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# INGRESSI DIGITALI 12..17

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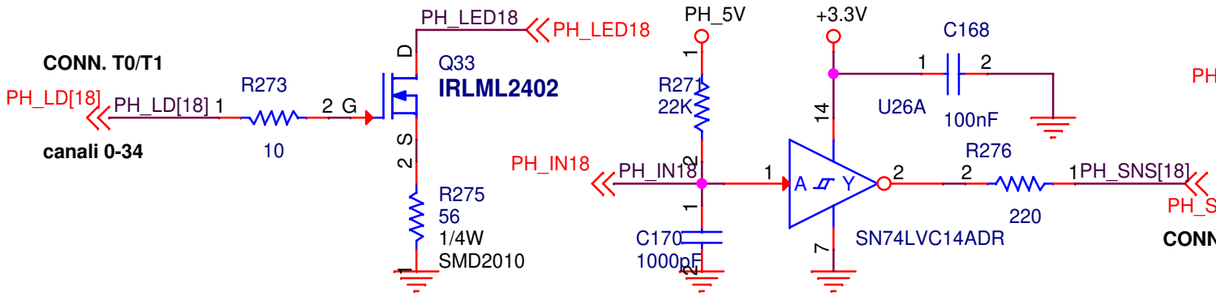
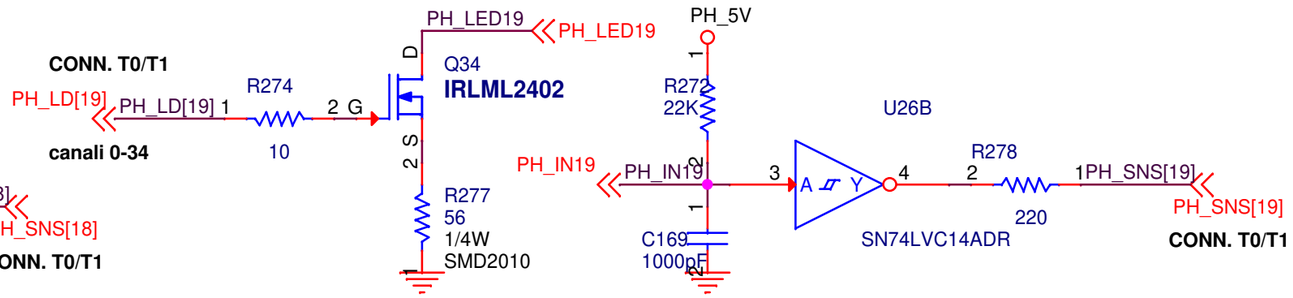
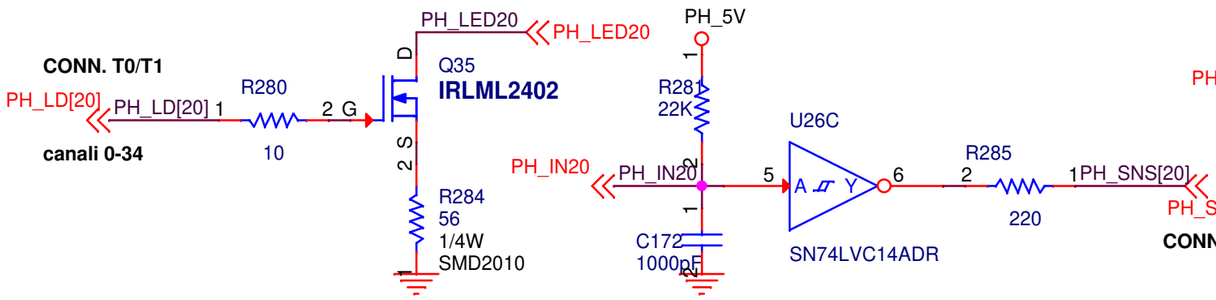
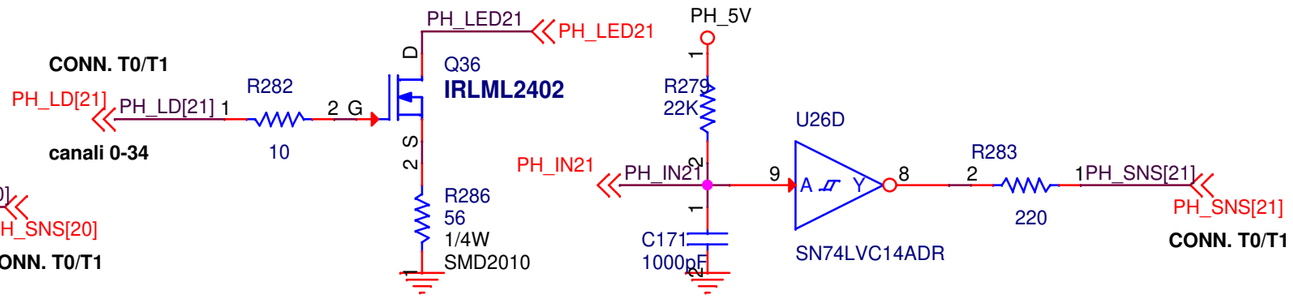
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number DIGITAL PHOTO channel 12..17 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

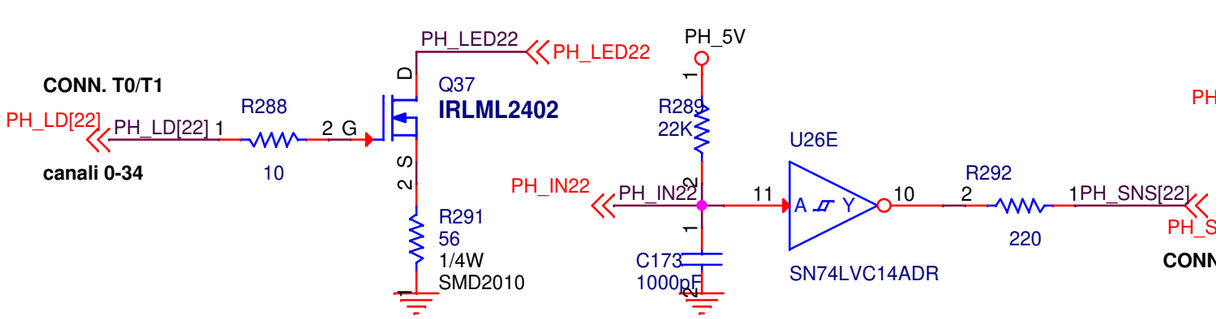
# INGRESSI DIGITALI 18..23

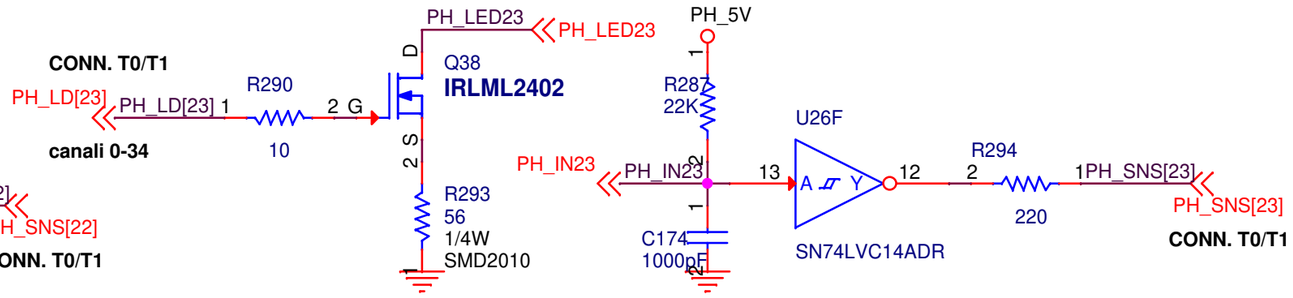
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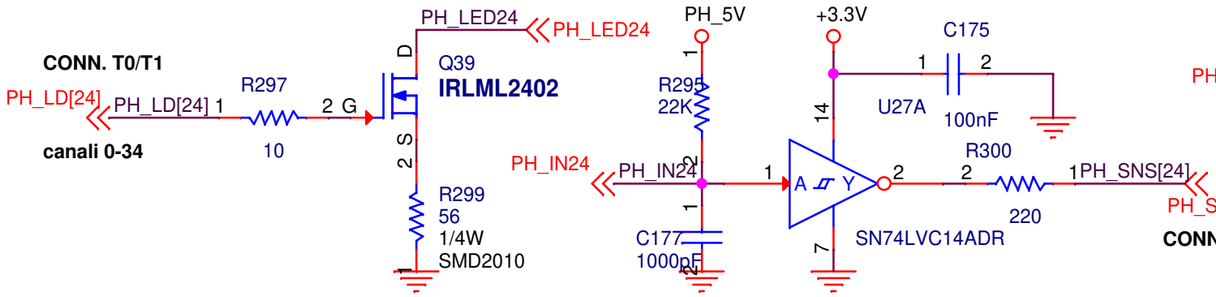
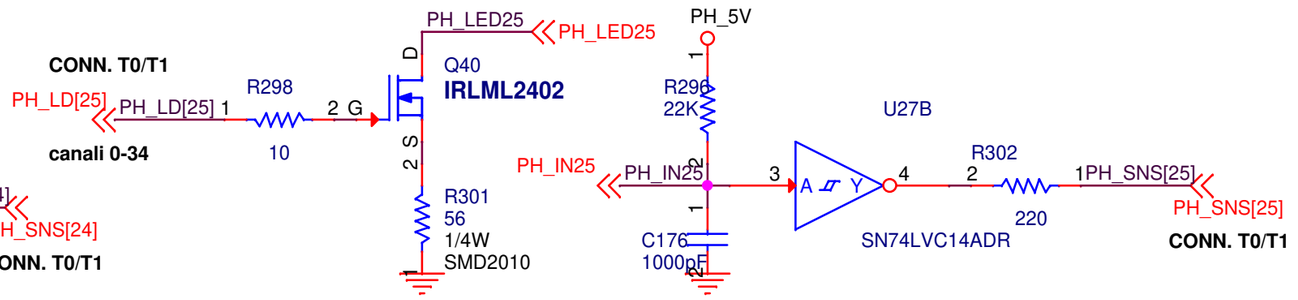
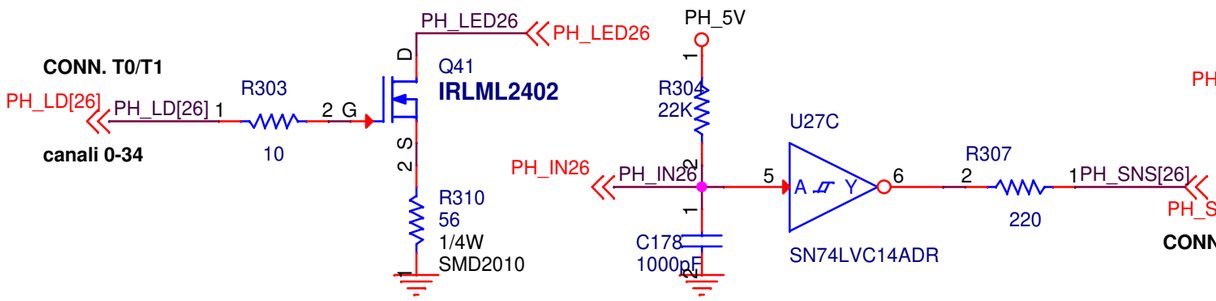
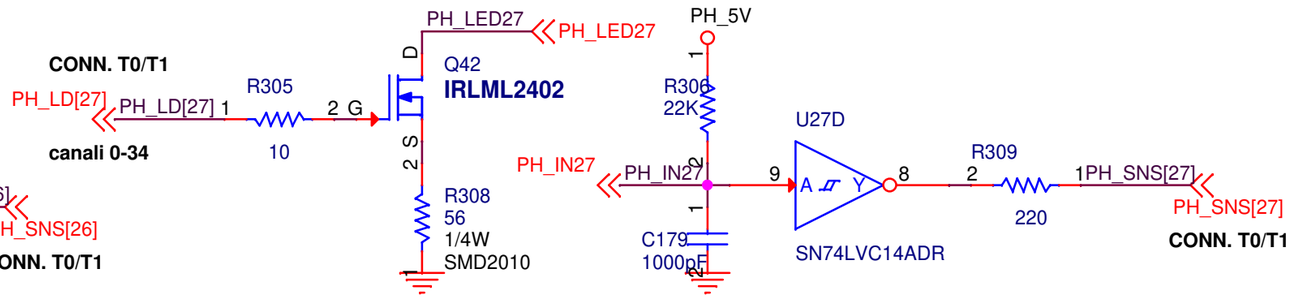
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: DIGITAL PHOTO channel 18..23 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

