

| Bill of Materials PCB MCU NCM107 v1.1<br>For Nixie Clock IN-12 (Tubes Board NCT412 v1.0) B1 |                                                                                           |          |                                         |                                                  |                     |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------|----------|-----------------------------------------|--------------------------------------------------|---------------------|
|                                                                                             | Creation Date: 21.12.2016                                                                 |          |                                         |                                                  |                     |
| #                                                                                           | Designator                                                                                | Quantity | Value                                   | Package                                          | Comment             |
| 1                                                                                           | B1                                                                                        | 1        | Buzzer HCS0903G                         | SMD 8,5x8,5mm                                    | Passive Buzzer      |
| 2                                                                                           | BT1                                                                                       | 1        | Battery Holder CR1220                   | SMD CR1220                                       | Battery Holder      |
| 3                                                                                           | C2, C3, C26, C27, C12, C16, C18, C20, C21, C22, C23, C29                                  | 12       | 100nF 50V                               | 0805                                             | Capacitor Ceramic   |
| 4                                                                                           | C4                                                                                        | 1        | 220uF 16V                               | SMD 6,3x7,7mm<br>(or TH Capacitor)               | Capacitor Aluminium |
| 5                                                                                           | C5, C9, C11, C14                                                                          | 4        | 10uF 16V                                | 0805                                             | Capacitor Ceramic   |
| 6                                                                                           | C6                                                                                        | 1        | 10uF 250V                               | 10x10,5mm<br>UUX2E100MNL1GS<br>(or TH Capacitor) | Capacitor Aluminium |
| 7                                                                                           | C7, C28                                                                                   | 2        | 100nF 250V                              | 1206                                             | Capacitor Ceramic   |
| 8                                                                                           | C10                                                                                       | 1        | 10nF 50V                                | 0805                                             | Capacitor Ceramic   |
| 9                                                                                           | C13                                                                                       | 1        | 1000uF 16V                              | 10x10,5mm<br>(or TH Capacitor)                   | Capacitor Aluminium |
| 10                                                                                          | C15, C17, C19                                                                             | 3        | 10uF 16V                                | Size-A (SMD3216)                                 | Capacitor Tantal    |
| 11                                                                                          | C24, C25                                                                                  | 2        | 22pF 50V                                | 0805                                             | Capacitor Ceramic   |
| 12                                                                                          | D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D21, D22, D23, D24, D25, D26, D27, D28, D29 | 20       | BAV103                                  | SOD80/MLL34                                      | Diode               |
| 13                                                                                          | D12                                                                                       | 1        | ZM4764A                                 | DO-213AB                                         | Diode zener         |
| 14                                                                                          | D13                                                                                       | 1        | LED                                     | LED RED 1206                                     | Diode LED           |
| 15                                                                                          | D14                                                                                       | 1        | ES2J                                    | DO-214AA (SMB)                                   | Diode Fast          |
| 16                                                                                          | D15, D19                                                                                  | 2        | SS26                                    | DO-214AA (SMB)                                   | Diode schottky      |
| 17                                                                                          | D16                                                                                       | 4        | SMAJ18CA                                | DO-213AC (SMA)                                   | Diode TVS           |
| 18                                                                                          | D17                                                                                       | 1        | SMBJ220CA                               | DO-214AA (SMB)                                   | Diode TVS           |
| 19                                                                                          | D20                                                                                       | 4        | DL4148                                  | SOD80/MLL34                                      | Diode               |
| 20                                                                                          | DOWN, MODE, UP                                                                            | 3        | Button SWT-3                            | SWT-3 6mm                                        | Button              |
| 21                                                                                          | ExDOWN, ExMODE, ExUp, ExPow                                                               | 4        | PH2-0-2p                                | PH2-2p                                           | Header connector    |
| 22                                                                                          | ExUSB                                                                                     | 4        | PH2-0-4p                                | PH2-4p                                           | Header connector    |
| 23                                                                                          | F1                                                                                        | 1        | 0 ohm                                   | 1206 (or Fuse 3A 36V)                            | Resistor            |
| 24                                                                                          | J1                                                                                        | 1        | PWR_DJK-02A                             | KLD-0202_NOM                                     | Power connector     |
| 25                                                                                          | J2                                                                                        | 1        | MUSB                                    | UX60-MB                                          | Mini USB            |
| 26                                                                                          | L1                                                                                        | 1        | 220uH 1,7A                              | SMD 12x8mm                                       | Shielded inductor   |
| 27                                                                                          | L2                                                                                        | 1        | 15-22uH 2A                              | CDRH104R 10x10mm                                 | Shielded inductor   |
| 28                                                                                          | MAIN                                                                                      | 1        | PBD-38                                  | PBD-38 (KLS1<br>208-2-38-S)                      | Header connectors   |
| 29                                                                                          | Q1                                                                                        | 1        | STD18N55M5<br>(IRFR320TRPBF,<br>AOD458) | DPAK                                             | Transistor          |
| 30                                                                                          | R1, R2, R3, R4, R5, R8, R29, R31, R33, R34, R35                                           | 11       | 1k                                      | 0805                                             | Resistor            |
| 31                                                                                          | R6, R7, R19, R20                                                                          | 4        | 300k 0805                               | 0805                                             | Resistor            |
| 32                                                                                          | R9                                                                                        | 1        | 1.5 MOhm 0805                           | 0805                                             | Resistor            |
| 33                                                                                          | R10                                                                                       | 1        | 1 Ohm                                   | 1206                                             | Resistor            |
| 34                                                                                          | R11                                                                                       | 1        | 150k 0805                               | 0805                                             | Resistor            |
| 35                                                                                          | R12, R14, R15, R16, R18, R26, R27, R30                                                    | 8        | 10k 0805                                | 0805                                             | Resistor            |
| 36                                                                                          | R13                                                                                       | 4        | 40k Opt 0805                            | R_0805                                           | Resistor            |
| 37                                                                                          | R17                                                                                       | 1        | 10k                                     | 3296W                                            | Resistor adjust     |
| 38                                                                                          | R21                                                                                       | 1        | 0.1 Ohm                                 | R2512                                            | Resistor            |
| 39                                                                                          | R22                                                                                       | 1        | 95.3k 0805                              | 0805                                             | Resistor            |
| 40                                                                                          | R23                                                                                       | 1        | 18.2k 0805                              | 0805                                             | Resistor            |
| 41                                                                                          | R24, R25                                                                                  | 2        | 27 Ohm 0805                             | 0805                                             | Resistor            |
| 42                                                                                          | T1, T3, T5                                                                                | 3        | PMBTA92                                 | SOT23-3N                                         | Transistor PNP      |
| 43                                                                                          | T2, T4, T6, T7, T8                                                                        | 5        | PMBTA42                                 | SOT23-3N                                         | Transistor NPN      |
| 44                                                                                          | TL1                                                                                       | 4        | PH2-0-3p                                | PH2-3p                                           | Header connectors   |
| 45                                                                                          | U1                                                                                        | 1        | HV5812WG                                | SOIC-28W                                         | IC Driver           |
| 46                                                                                          | U4                                                                                        | 1        | MAX1771CSA                              | SOIC-8                                           | IC DC-DC            |
| 47                                                                                          | U5                                                                                        | 1        | RT8258GE<br>(Replace see schem)         | SOT23-6                                          | IC DC-DC            |
| 48                                                                                          | U6                                                                                        | 1        | DS3231S                                 | SOIC-16W                                         | IC RTC              |
| 49                                                                                          | U7                                                                                        | 1        | FT230XS                                 | SSOP-16                                          | IC USB-UART         |
| 50                                                                                          | U8                                                                                        | 1        | ATmega328P-PU                           | DIP-28                                           | IC MCU              |
| 51                                                                                          | U9                                                                                        | 1        | ULN2003D                                | SOIC-16                                          | IC Driver           |
| 52                                                                                          | Z1                                                                                        | 1        | 16Mhz                                   | SMD 6x3,5mm                                      | Quartz              |
| 53                                                                                          | not market on PCB                                                                         | 1        | SIP DIP-28                              | SIP DIP-28                                       | Install to U8       |
| 54                                                                                          | not market on PCB                                                                         | 1        | Battery Li-ion CR1220                   | CR1220                                           | Install to BT1      |
| 55                                                                                          | PCB MCU NCM107 v1.1                                                                       | 1        |                                         |                                                  | PCB 50x100mm        |

