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Рис. 1. Схема электрическая принципиальная.

**2. Описание работы схемы таймера**

Таймер собран на микросхемах повышенной степени интеграции и энергоэкономичности. При отключенной индикации устройство потребляет всего доли микроватта, в ждущем режиме расходуемый им ток не превышает 0,3 мА. Блок индикации, выполненный на миниатюрных светодиодных индикаторах, может быть встроен в любое удобное место радиоаппаратуры. Интегральная микросхема К176ИЕ18 специально разработана для использования в электронных часах. В ее состав входит генератор, рассчитанный на работу с внешним кварцевым резонатором частотой 32 768 Гц, и два делителя частоты с коэффициентами деления 215=32768 и 60. Сопротивление резистора R1 может находиться в пределах 10-33 МОм. Конденсатор С3 служит для точной подстройки частоты. На выходах Т1-Т4 DD1 формируются импульсы с частотой 128 Гц и скважностью 4, сдвинутые между собой на четверть периода. Они необходимы для коммутации разрядов индикатора в часах при динамической индикации. Сигнал с частотой 1 Гц с вывода 4 микросхемы можно использовать для зажигания разделительной точки. В данном устройстве он сигнализирует о работе часов в режиме "будильник-таймер".

МС К176ИЕ18 имеет специальный формирователь звукового сигнала. При подаче на вход HS импульса положительной полярности с одноименного выхода микросхемы DD2 на выводе 7 DD1 появляются пачки отрицательных импульсов с частотой заполнения 2048 Гц и скважностью 2. Длительность пачек - 0,5 с, период заполнения - 1 с. Выход Q3 (вывод 7) выполнен с "открытым" стоком и позволяет подключать излучатели сопротивлением более 50 Ом без эмиттериых повторителей.

Микросхема DD2 содержит счетчики минут и часов, регистр памяти будильника, цепи сравнения и включения звукового сигнала, цепи формирования сигналов цифр в двоичном коде при динамической индикации. При уровне 1 на выходе Т1 DD1, на выходах А-В-С-D DD2 присутствуют сигналы, соответствующие в двоичном коде цифре единиц минут: при таком же уровне на выходе Т2 - сигналы десятков минут и т. д. На выходе Q1 (вывод 12) формируются импульсы для записи сигналов цифр в триггеры памяти микросхемы DD3. С выхода HS (вывод 7 DD2) снимается сигнал будильника, используемый для запуска выходного реле К1, коммутирующего выключатель питания в режиме таймера. Реле включено в катодную цепь триннстора VS1, управляющий вход которого подключен через согласующий повторитель на транзисторе VT5 к выводу 7 DD2. Напряжение питания 9 В на все три микросхемы подается на вывод 16, а с общим проводом соединяют вывод 8.

При подаче питания счетчики часов и минут, а также регистр памяти автоматически переводятся в нулевое состояние. Для установки счетчика минут нажимают на кнопку SB2. При этом показания разрядов минут в индикаторе начинают меняться с частотой 2 Гц от 0 до 59 (далее снова 0 и т.д.).

В момент перехода от числа 59 к 00 показания счетчика часов увеличатся на единицу. Если нажать на кнопку SB3, то с той же частотой будут изменяться показания разрядов часов (от 00 до 23). При нажатой кнопке SB4 на индикаторе появится время включения сигнала будильника. Если одновременно нажать на кнопки SB2 и SB4, то показания разрядов минут включения будильника станут изменяться, как и при нажатой кнопке SB2, однако в разряде часов переключения не будет. При одновременно нажатых кнопках SB3 и SB4 устанавливают показания разрядов часов будильника, но при переходе из состояния 23 в 00 осуществляется перевод в нулевое значение разрядов минут. Кнопка SB5 служит для коррекции хода часов в процессе эксплуатации. Если нажать на кнопку SB5 и отпустить ее спустя секунду после шестого сигнала поверки времени, то появится нулевое показание разрядов минут. После этого можно установить показание разрядов часов в индикаторе, нажав кнопку SB3. При этом ход минут не будет нарушен. Следует помнить, что при показаниях индикатора в пределах от 00 до 39 состояние счетчика часов при нажатии и отпускании кнопки SB5 не изменяется. В интервале же от 40 до 59 минут после отпускания кнопки SB5 значения разрядов часов увеличатся на 1. Если текущее время и время включения сигнала будильника не совпадают, на выходе HS (вывод 7 DD2) присутствует уровень логического 0. При совпадении показания на выходе HS появляются импульсы положительной полярности с частотой повторения 128 Гц и скважностью 16. Когда их подают на излучатель через эмиттерный повторитель, то раздается сигнал, напоминающий звук механического будильника. Сигнал прекратится, как только текущее время перестанет совпадать с временем включения будильника, то есть через 1 мин. Для согласования микросхем К176ИЕ18 и К176ИЕ13 с индикатором используется дешифратор DD3 и ключи на транзисторах VT1-VT4.