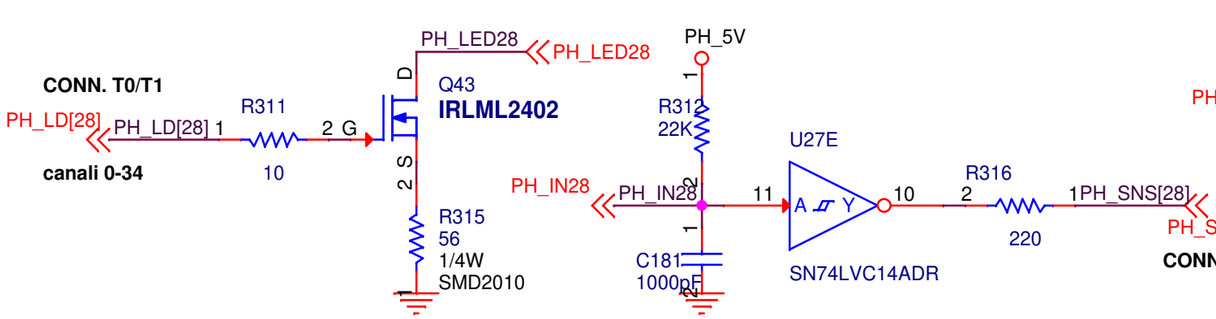
# INGRESSI DIGITALI 24..29

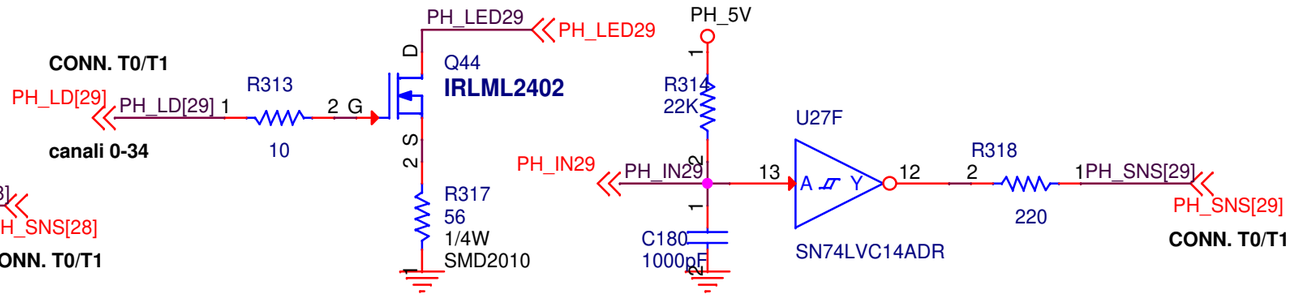


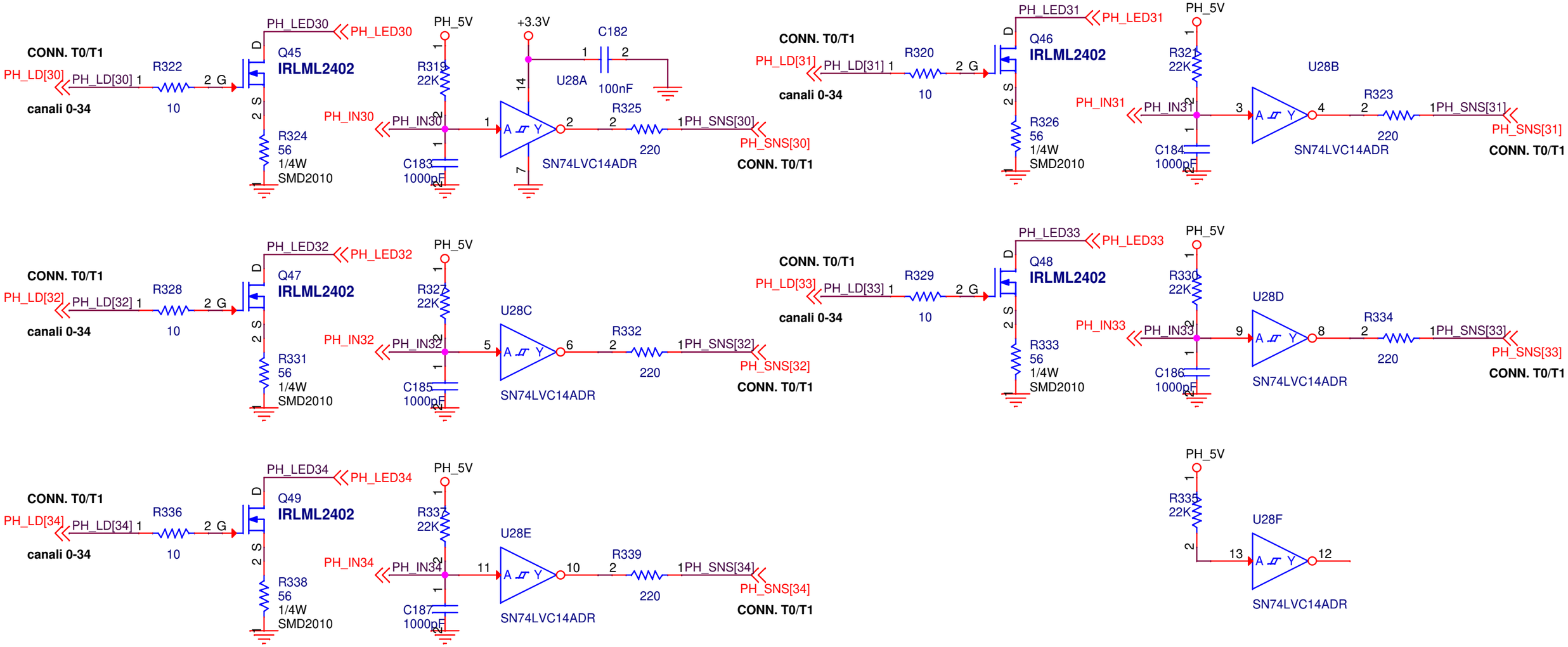




| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: DIGITAL PHOTO channel 24..29 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# INGRESSI DIGITALI 30..34

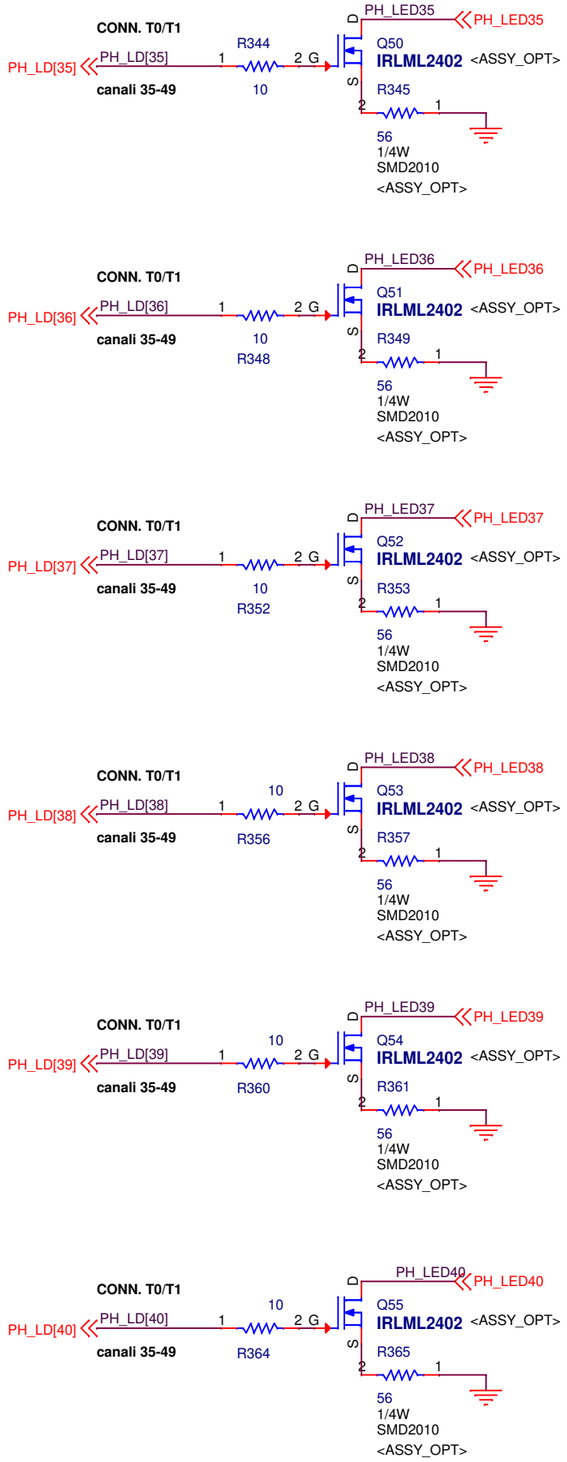



| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number DIGITAL PHOTO channel 30..34 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# INGRESSI DIGITALI 35-40

**NOTA:**
**La selezione della alimentazione dei led agisce su un intero connettore,quindi per un minimo di 5 led**


**NOTA:**
**Questo segnale e' di alimentazione per cui deve essere adeguatamente dimensionato**

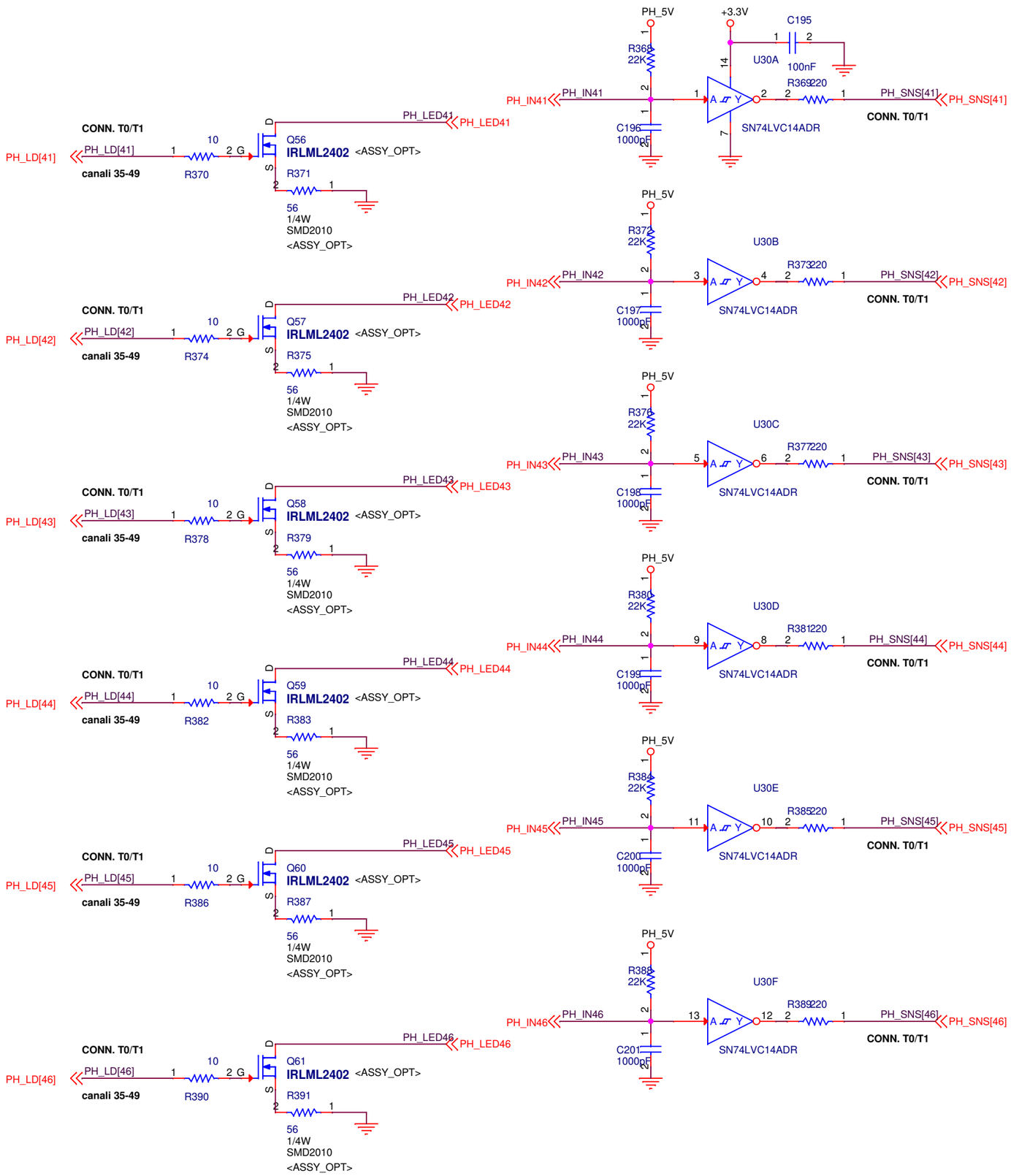



| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A3 | Document Number DIGITAL PHOTO 35-40 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# INGRESSI DIGITALI 41-46

