Plataforma electrónica para incluir juguetes
convencionales en juegos de realidad mixta
ANEXOS

ANEXOS

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A. Datasheets

1. Arduino Nano V3.1

La placa de desarrollo electrónico que se va a utilizar para los juguetes fabricaos en este TFG es Arduino Nano V3.1

Se trata de una placa de desarrollo cuyo hardware consta de una placa de circuito impreso de color azul con una serie de componentes en ambas caras.   Podemos ver su aspecto en las figuras 1 y 2.
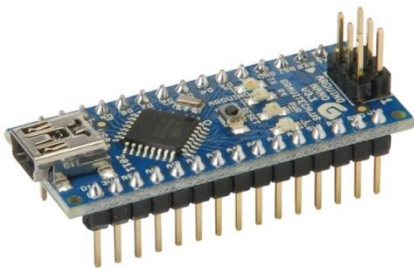
Figura 1: Arduino Nano V3.1

Figura 2: Arduino Nano V3.1 (front)

El microcontrolador que lleva incorporado es el Atmega 328p (visible en la figura 3), tiene 32 pines.
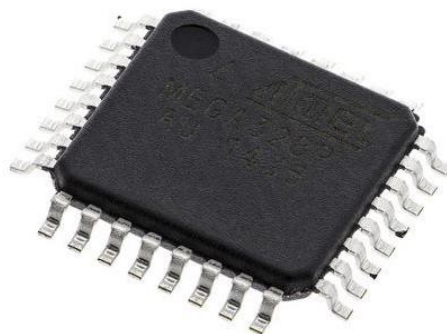
Figura 3: Atmega 328p au

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Esta placa de desarrollo tiene 30 pads (la mayoría puertos digitales y analógicos de entrada/salida) mostrados en la figura 4. Estos 30 pads están soldados a 2 tiras de pines (15 pines cada una) que podemos ver en la figura 5.
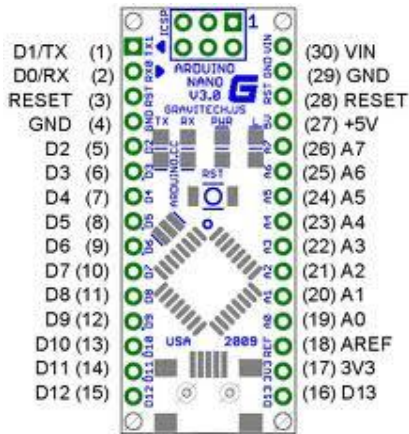

Figura 4: pin map

Figura 5: Tira de pines (distancia 0.1 pulgadas)

Lleva un conector Mini USB que puede servir tanto para alimentar la placa como para transmitir información de forma síncrona o asíncrona. Podemos verlo en la figura 6

Figura 6: conector Mini USB

La alimentación es regulada a 5V con un regulador lineal de tensión UA78M05CDCY, permite una corriente máxima de 500mA mostrado en la figura 7.

Figura 7: regulador de tensión

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La transmisión y recepción de datos asíncrona por el conector Mini USB se realiza gracias al Chip conversor serie-USB(TTL) FT232RL mostrado en la figura 8.

Figura 8: Conversor Série-USB (TTL) FT232RL

Además de esto, también lleva una serie de resistencias con encapsulado SMD, LED's luminosos, condensadores SMD, un diodo schottky y un pulsador para resetear el microcontrolador.

