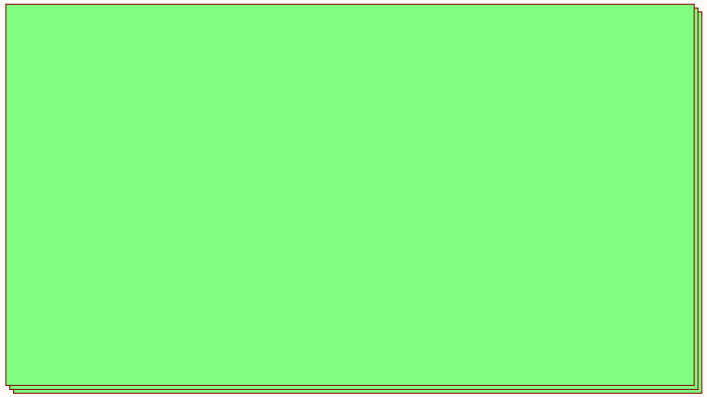
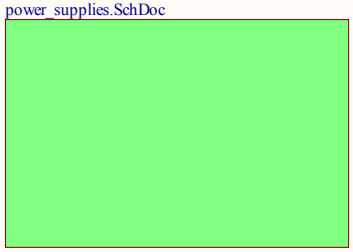
NIM levels:

Logic 1 = -14mA to -18mA into 50ohms
Logic 0 = -1mA to +1mA into 50ohms

REPEAT(CHANNEL,1,3)
channel.SchDoc

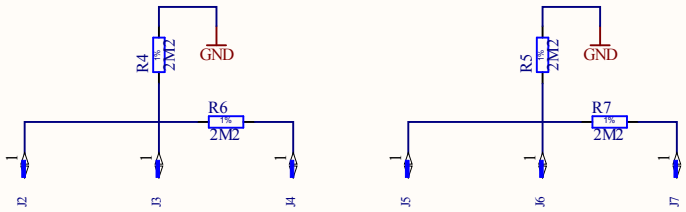


Power supplies
power_supplies.SchDoc

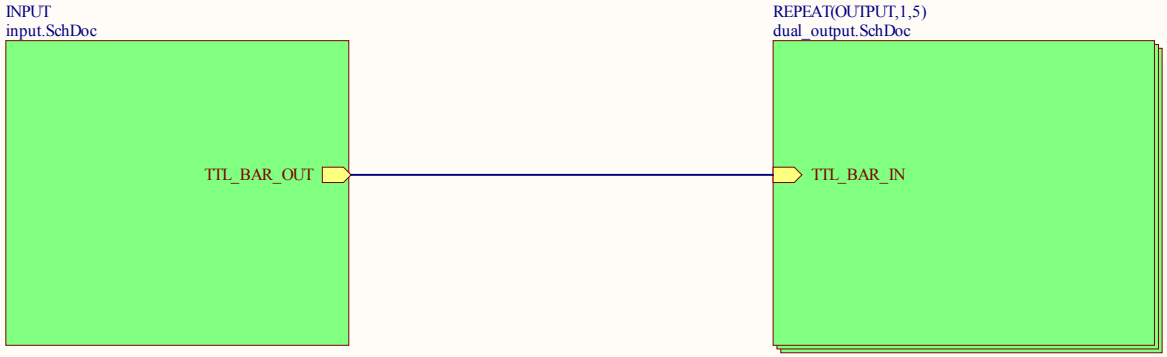


## GND test points


## ESD discharge strips (top and bottom of the card)




| | | | |
|---|---|---|---|
| Project/Equipment | CONV TTL NIM 3in 30out | | |
| Document | **TTL to NIM converter 3x 1:10 Top level** | Designer | mcattin |
| | | Drawn by | mcattin 07/07/2010 |
| | | Check.by | - - |
| | | Last Mod. | - 7/14/2010 |
| | | File | top.SchDoc |
| | | Print Date | 7/16/2010 10:58:19 AM Sheet 1 of 5 |
| *European Organization for Nuclear Research CH-1211 Genève 23 - Switzerland* | EDA-XXXXX-VX-X | Size | A4 |
| | | Rev | - |




| | | | |
|---|---|---|---|
| Project/Equipment | CONV TTL NIM 3in 30out | | |
| Document | **TTL to NIM converter 3x 1:10<br>1 input 10 outputs channel** | Designer | mcattin |
| | | Drawn by | mcattin 07/07/2010 |
| | | Check.by | - - |
| | | Last Mod. | - 7/14/2010 |
| | | File | channel.SchDoc |
| | | Print Date | 7/16/2010 10:58:19 AM Sheet 2 of 5 |