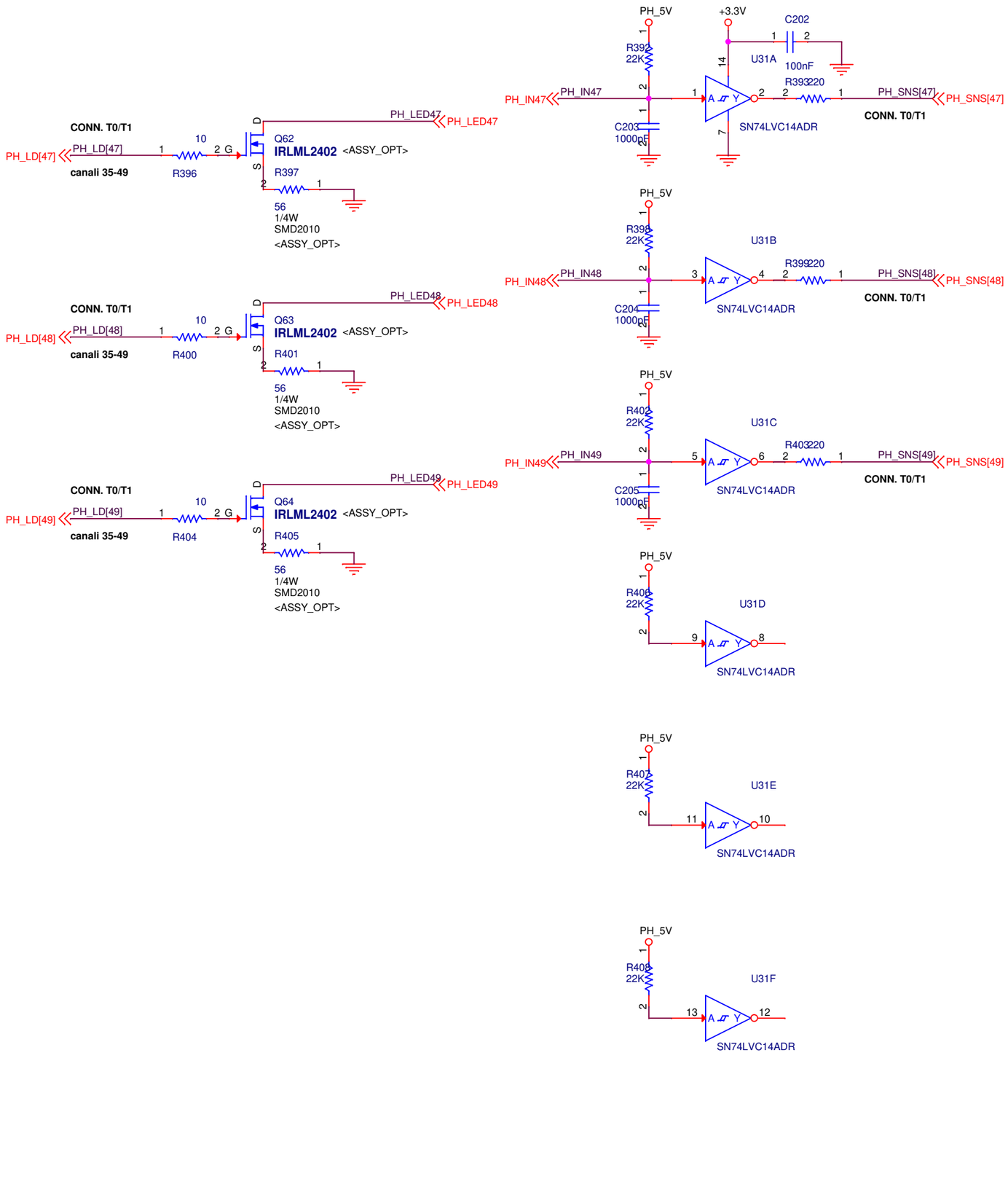
**NOTA:**
**La selezione della alimentazione dei led agisce su un intero connettore,quindi per un minimo di 5 led**


**NOTA:**
**Questo segnale e' di alimentazione per cui deve essere adeguatamente dimensionato**

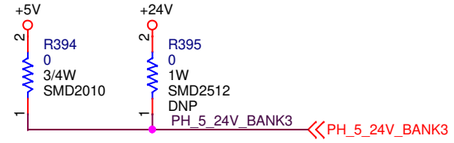



| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A3 | Document Number DIGITAL PHOTO 41-46 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# INGRESSI DIGITALI 47-49




**NOTA:**
**La selezione della alimentazione dei led agisce su un intero connettore,quindi per un minimo di 5 led**

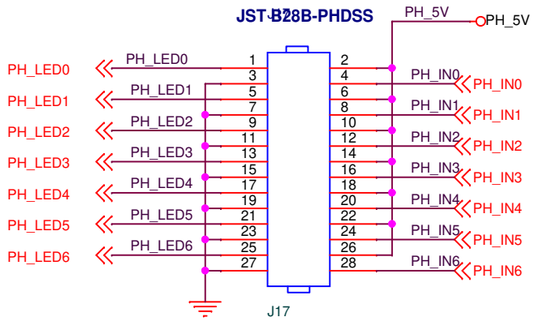


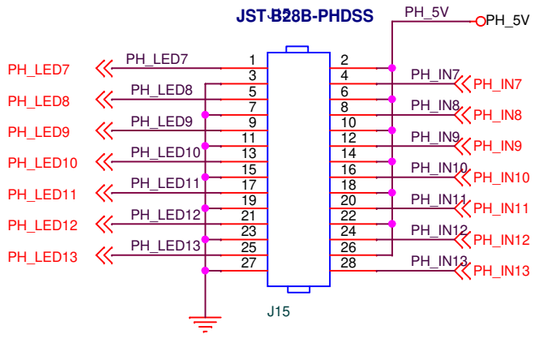

**NOTA:**
**Questo segnale e' di alimentazione per cui deve essere adeguatamente dimensionato**

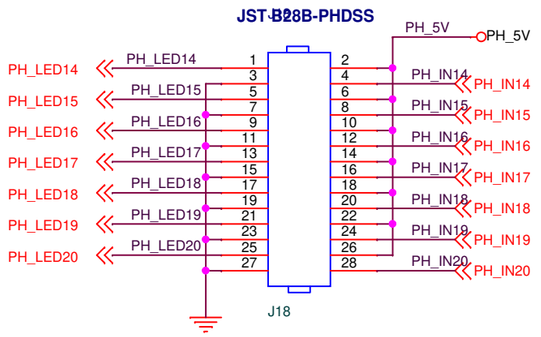
| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A3 | Document Number: DIGITAL PHOTO 47-49 | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

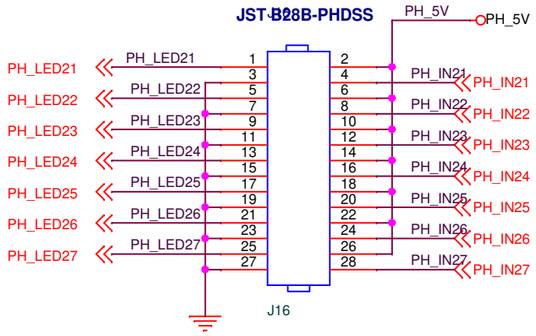
# INGRESSI DIGITALI Connectors

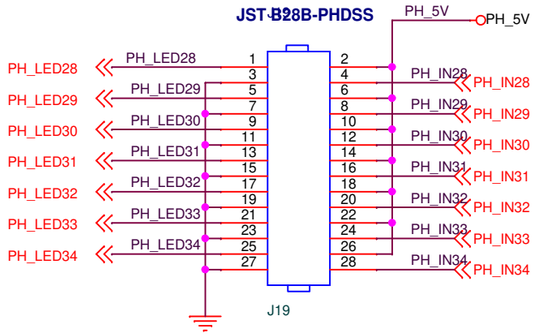
## CANALI 0-34



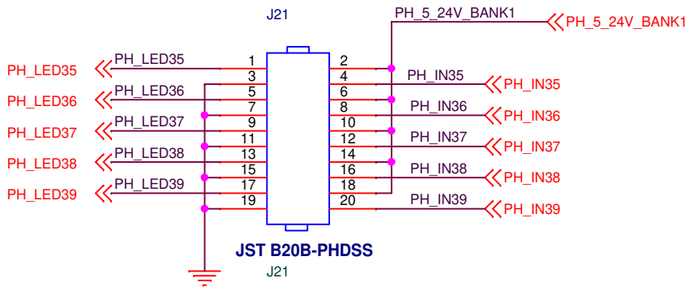



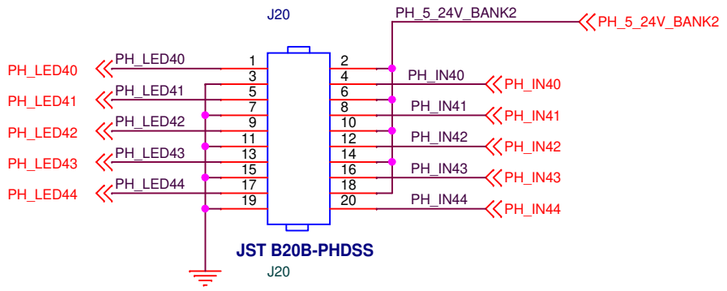



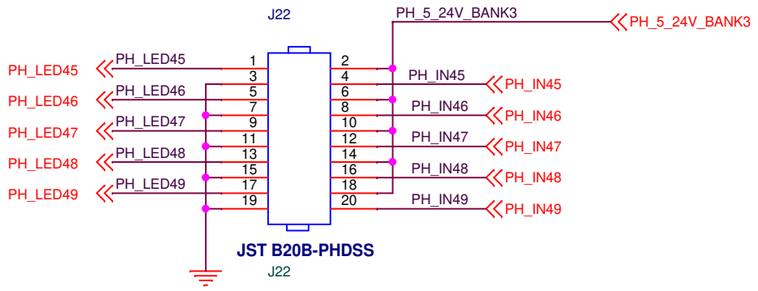




PH_IN34 e' presente sia sul connettore ingressi generici, sia sul connettore stapler e quindi ha due funzioni alternative fra loro

## CANALI 35-49




| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A3 | Document Number: DIGITAL PHOTO connector | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# DOT MATRIX PRINTER

segnali utilizzati
in alternativa
alla stampante
INKJET3

IKJ3_DIN1
IKJ3_DIN2
IKJ3_DCLK
IKJ3_DLOAD

R409 4K7 1% DNP
R410 4K7 1% DNP
R411 4K7 1% DNP
R412 4K7 1% DNP
R413 4K7 1% DNP
R414 4K7 1% DNP
R415 4K7 1% DNP
R416 4K7 1% DNP