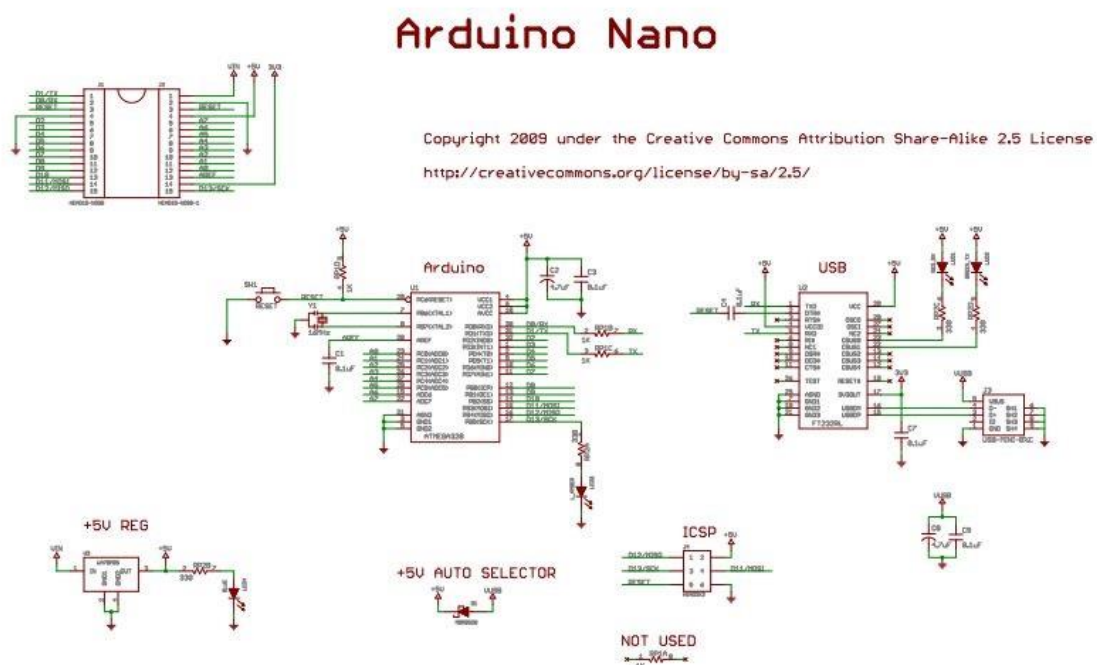En la figura 16 podemos ver el esquemático completo del Arduino Nano V3.1.

Figura 16: Esquemático de Arduino Nano V3.1

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Por otro lado, el software de esta placa de desarrollo consiste en un entorno de desarrollo (IDE) cuyo lenguaje de programación denominado "processing" es de alto nivel y bastante similar al lenguaje de programación C++.

8 Características principales del Arduino Nano V3.1 (Hardware y software):

1.- Límites de tensión de entrada por la patilla Vin: de 6 a 20V.

2.- Tensión recomendada de en entrada por la patilla Vin: de 7 a 12V.

3.- 32KB de memoria Flash de los cuales, 2KB son usados en el bootloader (gestor de arranque).

4.- 2KB de memoria RAM estática (SRAM).

5.- 1KB de EEPROM (que es un tipo de memoria ROM que puede ser programada, borrada y reprogramada eléctricamente).

6.- frecuencia del clock = 16MHz.

7.- Dimensiones placa: 45mm de largo, 18mm de ancho.

8.- Peso: 5g

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2. Digital IR Receiver Module V2

DFRobot Digital IR Receiver Module

Introduction

IR is widely used in remoter control. With this IR receiver, the Arduino project is able to receive command from any IR remoter controller if you have the right decoder. Well, it will be also easy to make your own IR controller using IR transmitter.
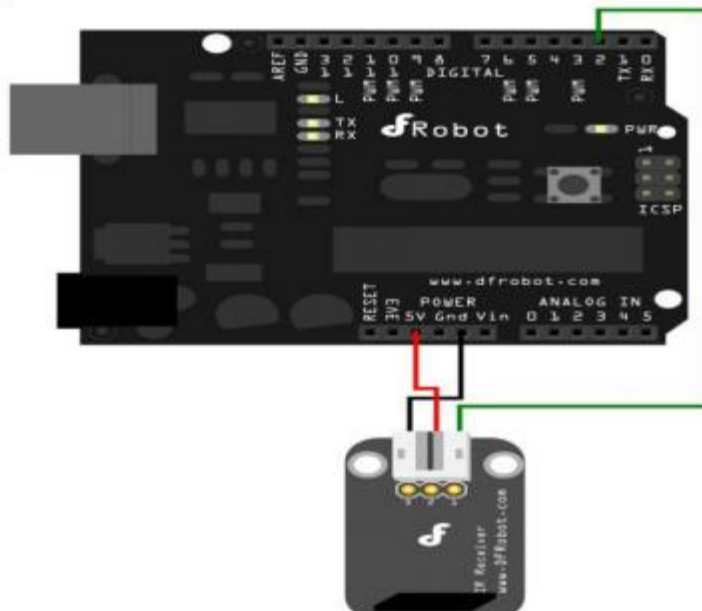
Specification

- Power Supply:5V
- Interface:Digital
- Modulate Frequency:38Khz
- Module interface socket:JST PH2.0

Wiring Diagram

The following image shows a suggested connection method. You may use any Digital I/O pin that is not in use by another device.