**3. Размешение элементов**

**4. Спецификация**

|  |  |  |  |
| --- | --- | --- | --- |
| Позиционное обозначение | Наименование | Кол. | Примечание |
|  | Микросхемы |  |  |
| DD1 | К176ИЕ18 | 1 |  |
| DD2 | К176ИЕ13 | 1 |  |
| DD3 | К176ИД2 | 1 |  |
|  | Индикаторы |  |  |
| HG1-HG4 | АЛС314А | 4 |  |
|  | Транзисторы |  |  |
| VT1-VT4 | КТ503Г | 4 |  |
| VT5 | КТ3102Б | 1 |  |
|  | Диоды |  |  |
| VD1-VD5 | Д223 | 5 |  |
|  | Тиристоры |  |  |
| VS1 | КУ101И | 1 |  |
|  | Резисторы |  |  |
| R1 | МЛТ-0.125-22 МОм | 1 |  |
| R2 | МЛТ-0.125-510 кОм | 1 |  |
| R3-R6 | МЛТ-0.125-36 кОм | 4 |  |
| R7,R9 | МЛТ-0.125-100 кОм | 2 |  |
| R8,R20 | МЛТ-0.125-110 Ом | 1 |  |
| R10-R16 | МЛТ-0.125-910 Ом | 7 |  |
| R17 | МЛТ-0.125-15 кОм | 1 |  |
| R18 | МЛТ-0.125-3,3 кОм | 1 |  |
| R19 | МЛТ-0.125-200 Ом | 1 |  |
|  | Конденсаторы |  |  |
| C1 | Электролитический 30мкФ16V  | 1 |  |
| C2 | Электролитический 20мкФ16V  | 1 |  |
| C3 | Электролитический 2-7мкФ16V  | 1 |  |
| C4 | Электролитический 1400мкФ16V  | 1 |  |
|  | Реле |  |  |
| H1 | Реле | 1 |  |
|  | Питание |  |  |
| GB1 | BAT\_CR 9В | 1 |  |
|  | Кнопки |  |  |
| SB1.1 | Кнопка «БУД» | 1 |  |
| SB1.2 | Кнопка  | 1 |  |
| SB1.3 | Кнопка  | 1 |  |
| SB1.4 | Кнопка «ВЫКЛ» | 1 |  |

|  |  |  |  |
| --- | --- | --- | --- |
| Позиционное обозначение | Наименование | Кол. | Примечание |
| SB2 | Кнопка «МИН» | 1 |  |
| SB3 | Кнопка «ТАС» | 1 |  |
| SB4 | Кнопка «РЕЖ» | 1 |  |
| SB5 | Кнопка «НОРР» | 1 |  |
| SB6 | Кнопка «ИНД» | 1 |  |

**5. Слои**

Рис.2. Первый слой

Рис.3. Второй слой.