+5V

U32
MC3487DR
INA
INB
INC
IND
A/BCTRL
C/DCTRL
5VOUT
GNDOUT
OUTA
OUTB
OUTC
OUTD

C206 100nF 250V

DOT_MOSIp
DOT_MOSIn
DOT_SSp
DOT_SSn
DOT_SCKp
DOT_SCKn
DOT_FIRp
DOT_FIRn

le resistenze di
terminazione della
linea sono montate
sulla scheda remota

U33
MC3486DR
O1
O2
O3
O4
+INA
-INA
+INB
-INB
+INC
-INC
+IND
-IND
EN1/2
EN3/4

C207 100nF 250V

R417 220 1%
R418 220 1%

DOT_RDY
DOT_PAP

DOT_RDYp
DOT_RDYn
DOT_PAPn
DOT_PAPp

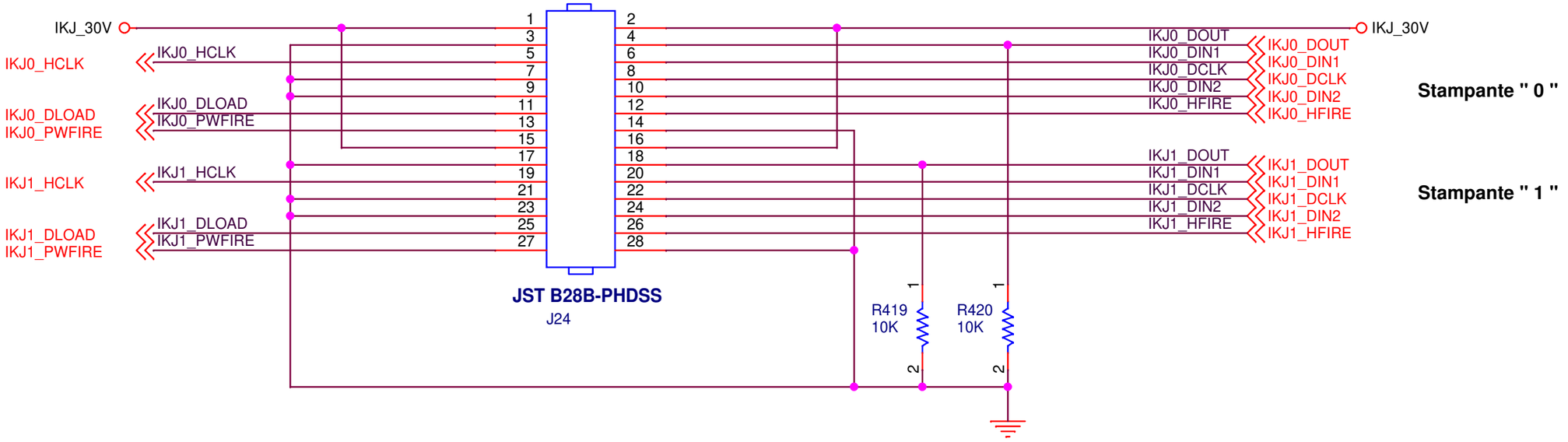
J23
JST B16B-PHDSS

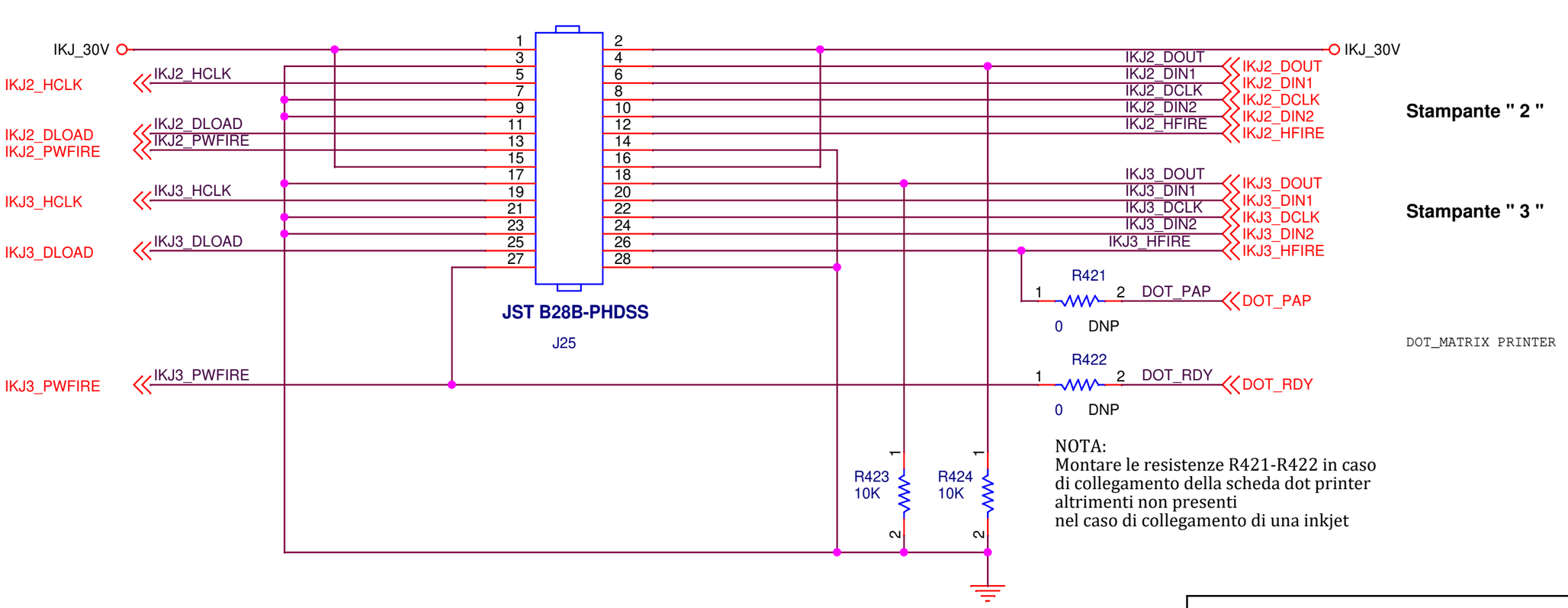
DOT_5V
DOT_24V
DOT_MOSIn
DOT_SSn
DOT_SCKn
DOT_FIRn
DOT_PAPn
DOT_RDYn

## CONNETTORE SCHEDA DOT MATRIX

| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: DOT MATRIX PRINTER | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# INKJET

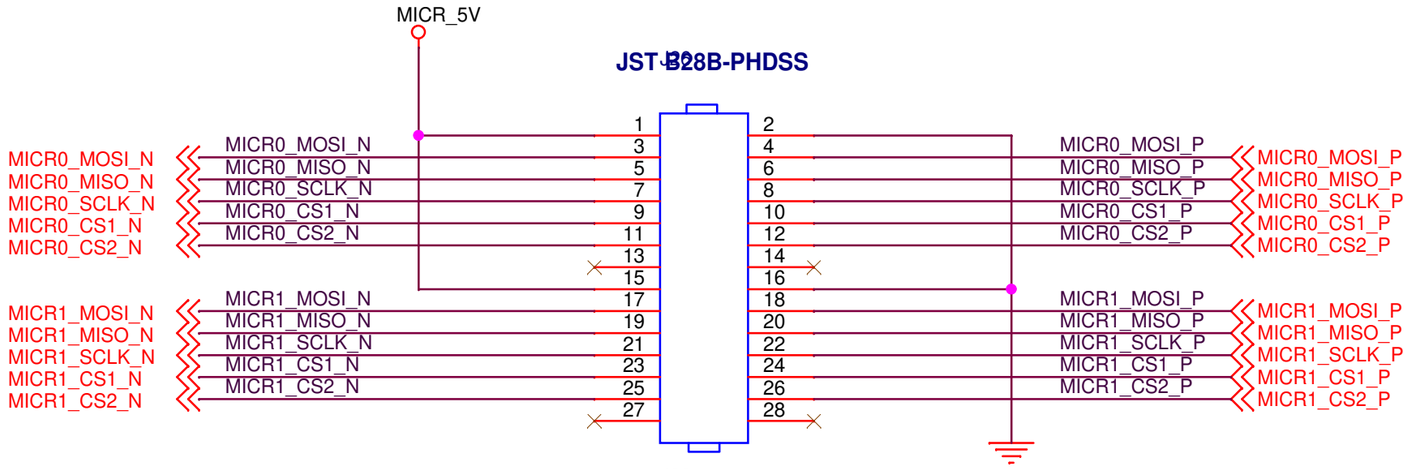



NOTA:
Montare le resistenze R421-R422 in caso di collegamento della scheda dot printer altrimenti non presenti
nel caso di collegamento di una inkjet

| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: INKJET | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# MICR READERS




| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: MICR READERS | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# SOLENOIDI

CONN. T0/T1

SOL[0] SOL[1] SOL[2] SOL[3]

+5V

C208 100nF

U34A — SN74ACT244ADW

R427 22K R428 22K R429 22K R430 22K

R425 100 R426 100

IRF7103 Q65

D13 GF1M D14 GF1M

C209 22uF SMD1210 35V

SOL_O0 SOL_O1

R431 100 R432 100

IRF7103 Q66

D15 GF1M D16 GF1M

C210 22uF SMD1210 35V

SOL_O2 SOL_O3

SOL[4] SOL[5] SOL[6] SOL[7]

U34B — SN74ACT244ADW

R433 22K R437 22K R434 22K R436 22K

R435 100 R438 100

IRF7103 Q67

D17 GF1M D18 GF1M

C211 22uF SMD1210 35V

SOL_O4 SOL_O5

SOL[8] SOL[9]

U35A — SN74ACT244ADW

R441 22K R442 22K

R439 100 R440 100

IRF7103 Q68

D19 GF1M D20 GF1M

C212 22uF SMD1210 35V

SOL_O6 SOL_O7

C213 100nF

U35B — SN74ACT244ADW

R443 100 R444 100

IRF7103 Q69

D21 GF1M D22 GF1M

C214 22uF SMD1210 35V

SOL_O8 SOL_O9

SOL_24V

SOL_O0 SOL_O1 SOL_O2 SOL_O3 SOL_O4 SOL_O5 SOL_O6 SOL_O7 SOL_O8 SOL_O9

JST B20B-PHDSS

J27

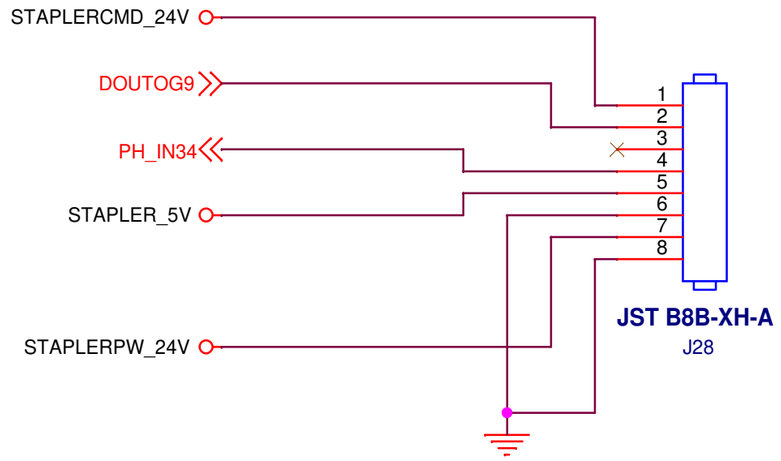
pull-down per evitare commutazioni indesiderate durante accensione con FPGA non configurato uscite in three-state

74ACT244 bufferizza il segnale e ne effettua la la traslazione di livello da 3.3V a 5V

| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number SOLENOIDI | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# STAPLER CONNECTOR

**DOUTG9 E' riportato anche sul connettore DIGITAL outputs,
PH_IN34 e' riportato anche sul connettore degli ingressi,
pertanto in caso di collegamento del modulo STAPLER
essi non possono essere utilizzati nella loro funzione originaria**




| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A4 | Document Number: STAPLER | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# MOTORE STEPPERS 0-1

| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

**CONN. R0/R1**

J29 — JumperPAD0.60_NC

+5V, C215 100nF, STEPPER_PW, C216 100uF 4V

U36 TB6560AFG

SM0_DIR, SM0_REF, SM0_M1P, SM0_M2P, SM0_CLK, SM0_ENA

C217 220pF

R445, R446, R447, R448 — SMD2010 1/2W

SM0AA, SM0NA, SM0BB, SM0NB

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

**CONN. R0/R1**

J31 — JumperPAD0.60_NC

+5V, C218 100nF, STEPPER_PW, C219 100uF 4V

U37 TB6560AFG

SM1_DIR, SM1_REF, SM1_M1P, SM1_M2P, SM1_CLK, SM1_ENA

C220 220pF

R449, R450, R451, R452 — SMD2010 1/2W

SM1AA, SM1NA, SM1BB, SM1NB

| | |
|---|---|
| 1 | SM0AA |
| 2 | SM0NA |
| 3 | SM0BB |
| 4 | SM0NB |
| 5 | SM1AA |
| 6 | SM1NA |
| 7 | SM1BB |
| 8 | SM1NB |

**JST B8B-XH-A**
J30

| | | | |
|---|---|---|---|
| Title | Rototype - RPB | | |
| Size A4 | Document Number MOTORI STEPPERS 0-1 | | Rev 1.0 |
| Date: Thursday, November 19, 2020 | | Sheet 0 of 42 | |

# MOTORE STEPPERS 2-3

| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

**CONN. R0/R1**

J32 — JumperPAD0.60_NC

+5V, C221 100nF, STEPPER_PW, C222 100uF 4V

U38 TB6560AFG

SM2_DIR, SM2_REF, SM2_M1P, SM2_M2P, SM2_CLK, SM2_ENA

C223 220pF

R453, R454, R455, R456 SMD2010 1/2W

SM2AA, SM2NA, SM2BB, SM2NB

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

**CONN. R0/R1**

J34 — JumperPAD0.60_NC

+5V, C224 100nF, STEPPER_PW, C225 100uF 4V

U39 TB6560AFG

SM3_DIR, SM3_REF, SM3_M1P, SM3_M2P, SM3_CLK, SM3_ENA

C226 220pF

R457, R458, R459, R460 SMD2010 1/2W

SM3AA, SM3NA, SM3BB, SM3NB

| | |
|---|---|
| 1 | SM2AA |
| 2 | SM2NA |
| 3 | SM2BB |
| 4 | SM2NB |
| 5 | SM3AA |
| 6 | SM3NA |
| 7 | SM3BB |
| 8 | SM3NB |

**JST B8B-XH-A**
J33

| | | | |
|---|---|---|---|
| Title | Rototype - RPB | | |
| Size A4 | Document Number MOTORI STEPPERS 2-3 | | Rev 1.0 |
| Date: Thursday, November 19, 2020 | | Sheet 0 of 42 | |