NOTE: In the sample code below Digital pin 11 is in use, you may either change your wiring or change

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the sample code to match.

Sample Code

IR Receiver test code:

```
/*
 * IRremote: IRrecvDemo - demonstrates receiving IR codes with IRrecv
 * An IR detector/demodulator must be connected to the input RECV_PIN.
 * Version 0.1 July, 2009
 * Copyright 2009 Ken Shirriff
 *
 */

#include <IRremote.h>

int RECV_PIN = 11;

IRrecv irrecv(RECV_PIN);

decode_results results;

void setup()
{
  Serial.begin(9600);
  irrecv.enableIRIn(); // Start the receiver
}

void loop() {
  if (irrecv.decode(&results)) {
    Serial.println(results.value, HEX);
    irrecv.resume(); // Receive the next value
  }
}
```
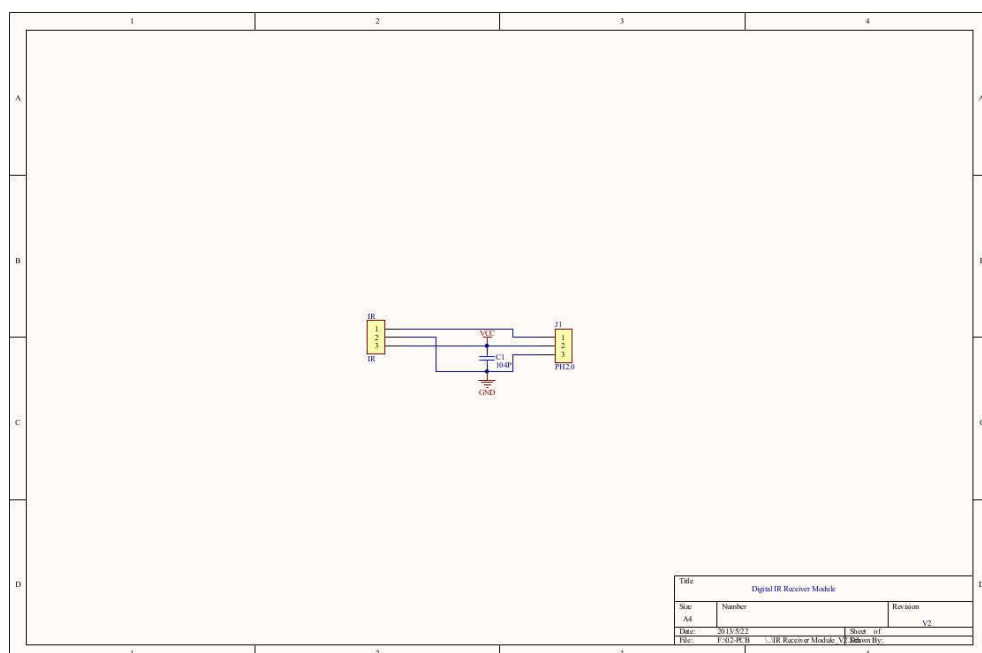
Schematic

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3. Digital IR Transmitter Module

DIGITAL IR Transmitter Module (SKU:DFR0095)

Introduction

IR Transmitter Module is designed for IR communication which is widely used for operating the television device from a short line-of-sight distance. The remote control is usually contracted to remote.

Since infrared (IR) remote controls use light, they require line of sight to operate the destination device. The signal can, however, be reflected by mirrors, just like any other light source.

If operation is required where no line of sight is possible, for instance when controlling equipment in another room or installed in a cabinet, many brands of IR extenders are available for this on the market. Most of these have an IR receiver, picking up the IR signal and relaying it via radio waves to the remote part, which has an IR transmitter mimicking the original IR control.