Рис.4.Карта отверстий.

|  |  |
| --- | --- |
| Вид отверстия | Диаметр отверстия, мм |
|  | 3,500 |
|  | 2,200 |
|  | 1,200 |
|  | 1,100 |
|  | 1,000 |
|  | 0,965 |

**6. Список связей (Net list)**

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(node "VD5" "2")

(node "R8" "2")

(node "VT4" "1")

(node "VT3" "1")

(node "VT1" "1")

(node "VT2" "1")

)

(net "NET00078"

(node "HL4" "3")

(node "VT2" "3")

)

(net "NET00064"

(node "HL3" "3")

(node "VT3" "3")

)

(net "NET00076"

(node "HL2" "3")

(node "VT4" "3")

)

(net "NET00029"

(node "SB1.3" "2")

(node "T1" "3")

(node "R18" "2")

)

(net "NET00027"

(node "R17" "1")

(node "VT5" "2")

)

(net "NET00028"

(node "VS1" "3")

(node "R18" "1")

(node "VT5" "1")

)

(net "NET00046"

(node "T1" "4")

(node "VS1" "2")

)

(net "NET00045"

(node "R19" "2")

(node "VS1" "1")

)

(net "NET00073"

(node "HL4" "10")

(node "HL1" "10")

(node "HL3" "10")

(node "R15" "1")

(node "HL2" "10")

)

(net "NET00074"

(node "HL4" "4")

(node "HL1" "4")

(node "HL3" "4")

(node "R12" "1")

(node "HL2" "4")

)

(net "NET00075"

(node "HL4" "7")

(node "HL1" "7")

(node "R10" "1")

(node "HL3" "7")

(node "HL2" "7")

)

(net "NET00012"

(node "DD4" "13")

(node "R14" "2")

)

(net "NET00016"

(node "DD4" "12")

(node "R13" "2")

)

(net "NET00069"

(node "HL4" "6")

(node "HL1" "6")

(node "HL3" "6")

(node "R11" "1")

(node "HL2" "6")

)

(net "NET00026"

(node "DD4" "11")

(node "R12" "2")

)

(net "NET00037"

(node "DD4" "10")

(node "R11" "2")

)

(net "NET00015"

(node "SB1.2" "2")

(node "HL2" "5")

)

(net "NET00040"

(node "DD4" "9")

(node "R10" "2")

)

(net "NET00063"

(node "DD1" "1")

(node "R4" "2")

(node "SB2" "1")

)

(net "NET00083"

(node "DD1" "2")

(node "R5" "2")

(node "SB3" "1")

)

(net "NET00038"

(node "HL4" "9")

(node "HL1" "9")

(node "R16" "1")

(node "HL3" "9")

(node "HL2" "9")

)

(net "NET00066"

(node "R6" "2")

(node "DD1" "3")

(node "SB4" "1")

)

(net "NET00056"

(node "HL4" "1")

(node "HL1" "1")

(node "HL3" "1")

(node "R14" "1")

(node "HL2" "1")

)

(net "NET00067"

(node "SB1.2" "1")

(node "DD1" "4")

)

(net "NET00060"

(node "HL4" "2")

(node "HL1" "2")

(node "R13" "1")

(node "HL3" "2")

(node "HL2" "2")

)

(net "NET00068"

(node "DD2" "9")

(node "DD1" "6")

)

(netClass "ПИТАНИЕ"

(netNameRef "+9V")

(netNameRef "GND")

(attr "Width" "1.2" (pt -0.00001 -0.00001) (textStyleRef "(Default)") (constraintUnits mil) )

)

(netClass "ЛИНИИ"

(netNameRef "NET00000")

(netNameRef "NET00001")

(netNameRef "NET00002")

(netNameRef "NET00003")

(netNameRef "NET00004")

(netNameRef "NET00005")

(netNameRef "NET00006")

(netNameRef "NET00007")

(netNameRef "NET00009")

(netNameRef "NET00011")

(netNameRef "NET00012")

(netNameRef "NET00015")

(netNameRef "NET00016")

(netNameRef "NET00017")

(netNameRef "NET00018")

(netNameRef "NET00019")

(netNameRef "NET00026")

(netNameRef "NET00027")

(netNameRef "NET00028")

(netNameRef "NET00029")

(netNameRef "NET00030")

(netNameRef "NET00036")

(netNameRef "NET00037")

(netNameRef "NET00038")

(netNameRef "NET00039")

(netNameRef "NET00040")