# MOTORE STEPPERS 4-5

| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

**CONN. R0/R1**

J35 — JumperPAD0.60_NC

+5V, C227 100nF, STEPPER_PW, C228 100uF 4V

U40 TB6560AFG

SM4_DIR, SM4_REF, SM4_M1P, SM4_M2P, SM4_CLK, SM4_ENA

C229 220pF

R461 SMD2010 1/2W, R462 SMD2010 1/2W, R463 SMD2010 1/2W, R464 SMD2010 1/2W

SM4AA, SM4NA, SM4BB, SM4NB

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

**CONN. R0/R1**

J37 — JumperPAD0.60_NC

+5V, C230 100nF, STEPPER_PW, C231 100uF 4V

U41 TB6560AFG

SM5_DIR, SM5_REF, SM5_M1P, SM5_M2P, SM5_CLK, SM5_ENA

C232 220pF

R465 SMD2010 1/2W, R466 SMD2010 1/2W, R467 SMD2010 1/2W, R468 SMD2010 1/2W

SM5AA, SM5NA, SM5BB, SM5NB

| | |
|---|---|
| 1 | SM4AA |
| 2 | SM4NA |
| 3 | SM4BB |
| 4 | SM4NB |
| 5 | SM5AA |
| 6 | SM5NA |
| 7 | SM5BB |
| 8 | SM5NB |

**JST B8B-XH-A**
J36

| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number MOTORI STEPPERS 4-5 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

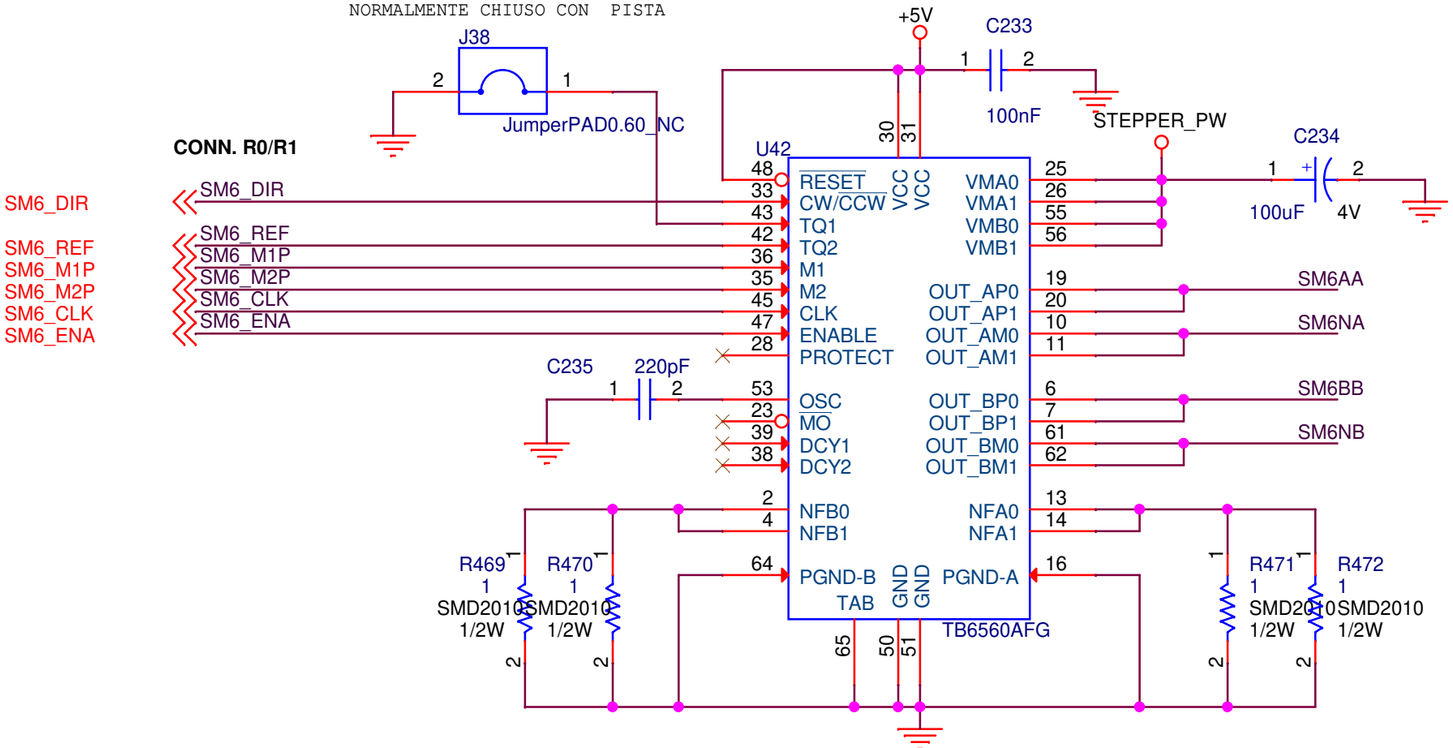
# MOTORE STEPPERS 6-7

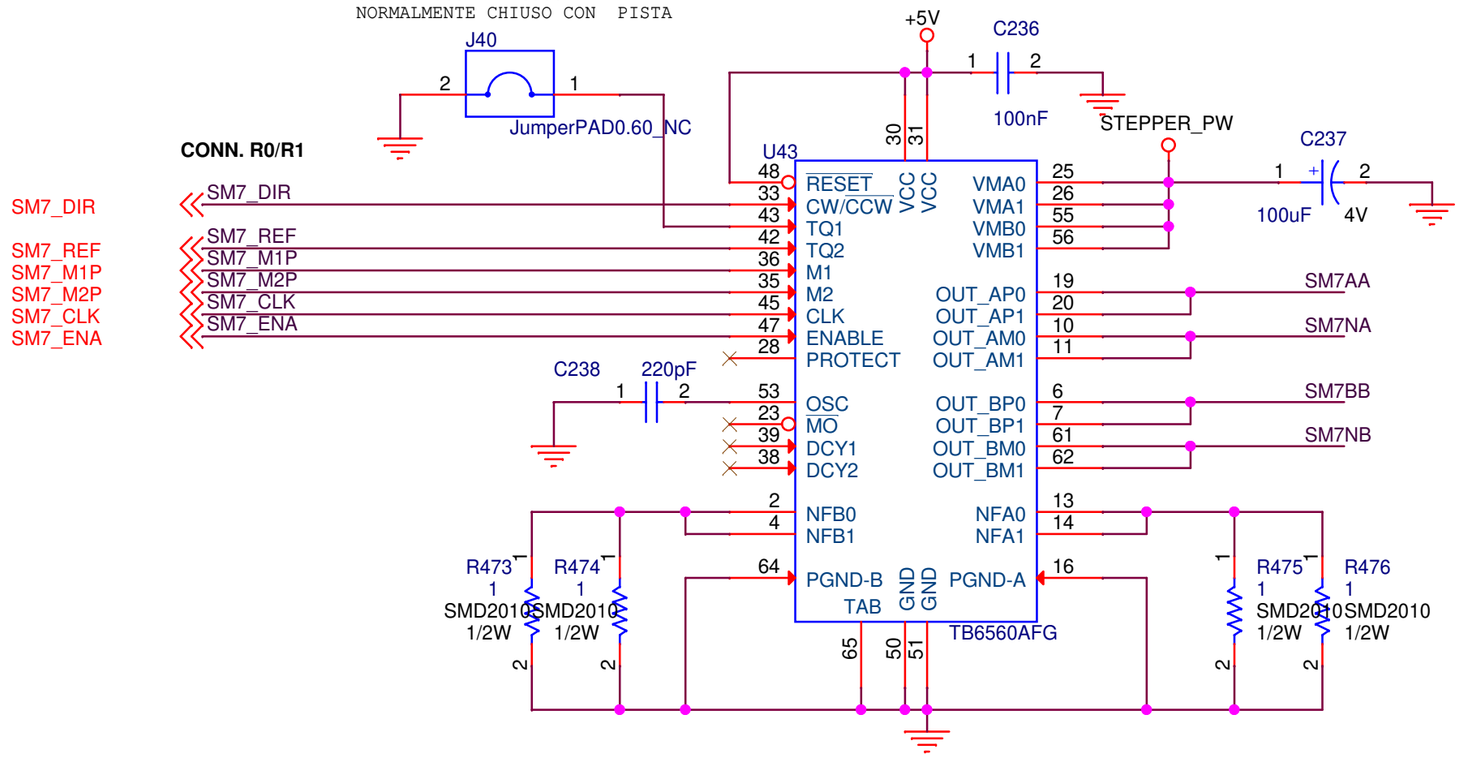
| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

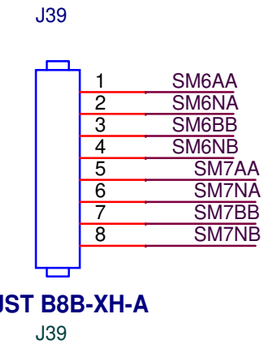
**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |




| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number MOTORI STEPPERS 6-7 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# MOTORE STEPPERS 8-9

| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

J41 — JumperPAD0.60_NC

CONN. R0/R1

SM8_DIR
SM8_REF
SM8_M1P
SM8_M2P
SM8_CLK
SM8_ENA

+5V, C239 100nF, STEPPER_PW, C240 100uF 4V

U44 TB6560AFG

| | | | |
|---|---|---|---|
| 48 | RESET | VMA0 | 25 |
| 33 | CW/CCW | VMA1 | 26 |
| 43 | TQ1 | VMB0 | 55 |
| 42 | TQ2 | VMB1 | 56 |
| 36 | M1 | | |
| 35 | M2 | OUT_AP0 | 19 |
| 45 | CLK | OUT_AP1 | 20 |
| 47 | ENABLE | OUT_AM0 | 10 |
| 28 | PROTECT | OUT_AM1 | 11 |
| 53 | OSC | OUT_BP0 | 6 |
| 23 | MO | OUT_BP1 | 7 |
| 39 | DCY1 | OUT_BM0 | 61 |
| 38 | DCY2 | OUT_BM1 | 62 |
| 2 | NFB0 | NFA0 | 13 |
| 4 | NFB1 | NFA1 | 14 |
| 64 | PGND-B | PGND-A | 16 |
| 30, 31 | VCC | | |
| 65, 50, 51 | GND | | |
| | TAB | | |

SM8AA, SM8NA, SM8BB, SM8NB

C241 220pF

R477 1 SMD2010 1/2W 2
R478 1 SMD2010 1/2W 2
R479 1 SMD2010 1/2W 2
R480 1 SMD2010 1/2W 2

JST B8B-XH-A
J42
1 SM8AA
2 SM8NA
3 SM8BB
4 SM8NB
5 SM9AA
6 SM9NA
7 SM9BB
8 SM9NB

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

J43 — JumperPAD0.60_NC

CONN. R0/R1

SM9_DIR
SM9_REF
SM9_M1P
SM9_M2P
SM9_CLK
SM9_ENA

+5V, C242 100nF, STEPPER_PW, C243 100uF 4V

U45 TB6560AFG

| | | | |
|---|---|---|---|
| 48 | RESET | VMA0 | 25 |
| 33 | CW/CCW | VMA1 | 26 |
| 43 | TQ1 | VMB0 | 55 |
| 42 | TQ2 | VMB1 | 56 |
| 36 | M1 | | |
| 35 | M2 | OUT_AP0 | 19 |
| 45 | CLK | OUT_AP1 | 20 |
| 47 | ENABLE | OUT_AM0 | 10 |
| 28 | PROTECT | OUT_AM1 | 11 |
| 53 | OSC | OUT_BP0 | 6 |
| 23 | MO | OUT_BP1 | 7 |
| 39 | DCY1 | OUT_BM0 | 61 |
| 38 | DCY2 | OUT_BM1 | 62 |
| 2 | NFB0 | NFA0 | 13 |
| 4 | NFB1 | NFA1 | 14 |
| 64 | PGND-B | PGND-A | 16 |
| 30, 31 | VCC | | |
| 65, 50, 51 | GND | | |
| | TAB | | |

SM9AA, SM9NA, SM9BB, SM9NB

C244 220pF

R481 1 SMD2010 1/2W 2
R482 1 SMD2010 1/2W 2
R483 1 SMD2010 1/2W 2
R484 1 SMD2010 1/2W 2

| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number MOTORI STEPPERS 8-9 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# MOTORE STEPPERS 10-11

| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

J44 JumperPAD0.60_NC

CONN. R0/R1

SM10_DIR
SM10_REF
SM10_M1P
SM10_M2P
SM10_CLK
SM10_ENA

+5V, C245 100nF, STEPPER_PW, C246 100uF 4V

U46 TB6560AFG

RESET, CW/CCW, TQ1, TQ2, M1, M2, CLK, ENABLE, PROTECT, OSC, MO, DCY1, DCY2, NFB0, NFB1, PGND-B, TAB, VCC, VCC, GND, GND, PGND-A
VMA0, VMA1, VMB0, VMB1, OUT_AP0, OUT_AP1, OUT_AM0, OUT_AM1, OUT_BP0, OUT_BP1, OUT_BM0, OUT_BM1, NFA0, NFA1