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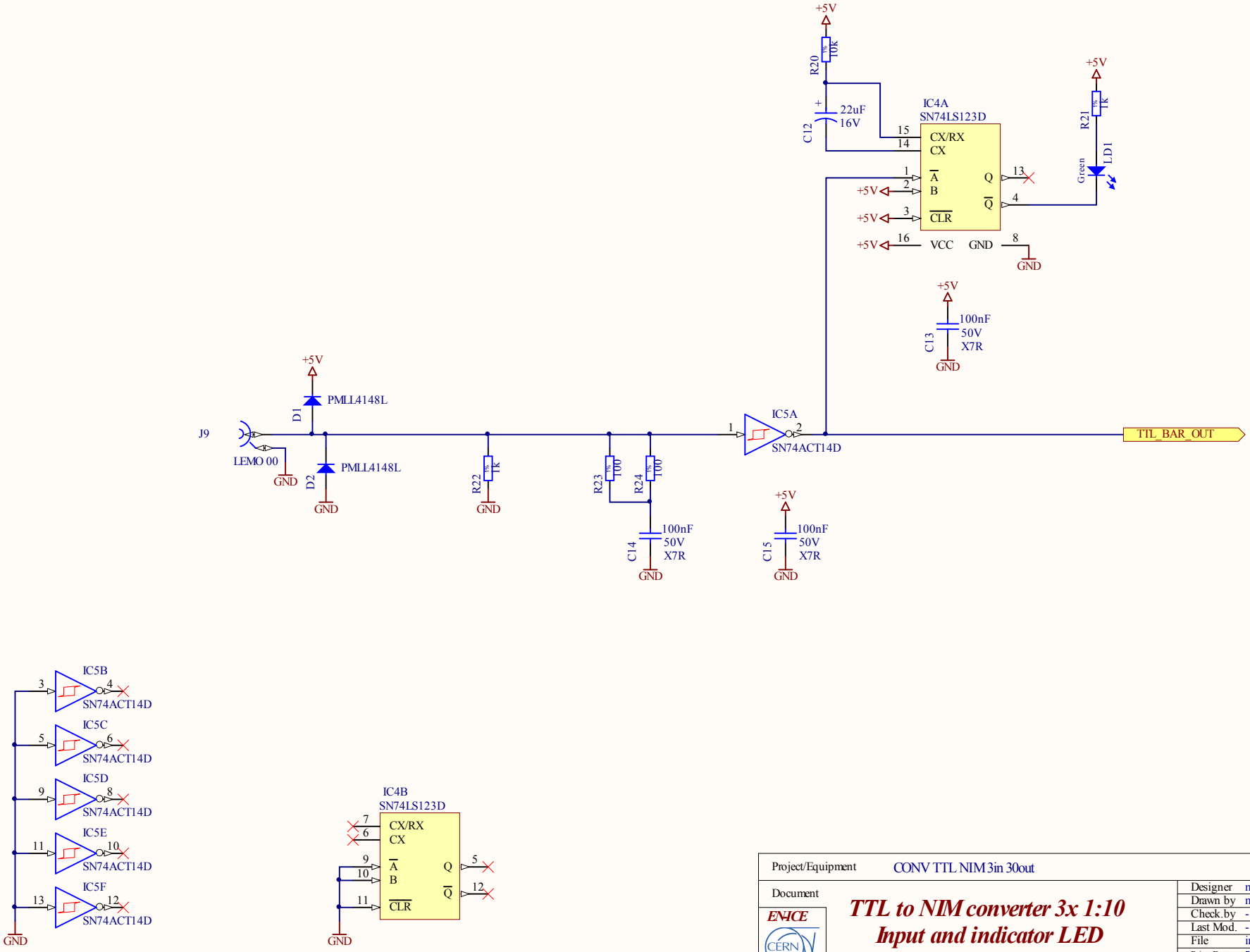
*CH-1211 Genève 23 - Switzerland*

EDA-XXXXX-VX-X

Size A4 | Rev -




| | |
|---|---|
| Project/Equipment | CONV TTL NIM 3in 30out |
| Document | **TTL to NIM converter 3x 1:10 Input and indicator LED** |
| Designer | mcattin |
| Drawn by | mcattin 09/07/2010 |
| Check.by | - - |
| Last Mod. | - 7/14/2010 |
| File | input.SchDoc |
| Print Date | 7/16/2010 10:58:19 AM Sheet 3 of 5 |