(netNameRef "NET00044")

(netNameRef "NET00045")

(netNameRef "NET00046")

(netNameRef "NET00048")

(netNameRef "NET00049")

(netNameRef "NET00050")

(netNameRef "NET00051")

(netNameRef "NET00056")

(netNameRef "NET00058")

(netNameRef "NET00060")

(netNameRef "NET00062")

(netNameRef "NET00063")

(netNameRef "NET00064")

(netNameRef "NET00066")

(netNameRef "NET00067")

(netNameRef "NET00068")

(netNameRef "NET00069")

(netNameRef "NET00073")

(netNameRef "NET00074")

(netNameRef "NET00075")

(netNameRef "NET00076")

(netNameRef "NET00078")

(netNameRef "NET00079")

(netNameRef "NET00080")

(netNameRef "NET00081")

(netNameRef "NET00083")

(netNameRef "NET00086")

(netNameRef "NET00090")

(netNameRef "NET00091")

(netNameRef "NET00092")

(netNameRef "NET00095")

(netNameRef "NET00096")

(attr "Width" "0.25" (pt -0.00001 -0.00001) (textStyleRef "(Default)") (constraintUnits mil) )

)

)

**7. Протокол верификации**

ERC Summary:

------------

Single Node:

Errors: 0

Warnings: 0

Ignored Errors: 0

No Node:

Errors: 0

Warnings: 0

Ignored Errors: 0

Electrical:

Errors: 0

Warnings: 94

Ignored Errors: 0

Unconnected Pin:

Errors: 0

Warnings: 0

Ignored Errors: 0

Unconnected Wire:

Errors: 0

Warnings: 0

Ignored Errors: 0

Bus/Net:

Errors: 0

Warnings: 0

Ignored Errors: 0

Component:

Errors: 0

Warnings: 0

Ignored Errors: 0

Net Connectivity:

Errors: 0

Warnings: 0

Ignored Errors: 0

Hierarchy:

Errors: 0

Warnings: 0

Ignored Errors: 0

**8. Программа для N/C Drill**

M48

METRIC,0000.00

T01C0.60

T02C0.90

T03C0.97

T04C1.00

T05C1.00

T06C1.10

T07C1.20

T08C2.20

T09C3.50

%

T01

X+002794Y+004775

X+003505Y+002844

X+003302Y+002946

X+004368Y+004064

X+004419Y+005740

X+004318Y+005933

X+004064Y+005994

X+004927Y+004724

X+005181Y+004826

X+005029Y+004978

X+004927Y+005435

X+004986Y+006959

X+005194Y+007315

X+004876Y+007924

X+004826Y+008280

X+005130Y+007721

X+005537Y+005080

X+005842

X+005943Y+007416

X+005689Y+007518

X+006756Y+003606

X+006299Y+004419

X+006502Y+005029

X+006705Y+008839

X+007010Y+003505

X+007442Y+004445

X+007061Y+004775

X+007823Y+003302

X+007924Y+004775

X+008128

X+007924Y+006705

Y+006350

X+007975Y+009042

X+008128Y+009245

X+008737Y+005232

X+008483Y+005181

X+008686Y+005994

X+009499Y+003149

X+009296Y+003708

X+009753Y+003230

X+009804Y+005080

X+009652Y+005435

X+009702Y+005994

Y+006578

X+009448Y+007213

X+009296Y+007721

X+010109Y+005892

X+010007Y+005689

X+011023Y+005943

X+002895Y+006858

X+004064Y+004622

X+004165Y+005334

X+005994Y+003860

X+006400Y+006146

X+007264Y+005334

X+008178Y+003759

X+008585Y+006858

X+008618Y+007620

X+010363Y+003759

X+011023Y+004544

X+010769Y+003860

X+003048Y+005537

Y+005740

X+003098Y+007975

X+005334Y+003403

X+004622Y+003505

X+004521Y+003302

X+003860Y+005435

X+004521Y+008686

X+006908Y+011074

X+010617Y+005588

X+009855Y+008788

X+004648Y+006172

X+005334Y+006146

X+009093Y+003098

X+006858Y+005384

X+010680Y+003048

X+010718Y+005384

X+012230Y+003380

X+011980

X+011730

X+011480

X+011230

X+010980

X+010730

X+010480

Y+002630

X+010730

X+010980

X+011230

X+011480

X+011730

X+011980

X+012230

X+004430Y+005090

X+004180

X+003930

X+003680

X+003430

X+003180

X+002930

X+002680

Y+004340

X+002930

X+003180

X+003430

X+003680

X+003930

X+004180

X+004430

X+010210Y+003380

X+009960

X+009710

X+009460

X+009210

X+008960

X+008710

X+008460

Y+002630

X+008710

X+008960

X+009210

X+009460

X+009710

X+009960

X+010210

T02

X+010290Y+004750

X+002720Y+006900

X+003420

X+004120

X+004820

X+005870

X+005520

X+006570

X+007270

X+007970

X+005550Y+009210

X+004580

X+007490

X+008460

X+009940Y+004750

X+010640

X+003070Y+006900

X+003770

X+004470

X+005170

X+006220

X+008320

X+006920

X+007620

X+006520Y+009210

T03

X+002670Y+007430

Y+007180

X+010290Y+004000

X+002720Y+006150

X+003420

X+004120

X+004820

X+005870

X+005520

X+006570

X+007270

X+007970

X+008880Y+006410

Y+006160

X+008620Y+006410

Y+006160

X+009660Y+006410

Y+006160

X+009400Y+006410

Y+006160

X+010440Y+006410

Y+006160

X+010180Y+006410

Y+006160

X+005548Y+002940

X+005040

X+004758

X+004250

X+005550Y+007170

X+004580

X+004820Y+011190

X+005570

X+008178Y+002940

X+007670

X+007388

X+006880

X+007490Y+007170

X+008460

X+009940Y+004000

X+010640

X+003070Y+006150

X+003770

X+004470

X+005170

X+006220

X+008320

X+006920

X+007620

X+009140Y+006410

Y+006160

X+009920Y+006410

Y+006160

X+006520Y+007170

X+011860Y+008620

X+005830Y+003070

X+006592

T04

X+003920Y+011200

X+004170

T05

X+004710Y+004030

X+004964

Y+005617

X+004710

X+005472Y+004030

X+005726

Y+005617

X+005472

X+005218Y+004030

Y+005617

X+004190Y+010240

X+004690

X+004440

X+005480

X+005980

X+005730

X+007310Y+004030

X+007564

Y+005617

X+007310

X+008072Y+004030

X+008326

Y+005617

X+008072

X+007818Y+004030

Y+005617

X+008220Y+010360

X+008345Y+010610

X+008470Y+010360

X+006010Y+004030

X+006264

Y+005617

X+006010

X+006772Y+004030

X+007026

Y+005617

X+006772

X+006518Y+004030

Y+005617

X+008610Y+004030

X+008864

Y+005617

X+008610

X+009372Y+004030

X+009626

Y+005617

X+009372

X+009118Y+004030

Y+005617

X+002940Y+008480

X+003956

X+002940Y+007210

X+003956

X+006770Y+010240

X+007270

X+007020

X+002900

X+003400

X+003150

T06

X+003670Y+003440

X+002670

T07

X+009090Y+008620

X+010590

T08

X+009710Y+010510

X+010210

X+009210

T09

X+002600Y+002400

X+002620Y+011590

X+012660Y+002420

Y+011600

T00

M30

**9. Программа для фотоплоттера**

G04\*

G04 File: SXEMA.T-MASK, Thu May 11 10:20:51 2006\*

G04 Source: P-CAD 2002 PCB, Version 17.00.50, (E:\диск Е\Рефераты с интернета\институт\4 курс\4 курс2\P-CAD\Библиотеки\таймер\SXEMA.pcb)\*