C247 220pF

R485 SMD2010 1/2W
R486 SMD2010 1/2W
R487 SMD2010 1/2W
R488 SMD2010 1/2W

SM10AA
SM10NA
SM10BB
SM10NB

| | |
|---|---|
| 1 | SM10AA |
| 2 | SM10NA |
| 3 | SM10BB |
| 4 | SM10NB |
| 5 | SM11AA |
| 6 | SM11NA |
| 7 | SM11BB |
| 8 | SM11NB |

JST B8B-XH-A
J45

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

J46 JumperPAD0.60_NC

CONN. R0/R1

SM11_DIR
SM11_REF
SM11_M1P
SM11_M2P
SM11_CLK
SM11_ENA

+5V, C248 100nF, STEPPER_PW, C249 100uF 4V

U47 TB6560AFG

RESET, CW/CCW, TQ1, TQ2, M1, M2, CLK, ENABLE, PROTECT, OSC, MO, DCY1, DCY2, NFB0, NFB1, PGND-B, TAB, VCC, VCC, GND, GND, PGND-A
VMA0, VMA1, VMB0, VMB1, OUT_AP0, OUT_AP1, OUT_AM0, OUT_AM1, OUT_BP0, OUT_BP1, OUT_BM0, OUT_BM1, NFA0, NFA1

C250 220pF

R489 SMD2010 1/2W
R490 SMD2010 1/2W
R491 SMD2010 1/2W
R492 SMD2010 1/2W

SM11AA
SM11NA
SM11BB
SM11NB

| | | | |
|---|---|---|---|
| Title | Rototype - RPB | | |
| Size A4 | Document Number MOTORI STEPPERS 10-11 | | Rev 1.0 |
| Date: Thursday, November 19, 2020 | | Sheet 0 of 42 | |

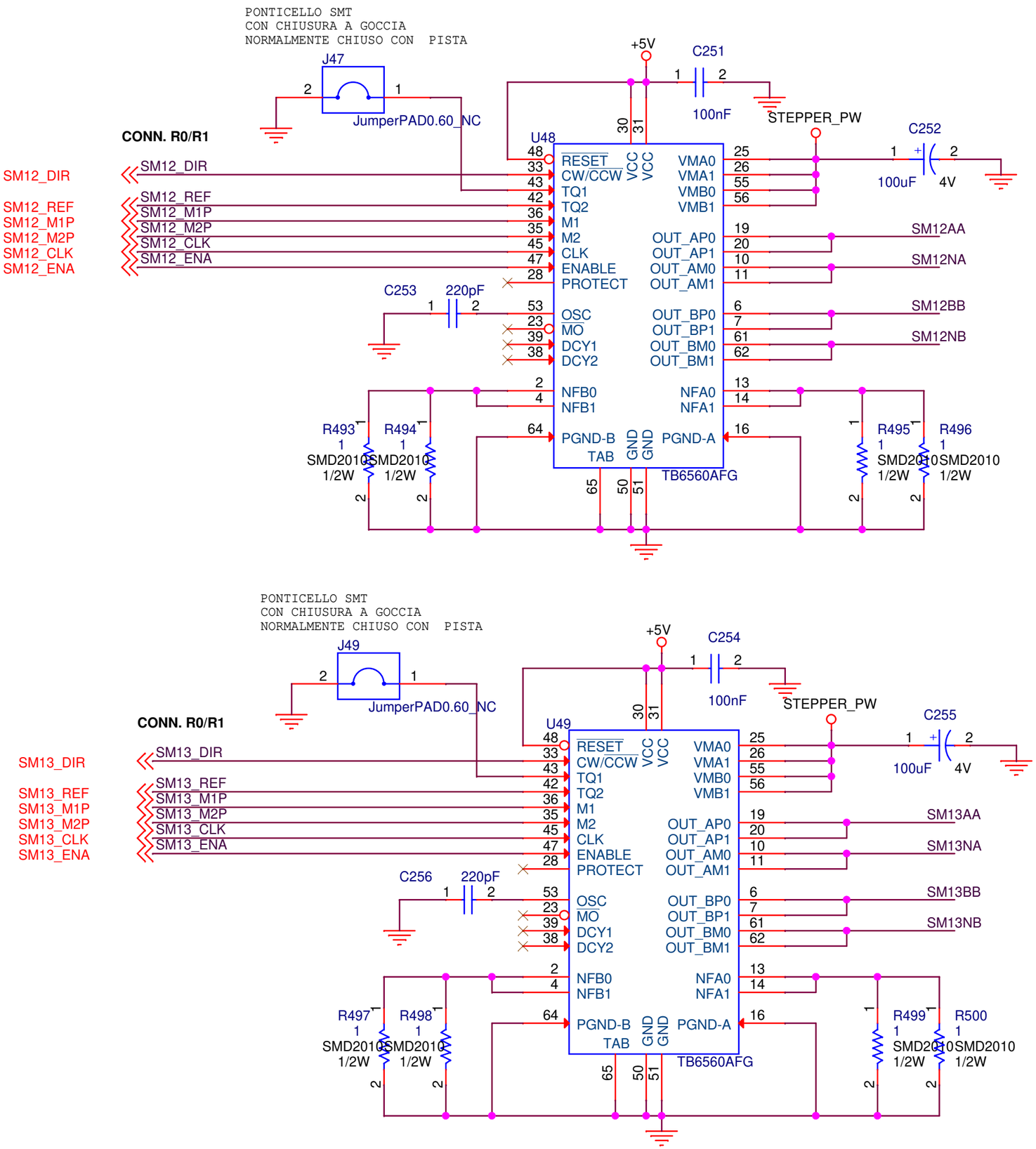
# MOTORE STEPPERS 12-13

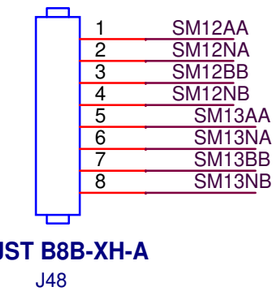
| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |




| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number MOTORI STEPPERS 12-13 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

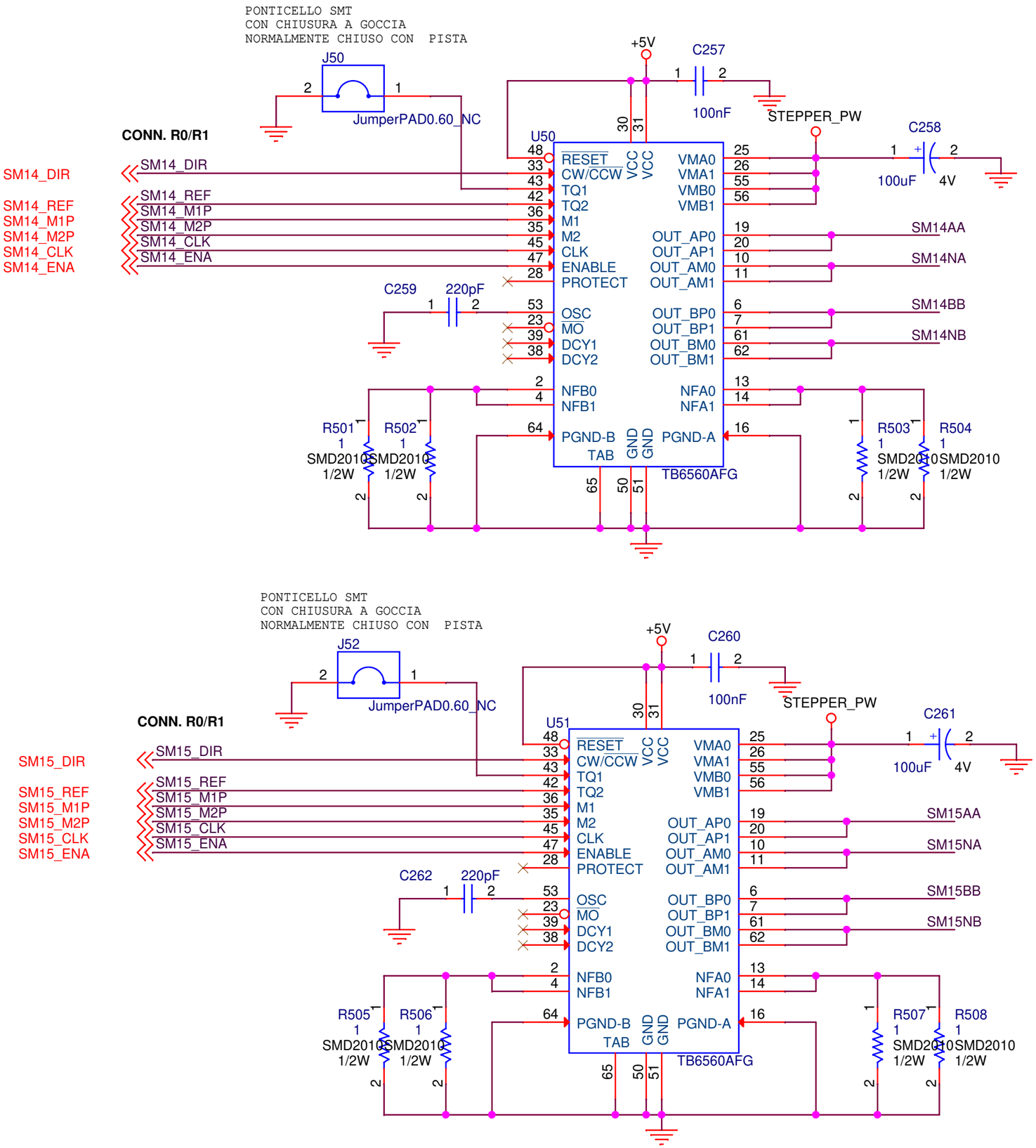
# MOTORE STEPPERS 14-15

| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |




| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number MOTORI STEPPERS 14-15 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

# MOTORE STEPPERS 16-17

| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

J53 — JumperPAD0.60_NC

**CONN. R0/R1**

SM16_DIR
SM16_REF
SM16_M1P
SM16_M2P
SM16_CLK
SM16_ENA

+5V, C263 100nF, STEPPER_PW, C264 100uF 4V

U52 TB6560AFG

| | | | |
|---|---|---|---|
| 48 | RESET | VMA0 | 25 |
| 33 | CW/CCW | VMA1 | 26 |
| 43 | TQ1 | VMB0 | 55 |
| 42 | TQ2 | VMB1 | 56 |
| 36 | M1 | | |
| 35 | M2 | OUT_AP0 | 19 |
| 45 | CLK | OUT_AP1 | 20 |
| 47 | ENABLE | OUT_AM0 | 10 |
| 28 | PROTECT | OUT_AM1 | 11 |
| 53 | OSC | OUT_BP0 | 6 |
| 23 | MO | OUT_BP1 | 7 |
| 39 | DCY1 | OUT_BM0 | 61 |
| 38 | DCY2 | OUT_BM1 | 62 |
| 2 | NFB0 | NFA0 | 13 |
| 4 | NFB1 | NFA1 | 14 |
| 64 | PGND-B | PGND-A | 16 |
| 30, 31 | VCC | | |
| 65, 50, 51 | GND | | |

SM16AA, SM16NA, SM16BB, SM16NB

C265 220pF

R509, R510, R511, R512 — SMD2010 1/2W

J54

| | |
|---|---|
| 1 | SM16AA |
| 2 | SM16NA |
| 3 | SM16BB |
| 4 | SM16NB |
| 5 | SM17AA |
| 6 | SM17NA |
| 7 | SM17BB |
| 8 | SM17NB |

**JST B8B-XH-A**

J54

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

J55 — JumperPAD0.60_NC

**CONN. R0/R1**

SM17_DIR
SM17_REF
SM17_M1P
SM17_M2P
SM17_CLK
SM17_ENA

+5V, C266 100nF, STEPPER_PW, C267 100uF 4V

U53 TB6560AFG

| | | | |
|---|---|---|---|
| 48 | RESET | VMA0 | 25 |
| 33 | CW/CCW | VMA1 | 26 |
| 43 | TQ1 | VMB0 | 55 |
| 42 | TQ2 | VMB1 | 56 |
| 36 | M1 | | |
| 35 | M2 | OUT_AP0 | 19 |
| 45 | CLK | OUT_AP1 | 20 |
| 47 | ENABLE | OUT_AM0 | 10 |
| 28 | PROTECT | OUT_AM1 | 11 |
| 53 | OSC | OUT_BP0 | 6 |
| 23 | MO | OUT_BP1 | 7 |
| 39 | DCY1 | OUT_BM0 | 61 |
| 38 | DCY2 | OUT_BM1 | 62 |
| 2 | NFB0 | NFA0 | 13 |
| 4 | NFB1 | NFA1 | 14 |
| 64 | PGND-B | PGND-A | 16 |
| 30, 31 | VCC | | |
| 65, 50, 51 | GND | | |