ENICE

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EDA-XXXXX-VX-X

Size A4 | Rev -

Gain = -0.4

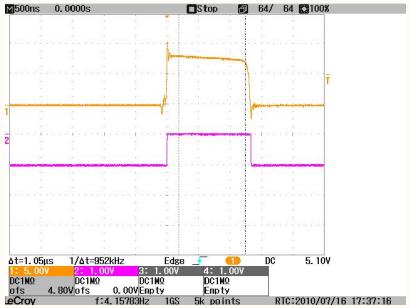
TTL_BAR_IN

R8 10k
R9 1k
R10 1k
R11 10k
R12 100
R13 100
IC2 AD8014ARZ
+5V
-5V
GND
BOT
J8A
LEMO 00

R14 10k
R15 1k
R16 1k
R17 10k
R18 100
R19 100
IC3 AD8014ARZ
TOP
J8B

C6 4.7uF
C7 100nF 50V X7R
C8 100nF 50V X7R
C9 4.7uF
C10 100nF 50V X7R
C11 100nF 50V X7R

Orange: TTL input signal
Pink: NIM output signal (on 50 ohms termination)



| | |
|---|---|
| Project/Equipment | CONV TTL NIM 3in 30out |
| Document | **TTL to NIM converter 3x 1:10 Dual output buffer block** |
| Designer | mcattin |
| Drawn by | mcattin 07/07/2010 |
| Check.by | - - |
| Last Mod. | - 7/16/2010 |
| File | dual_output.SchDoc |
| Print Date | 7/16/2010 10:58:19 AM Sheet 4 of 5 |

ENICE

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EDA-XXXXX-VX-X

Size A4 Rev -

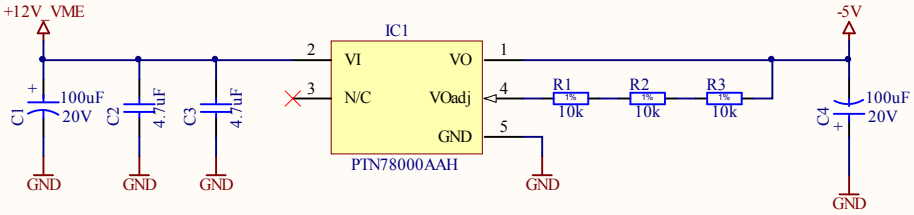
Estimated power cosumption:

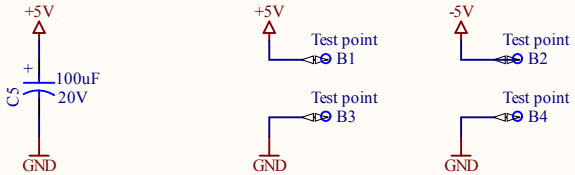
+5V -> 75mA / channel

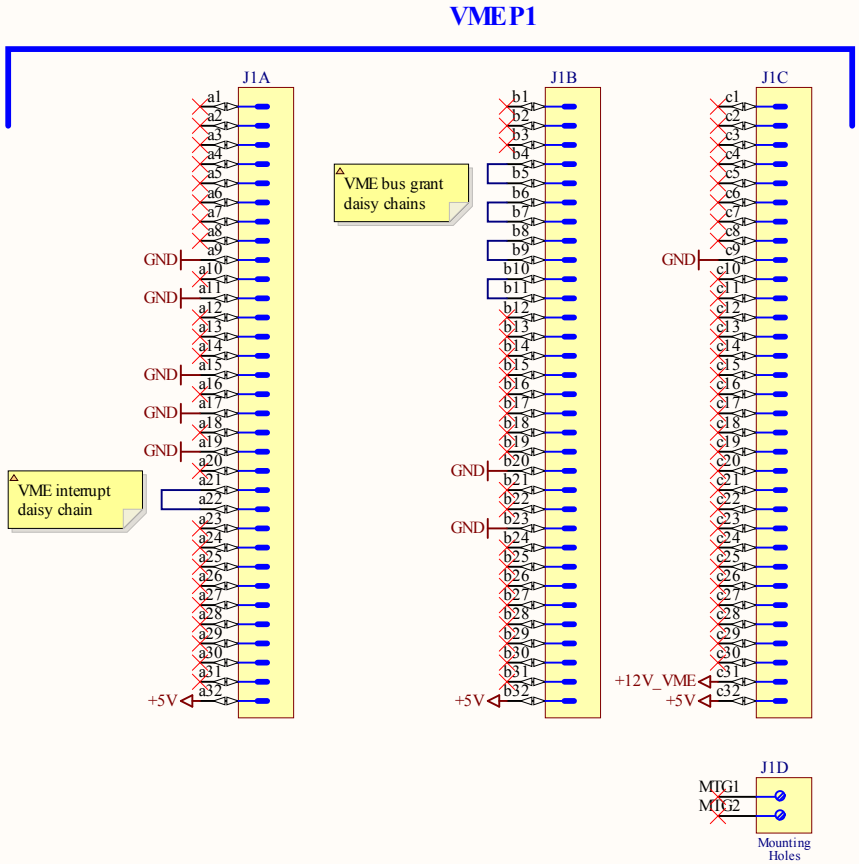
-5V -> 250mA / channel

Channel = 1 input and 10 outputs

Vo = -(3*(Rset + 28.5k))/(Rset + 5.62k)
With Rset = 30k -> Vo = -4.927 V




| | | | |
|---|---|---|---|
| Project/Equipment | CONV TTL NIM 3in 30out | | |
| Document | **TTL to NIM converter 3x 1:10 Power supplies, VME connector** | Designer mcattin | |
| | | Drawn by mcattin | 07/07/2010 |
| | | Check.by - | - |
| | | Last Mod. - | 7/16/2010 |
| | | File power_supplies.SchDoc | |
| | | Print Date 7/16/2010 10:58:19 AM | Sheet 5 of 5 |
| ENICE CERN | *European Organization for Nuclear Research CH-1211 Genève 23 - Switzerland* | EDA-XXXXX-VX-X | Size A4 / Rev - |