G04 Format: Gerber Format (RS-274-D), ASCII\*

G04\*

G04 Format Options: Absolute Positioning\*

G04 Leading-Zero Suppression\*

G04 Scale Factor 1:1\*

G04 NO Circular Interpolation\*

G04 Millimeter Units\*

G04 Numeric Format: 4.4 (XXXX.XXXX)\*

G04 G54 NOT Used for Aperture Change\*

G04\*

G04 File Options: Offset = (0.000mm,0.000mm)\*

G04 Drill Symbol Size = 2.032mm\*

G04 No Pad/Via Holes\*

G04\*

G04 File Contents: No Pads\*

G04 No Vias\*

G04 No Designators\*

G04 No Types\*

G04 No Values\*

G04 No Drill Symbols\*

G04 Top\*

G04\*

G04\*

G04 Aperture Descriptions\*

G04 D010 EL X0.254mm Y0.254mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X0.254mm Y0.254mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D011 EL X0.300mm Y0.300mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X0.300mm Y0.300mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D012 EL X0.500mm Y0.500mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X0.500mm Y0.500mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D013 EL X0.050mm Y0.050mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X0.050mm Y0.050mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D014 EL X0.064mm Y0.064mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X0.064mm Y0.064mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D015 EL X0.100mm Y0.100mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X0.100mm Y0.100mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D016 EL X1.200mm Y1.200mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X1.200mm Y1.200mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D017 EL X0.200mm Y0.200mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X0.200mm Y0.200mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D018 EL X0.250mm Y0.250mm H0.000mm 0.0deg (0.000mm,0.000mm) DR\*

G04 "Ellipse X0.250mm Y0.250mm H0.000mm 0.0deg (0.000mm,0.000mm) Draw"\*

G04 D019 EL X2.901mm Y2.901mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X2.901mm Y2.901mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D020 EL X3.881mm Y3.881mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X3.881mm Y3.881mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D021 EL X4.000mm Y4.000mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X4.000mm Y4.000mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D022 EL X4.381mm Y4.381mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X4.381mm Y4.381mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D023 EL X1.300mm Y1.300mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X1.300mm Y1.300mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D024 EL X1.524mm Y1.524mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X1.524mm Y1.524mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D025 EL X1.600mm Y1.600mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X1.600mm Y1.600mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D026 EL X1.681mm Y1.681mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X1.681mm Y1.681mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D027 EL X1.905mm Y1.905mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X1.905mm Y1.905mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D028 EL X1.981mm Y1.981mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X1.981mm Y1.981mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D029 EL X2.000mm Y2.000mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X2.000mm Y2.000mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D030 EL X2.381mm Y2.381mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X2.381mm Y2.381mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D031 EL X2.520mm Y2.520mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X2.520mm Y2.520mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D032 MH X3.500mm Y3.500mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Mounting Hole X3.500mm Y3.500mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D033 SQ X8.500mm Y8.500mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X8.500mm Y8.500mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D034 SQ X8.881mm Y8.881mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X8.881mm Y8.881mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D035 SQ X1.300mm Y1.300mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X1.300mm Y1.300mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D036 SQ X1.500mm Y1.500mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X1.500mm Y1.500mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D037 SQ X1.524mm Y1.524mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X1.524mm Y1.524mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D038 SQ X1.600mm Y1.600mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X1.600mm Y1.600mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D039 SQ X1.681mm Y1.681mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X1.681mm Y1.681mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D040 SQ X1.881mm Y1.881mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X1.881mm Y1.881mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D041 SQ X1.905mm Y1.905mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X1.905mm Y1.905mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D042 SQ X1.981mm Y1.981mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X1.981mm Y1.981mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D043 SQ X2.000mm Y2.000mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X2.000mm Y2.000mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D044 SQ X2.381mm Y2.381mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Rectangle X2.381mm Y2.381mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D045 EL X1.200mm Y1.200mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X1.200mm Y1.200mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04 D046 EL X1.581mm Y1.581mm H0.000mm 0.0deg (0.000mm,0.000mm) FL\*

G04 "Ellipse X1.581mm Y1.581mm H0.000mm 0.0deg (0.000mm,0.000mm) Flash"\*

G04\*

%FSLAX44Y44\*%

%SFA1B1\*%

G04\*

G71\*

G90\*

G01\*

D02\*

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