SM17AA, SM17NA, SM17BB, SM17NB

C268 220pF

R513, R514, R515, R516 — SMD2010 1/2W

| | | | |
|---|---|---|---|
| Title | Rototype - RPB | | |
| Size A4 | Document Number MOTORI STEPPERS 16-17 | | Rev 1.0 |
| Date: Thursday, November 19, 2020 | | Sheet 0 of 42 | |

# MOTORE STEPPERS 18-19

| TQ2 | TQ1 | Current Ratio |
|---|---|---|
| 0 | 0 | 100% |
| 0 | 1 | 75% |
| 1 | 0 | 50% |
| 1 | 1 | 25% |

**Resistenze setup corrente motore:**
**0,5 Vref / Rs**
**setup di default per tutti i canali :**
**0,5v / 0,5 ohm = 1A**

| M2 | M1 | Step Resolution |
|---|---|---|
| 0 | 0 | FULL STEP (2 phase excitation) |
| 0 | 1 | HALF STEP (1- 2 phase excitation) |
| 1 | 0 | STEP/16 (4W1-2 phase excitation) |
| 1 | 1 | STEP/8 (2W1-2 excitation mode) |

| Enable | |
|---|---|
| 0 | Driver disabilitato |
| 1 | Driver abilitato (corrente settata da TQ1/TQ2) |

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

J56 — JumperPAD0.60_NC

**CONN. R0/R1**

SM18_DIR
SM18_REF
SM18_M1P
SM18_M2P
SM18_CLK
SM18_ENA

+5V, C269 100nF, STEPPER_PW, C270 100uF 4V

U54 TB6560AFG

| | | | |
|---|---|---|---|
| 48 | RESET | VMA0 | 25 |
| 33 | CW/CCW | VMA1 | 26 |
| 43 | TQ1 | VMB0 | 55 |
| 42 | TQ2 | VMB1 | 56 |
| 36 | M1 | | |
| 35 | M2 | OUT_AP0 | 19 |
| 45 | CLK | OUT_AP1 | 20 |
| 47 | ENABLE | OUT_AM0 | 10 |
| 28 | PROTECT | OUT_AM1 | 11 |
| 53 | OSC | OUT_BP0 | 6 |
| 23 | MO | OUT_BP1 | 7 |
| 39 | DCY1 | OUT_BM0 | 61 |
| 38 | DCY2 | OUT_BM1 | 62 |
| 2 | NFB0 | NFA0 | 13 |
| 4 | NFB1 | NFA1 | 14 |
| 64 | PGND-B | PGND-A | 16 |
| | TAB | | |
| 30, 31 | VCC | | |
| 65, 50, 51 | GND | | |

SM18AA, SM18NA, SM18BB, SM18NB

C271 220pF

R517 1 SMD2010 1/2W
R518 1 SMD2010 1/2W
R519 1 SMD2010 1/2W
R520 1 SMD2010 1/2W

J57 — JST B8B-XH-A

| | |
|---|---|
| 1 | SM18AA |
| 2 | SM18NA |
| 3 | SM18BB |
| 4 | SM18NB |
| 5 | SM19AA |
| 6 | SM19NA |
| 7 | SM19BB |
| 8 | SM19NB |

PONTICELLO SMT
CON CHIUSURA A GOCCIA
NORMALMENTE CHIUSO CON PISTA

J58 — JumperPAD0.60_NC

**CONN. R0/R1**

SM19_DIR
SM19_REF
SM19_M1P
SM19_M2P
SM19_CLK
SM19_ENA

+5V, C272 100nF, STEPPER_PW, C273 100uF 4V

U55 TB6560AFG

| | | | |
|---|---|---|---|
| 48 | RESET | VMA0 | 25 |
| 33 | CW/CCW | VMA1 | 26 |
| 43 | TQ1 | VMB0 | 55 |
| 42 | TQ2 | VMB1 | 56 |
| 36 | M1 | | |
| 35 | M2 | OUT_AP0 | 19 |
| 45 | CLK | OUT_AP1 | 20 |
| 47 | ENABLE | OUT_AM0 | 10 |
| 28 | PROTECT | OUT_AM1 | 11 |
| 53 | OSC | OUT_BP0 | 6 |
| 23 | MO | OUT_BP1 | 7 |
| 39 | DCY1 | OUT_BM0 | 61 |
| 38 | DCY2 | OUT_BM1 | 62 |
| 2 | NFB0 | NFA0 | 13 |
| 4 | NFB1 | NFA1 | 14 |
| 64 | PGND-B | PGND-A | 16 |
| | TAB | | |
| 30, 31 | VCC | | |
| 65, 50, 51 | GND | | |

SM19AA, SM19NA, SM19BB, SM19NB

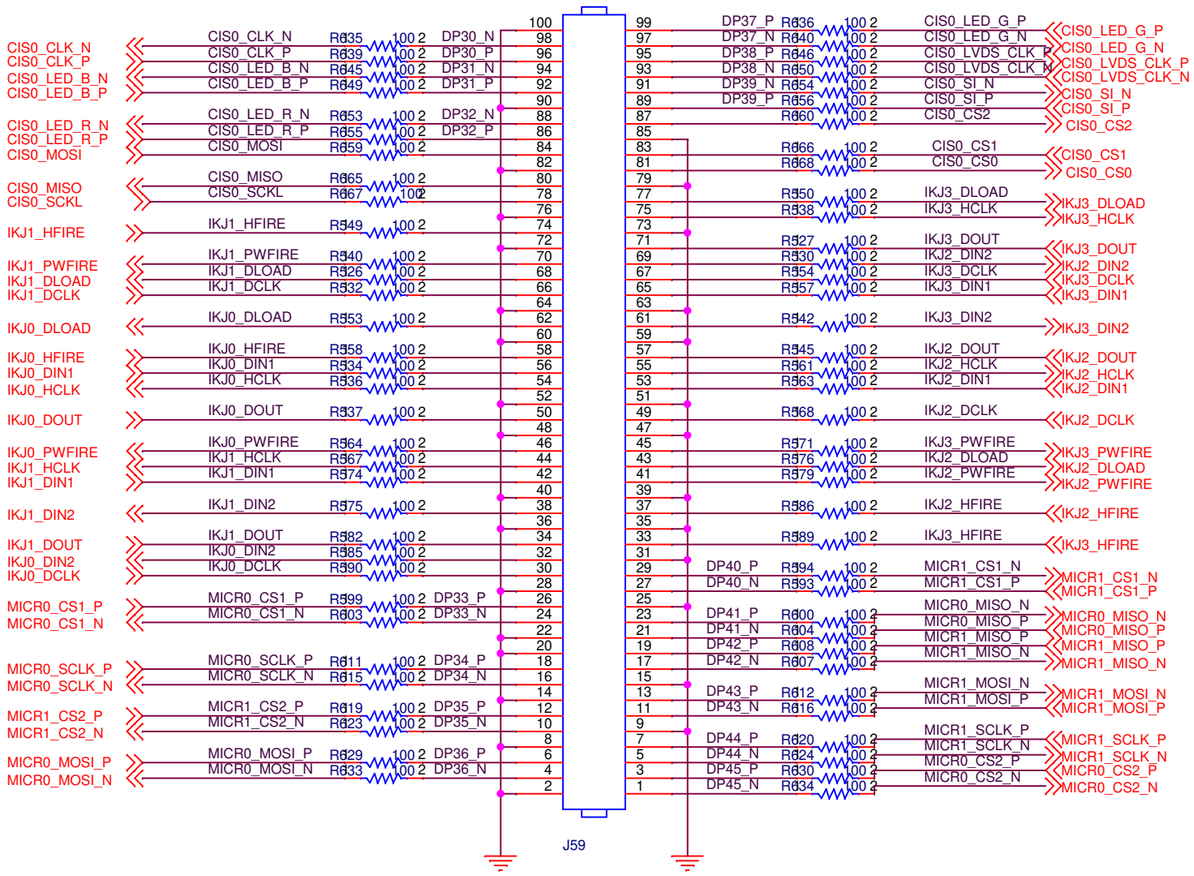
C274 220pF

R521 1 SMD2010 1/2W
R522 1 SMD2010 1/2W
R523 1 SMD2010 1/2W
R524 1 SMD2010 1/2W

| | | |
|---|---|---|
| Title | Rototype - RPB | |
| Size A4 | Document Number MOTORI STEPPERS 18-19 | Rev 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