| Comment | Description | Designator | Footprint | LibRef | Quantity |
|---|---|---|---|---|---|
| Test point | Single Terminal Socket | B1, B2, B3, B4 | OSTER5X1H_60-1640-11 | OSTER5X1H_60-1640-11 | 4 |
| 100uF | Polarised capacitor | C1, C4, C5 | CAPRR500-1050X1150 | CAPST_100UF_20%_LESR0R030_SANYO_5H | 3 |
| 4.7uF | Non-polarised capacitor | C2, C3, C6_1, C6_2, C6_3, C6_4, C6_5, C6_6, C6_7, C6_8, C6_9, C6_10, C6_11, C6_12, C6_13, C6_14, C6_15, C9_1, C9_2, C9_3, C9_4, C9_5, C9_6, C9_7, C9_8, C9_9, C9_10, C9_11, C9_12, C9_13, C9_14, C9_15 | CAPC3225X270N | CC1210_4.7UF_50V_10%_X7R | 32 |
| 100nF | Non-polarised capacitor | C7_1, C7_2, C7_3, C7_4, C7_5, C7_6, C7_7, C7_8, C7_9, C7_10, C7_11, C7_12, C7_13, C7_14, C7_15, C8_1, C8_2, C8_3, C8_4, C8_5, C8_6, C8_7, C8_8, C8_9, C8_10, C8_11, C8_12, C8_13, C8_14, C8_15, C10_1, C10_2, C10_3, C10_4, C10_5, C10_6, C10_7, C10_8, C10_9, C10_10, C10_11, C10_12, C10_13, C10_14, C10_15, C11_1, C11_2, C11_3, C11_4, C11_5, C11_7, C11_8, C11_9, C11_10, C11_11, C11_12, C11_13, C11_14, C11_15, C13_1, C13_2, C13_3, C14_1, C14_2, C14_3, C15_1, C15_2, C15_3 | CAPC3216X140N | CC1206_100NF_50V_10%_X7R | 69 |
| 22uF | Polarised capacitor | C12_1, C12_2, C12_3 | CAPMP6032X280N | CAPST_22UF_16V_10%_LESR0375 | 3 |
| PMLL4148L | Diode | D1_1, D1_2, D1_3, D2_1, D2_2, D2_3 | DIOMELF3515N | PMLL4148L | 6 |
| PTN78000AAH | 7V To 29V Input, 1.5A–15V To -3V Output, Adjustable Buck-Boost Switching Regulator | IC1 | TEXAS_EUS (R-PDSS-T5) | PTN78000AAH | 1 |
| AD8014ARZ | Operational Amplifier | IC2_1, IC2_2, IC2_3, IC2_4, IC2_5, IC2_6, IC2_7, IC2_8, IC2_9, IC2_10, IC2_11, IC2_12, IC2_13, IC2_14, IC2_15, IC3_1, IC3_2, IC3_3, IC3_4, IC3_5, IC3_6, IC3_7, IC3_8, IC3_9, IC3_10, IC3_11, IC3_12, IC3_13, IC3_14, IC3_15 | SOIC127P600X175-16N | AD8014ARZ | 30 |
| SN74LS123D | Retriggerable Monostable Multivibrator | IC4_1, IC4_2, IC4_3 | SOIC127P600X175-16N | SN74LS123D | 3 |
| SN74ACT14D | Hex Schmitt-Trigger Inverter | IC5_1, IC5_2, IC5_3 | SOIC127P600X175-14N | SN74ACT14D | 3 |
| DIN 41612 Type C | Connector (male male (3x32) | J1 | HARTING_09 03 196 2921 | HARTING_09 03 196 2921 | 1 |
| SMD Pad | Single SMD Pad | J2, J3, J4, J5, J6, J7 | R3503X200 | SMD_PAD_3.5X2MM | 6 |
| LEMO 00 | Dual Female Coax 1 2 Common Shield 3 | J8_1, J8_2, J8_3, J8_4, J8_5, J8_6, J8_7, J8_8, J8_9, J8_10, J8_11, J8_12, J8_13, J8_14, J8_15 | LEMO_EPY.00.250.NTN | LEMO_EPY.00.250.NTN | 15 |
| LEMO 00 | | J9_1, J9_2, J9_3 | LEMO_EPL.00.250.NTN | LEMO_EPL.00.250.NTN | 3 |
| Green | LED Green 1C 2A | LD1_1, LD1_2, LD1_3 | LED2_0R4L3GH1_55 | LED_0R4L3GH1_55 | 3 |
| 10k | Resistor - 1% | R1, R2, R3, R6_1, R6_2, R6_3, R6_4, R6_5, R6_6, R6_7, R6_8, R6_9, R6_10, R8_11, R8_12, R8_13, R8_14, R8_15, R11_1, R11_2, R11_3, R11_4, R11_5, R11_6, R11_7, R11_8, R11_9, R11_10, R11_11, R11_12, R11_13, R11_14, R11_15, R14_1, R14_2, R14_3, R14_4, R14_5, R14_6, R14_7, R14_8, R14_9, R14_10, R14_11, R14_12, R14_13, R14_14, R14_15, R17_1, R17_2, R17_3, R17_4, R17_5, R17_6, R17_7, R17_8, R17_9, R17_10, R17_11, R17_12, R17_13, R17_14, R17_15, R20_1, R20_2, R20_3 | RESC3216X65N | R1206_10K_1%_0.25W_100PPM | 66 |
| 2kΩ | Resistor - 1% | R4, R5, R6, R7 | RESC3216X65N | R1206_2kW_1%_0.25W_100PPM | 4 |
| 1k | Resistor - 1% | R6_1, R9_2, R9_3, R9_4, R9_5, R9_6, R9_7, R9_8, R9_9, R9_10, R9_11, R9_12, R9_13, R9_14, R9_15, R10_1, R10_2, R10_3, R10_4, R10_5, R10_6, R10_7, R10_8, R10_9, R10_10, R10_11, R10_12, R10_13, R10_14, R10_15, R15_1, R15_2, R15_3, R15_4, R15_5, R15_6, R15_7, R15_8, R15_9, R15_10, R15_11, R15_12, R15_13, R15_14, R15_15, R16_1, R16_2, R16_3, R16_4, R16_5, R16_6, R16_7, R16_8, R16_9, R16_10, R16_11, R16_12, R16_13, R16_14, R16_15, R21_1, R21_2, R21_3, R22_1, R22_2, R22_3 | RESC3216X65N | R1206_1K_1%_0.25W_100PPM | 66 |
| 100 | Resistor - 1% | R12_1, R12_2, R12_3, R12_4, R12_5, R12_6, R12_7, R12_8, R12_9, R12_10, R12_11, R12_12, R12_13, R12_14, R12_15, R13_1, R13_2, R13_3, R13_4, R13_5, R13_6, R13_7, R13_8, R13_9, R13_10, R13_11, R13_12, R13_13, R13_14, R13_15, R18_1, R18_2, R18_3, R18_4, R18_5, R18_6, R18_7, R18_8, R18_9, R18_10, R18_11, R18_12, R18_13, R18_14, R18_15, R19_1, R19_2, R19_3, R19_4, R19_5, R19_6, R19_7, R19_8, R19_9, R19_10, R19_11, R19_12, R19_13, R19_14, R19_15, R23_1, R23_2, R23_3, R24_1, R24_2, R24_3 | RESC3216X65N | R1206_100R_1%_0.25W_100PPM | 66 |
| Jumper Type2 | Jumper 2 pins | SW1, SW2, SW3 | COMATEL_313.000 | COMATEL_313.000 | 3 |