Infrared receivers also tend to have a more or less limited operating angle, which mainly depends on the optical characteristics of the phototransistor. However, it's easy to increase the operating angle using a matte transparent object in front of the receiver.
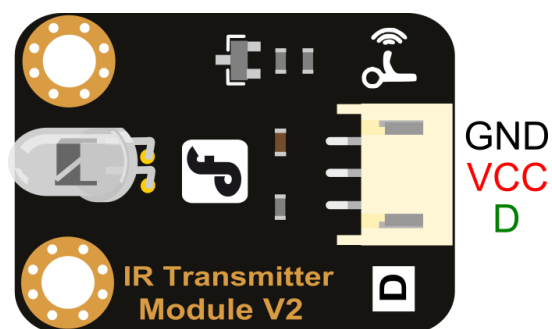
Applications

- Infrared remote control
- Infrared communication

Specification

- Power Supply:3-5V
- Infrared center frequency:850nm-940nm
- Infrared emission angle: about 20degree
- Infrared emission distance: about 1.3m (5V 38Khz)
- Interface socket:JST PH2.0
- Size:30x22mm
- Mounting hole: inner diameter is 3.2mm,spacing is 15mm
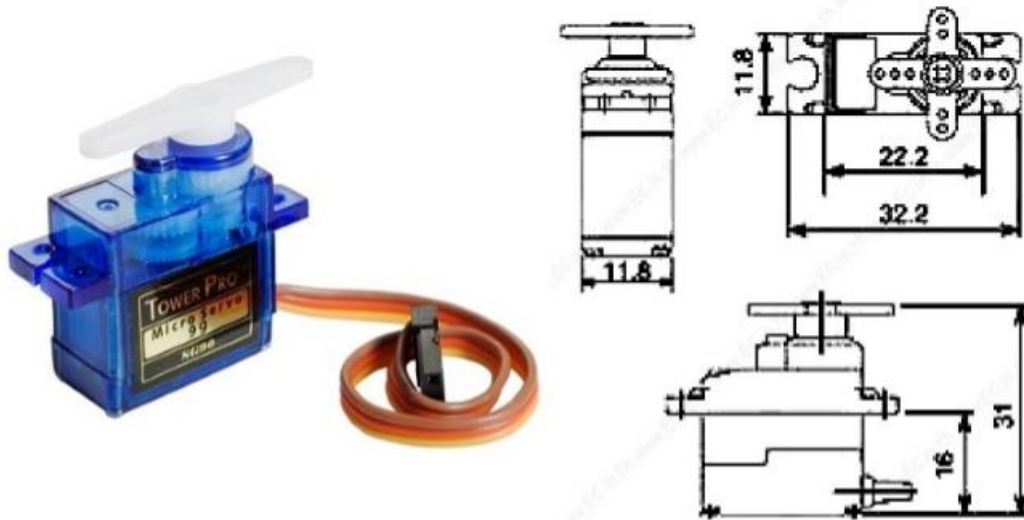
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Pinout Diagram

- GND: power negative
- VCC: power positive
- D: digital input; HIGH=open emission, LOW=close emission

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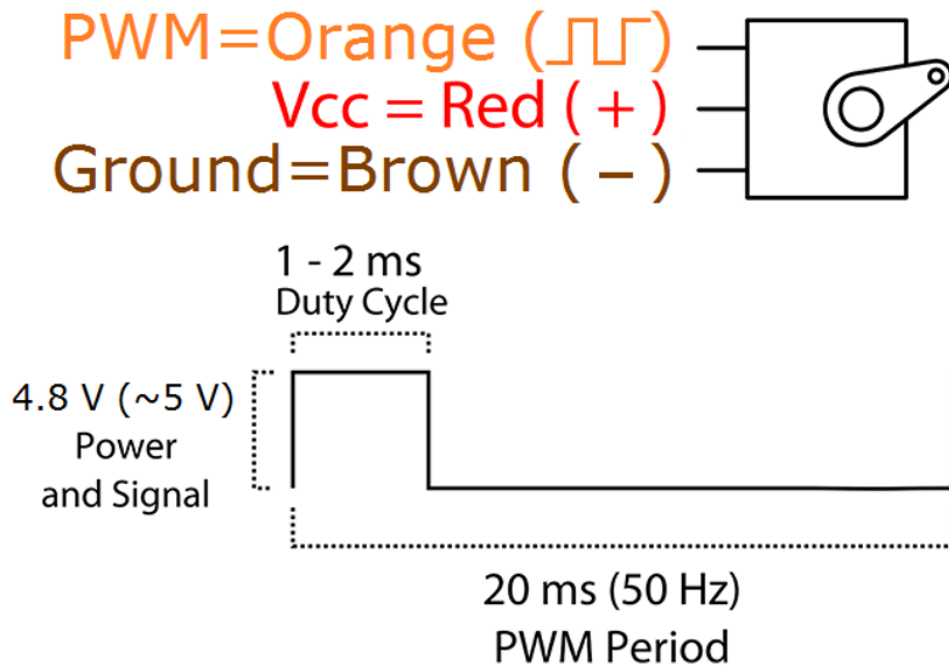convencionales en juegos de realidad mixta
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4. Micro Servo SG90 9g