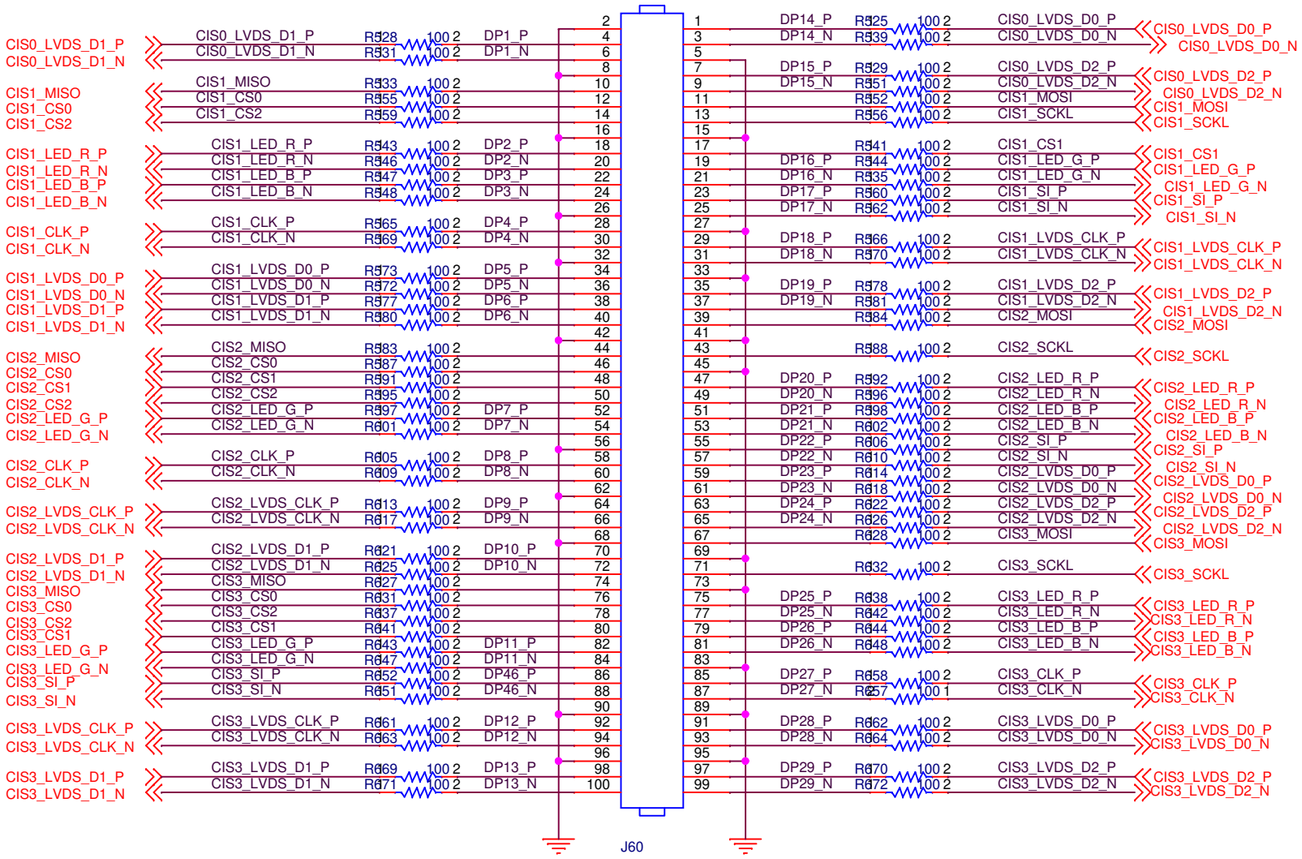
## CONN_B_0

Wurth 658807713100




## CONN_B_1

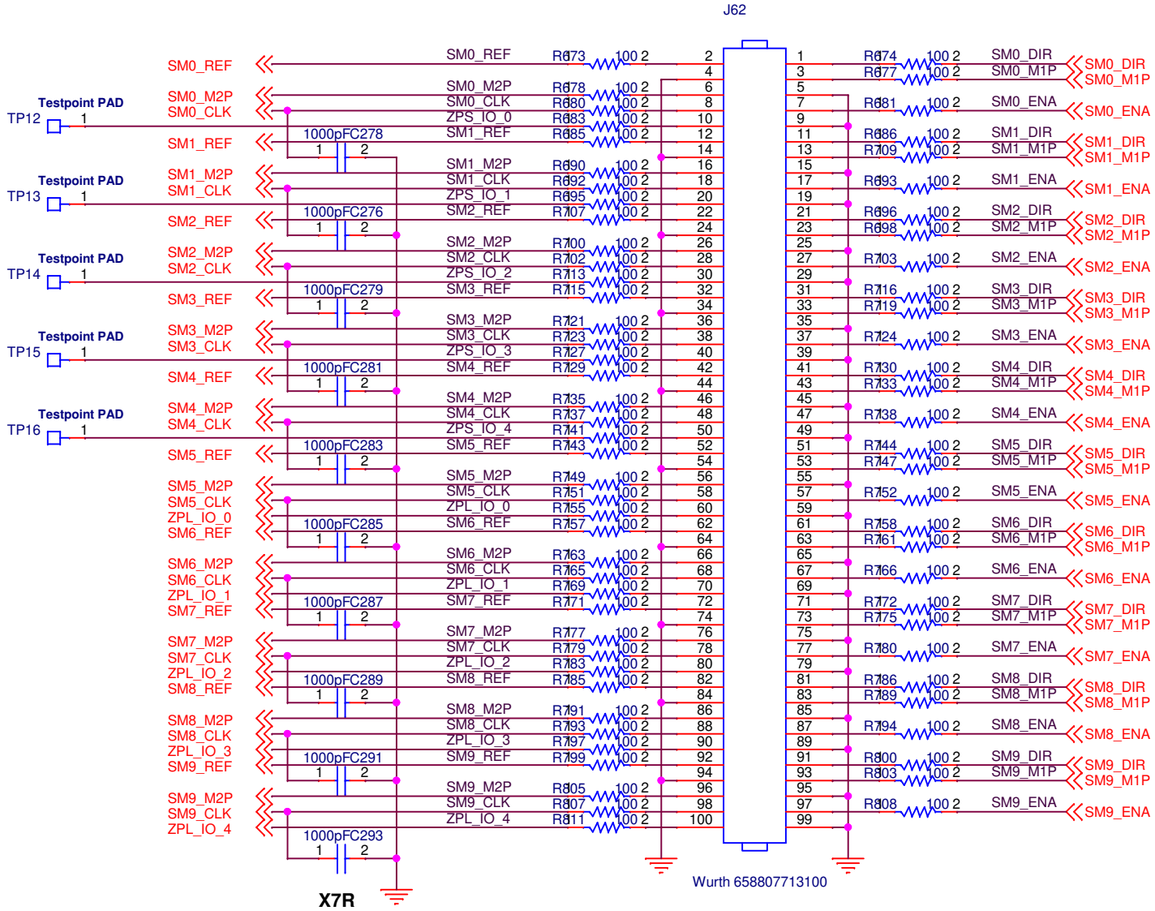
Wurth 658807713100



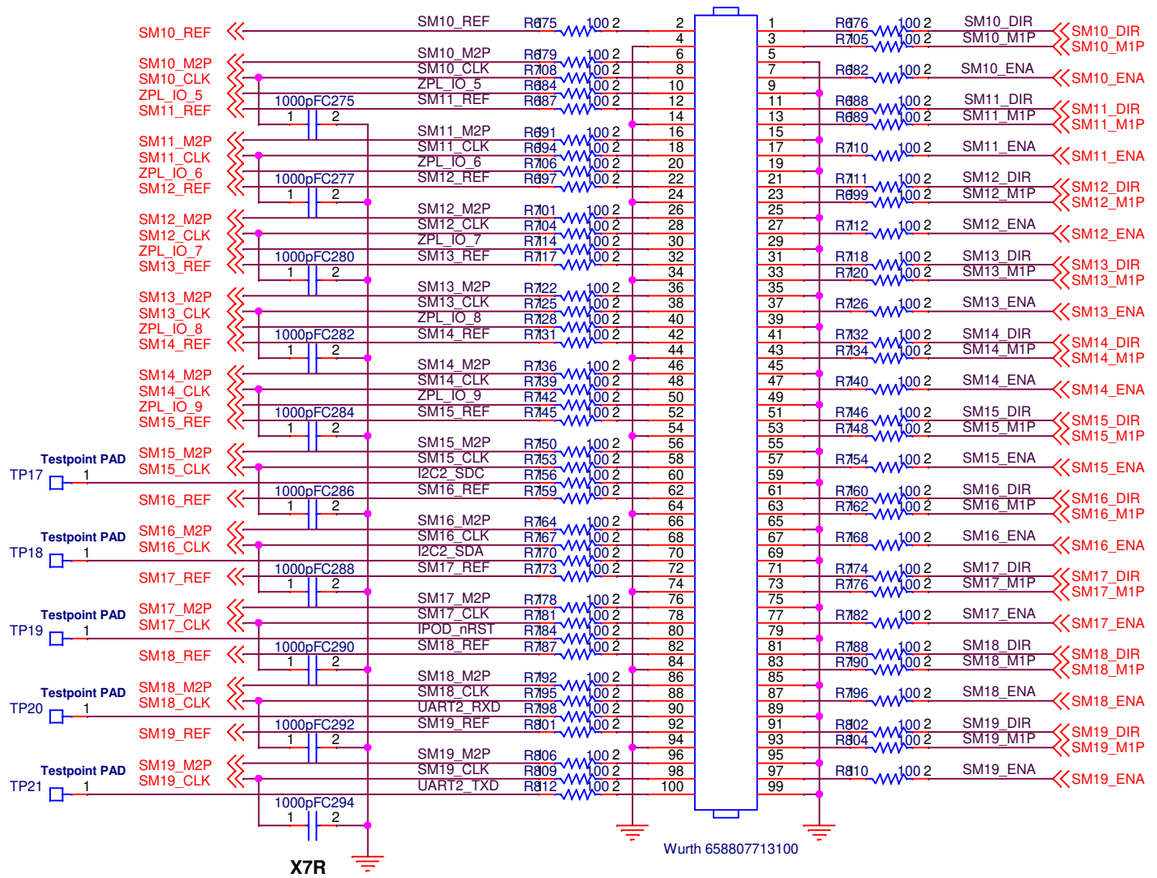

# B - Conector

| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A3 | Document Number: Connector - 06 - CONN - B | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

## CONN_R_0



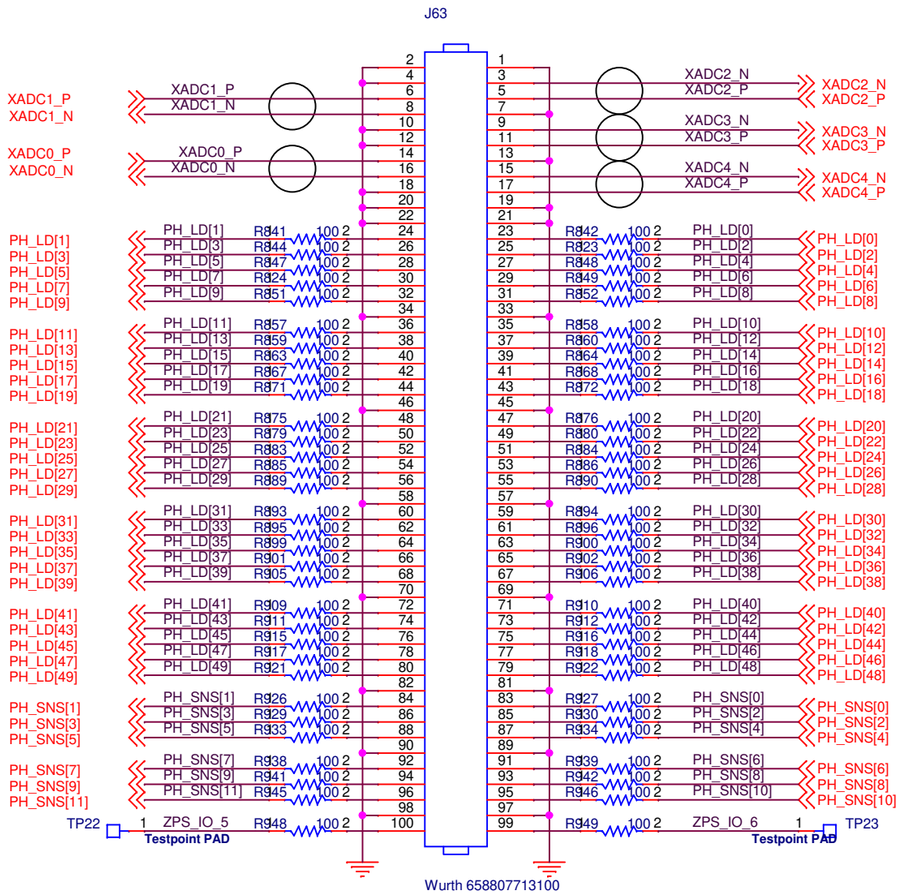

## CONN_R_1



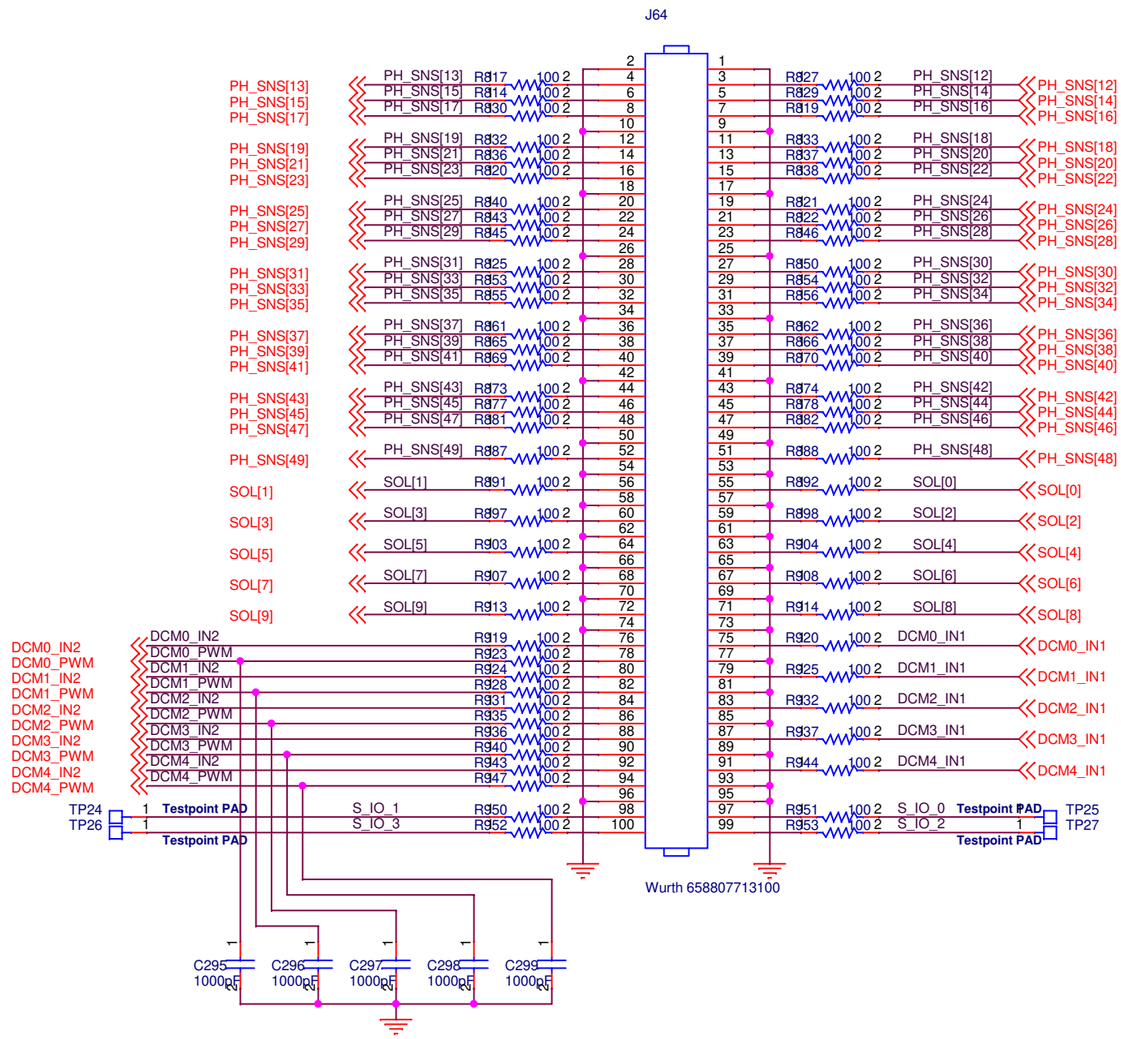

# R - Conector

| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A3 | Document Number: Connector - 06 - CONN - R | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |

## CONN_T_0




## CONN_T_1




# T - Connector

| | | |
|---|---|---|
| Title: Rototype - RPB | | |
| Size: A3 | Document Number: Connector - 06 - CONN - T | Rev: 1.0 |
| Date: Thursday, November 19, 2020 | Sheet 0 of 42 | |