| Bill of Materials PCB Tubes Board NCT412 v1.0 |                        |          |              |         |                   |
|-----------------------------------------------|------------------------|----------|--------------|---------|-------------------|
| #                                             | Designator             | Quantity | Value        | Package | Comment           |
| 1                                             | MAIN1                  | 1        | PLD-38       | PLD-38  | Header connectors |
| 2                                             | D1, D2, D3, D4, D5, D6 | 6        | LED RGB 3528 | 3528    | LED RGB           |

|    |                                                       |    |                 |             |                 |
|----|-------------------------------------------------------|----|-----------------|-------------|-----------------|
| 3  | R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16 | 12 | 150 Ohm         | 0805        | Resistor        |
| 4  | R17, R18, R19, R20, R21, R22                          | 6  | 150 Ohm         | 0805        | Resistor        |
| 5  | R1, R2, R3, R4                                        | 4  | 150k            | 0805        | Resistor        |
| 6  | R23, R24, R25, R26, R27, R28                          | 6  | 4.7k            | 0805        | Resistor        |
| 7  | NX0, NX1, NX2, NX3, NX4, NX5                          | 6  | IN-12           | NIXIE Tubes | NIXIE Tubes     |
| 8  | DS1, DS2, DS3, DS4                                    | 4  | INS-1           | Neon Lamps  | Neon Lamps      |
| 9  | not market on PCB                                     | 4  | M3x5mm          | IN-OUT      | Hex pillar      |
| 10 | not market on PCB                                     | 4  | M3x12mm         | IN-IN       | Hex pillar      |
| 11 | not market on PCB                                     | 2  | M3x18mm         | IN-IN       | Hex pillar      |
| 12 | not market on PCB                                     | 6  | M3x6mm<br>L=6mm |             | Screw           |
| 13 | PCB TUBES NCT412                                      | 1  |                 |             | PCB<br>50x180mm |