Tiny and lightweight with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller. You can use any servo code, hardware or library to control these servos. Good for beginners who want to make stuff move without building a motor controller with feedback & gear box, especially since it will fit in small places. It comes with a 3 horns (arms) and hardware.

Specifications

• Weight: 9 g • Dimension: 22.2 x 11.8 x 31 mm approx. • Stall torque: 1.8 kgf·cm • Operating speed: 0.1 s/60 degree • Operating voltage: 4.8 V (~5V) • Dead band width: 10 µs • Temperature range: 0 ºC – 55 ºC

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Position "0" (1.5 ms pulse) is middle, "90" (~2 ms pulse) is all the way to the right, "-90" (~1 ms pulse)is all the way to left.

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5. Altavoz

Cover Industrial Co., Ltd.

Block 12, 3/F, DongFang JianFu, YuSheng Industrial zone
GuShu Village, XiXiang Town, BaoAn District , Shenzhen
Guangdong Province, China 518126
Attn: Alex Xiao, Tel: 86-755-29173471, Fax: 86-755-29174502
Http://www.cover-cn.com

Parameters:

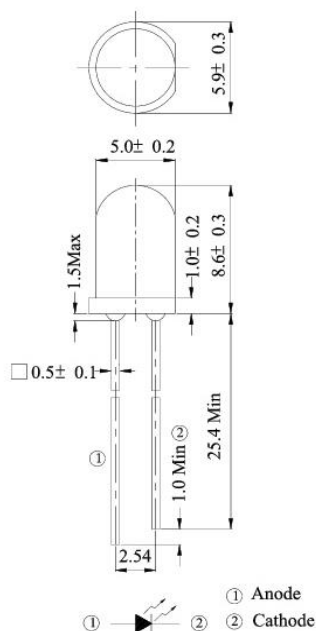| 1	Type	Dynamic speaker
2	Dimension	External diameter 40 mm
3	Rated Input Power	0.25 W
4	Impedance	8 ohm ± 15% at 1500Hz
5	Resonance Frequency (Fo)	440 Hz ± 20% at Fo, 1V
6	Sensitivity (S.P.L.)	85dB(W/m) ± 3 dB at AVE 0.6K,0.8K,1.0K,1.2K(Hz).
		96dB(0.25W/0.1m) ± 3 dB
7	Frequency Range	Fo – 20KHz
8	Distortion	Less than 10 % at 1500Hz 0.25W
9	Max. Input Power	Must be normal at 0.4W white noise for 1 minute.
10	Voice Coil	Diameter 10.8 mm
11	Magnet	Rare earth permanent (Nd-Fe-B) magnet Φ10 x 1.5mm
12	Weight	11g ± 2g
13	Appearance	Should not exist any obstacle to be harmful to normal operation; damages, cracks, rusts and distortions, etc.
14	Operation Test	Must be normal at program source –0.25W
15	Buzz, Rattle, etc.	Should not be audible at 1.41V sine Wave between Fo to 20KHz
16	Polarity	When positive voltage is applied to the terminal marked (+), diaphragm should move to the front.
17	Terminal Strength	Capable of withstand 1kg load for 30 seconds without resulting in any damage or rejection.
18	Load Test	0.2 W white noise is applied for 96 hours and satisfy the test listed on item 05,06,13,15
19	High Temp. Test	Keep 96 hours at +70℃±3℃ and leave 3 hours in normal temperature and then check
20	Low Temp. Test	Keep 96 hours at -20℃±3℃ and leave 3 hours in normal temperature and then check
21	Humidity Test	Keep 96 hours at + 60℃±3℃ relative humidity 95% and leave 3 hours in normal temperature and then checked.

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6. IR LED

EVERLIGHT

Package Dimensions

① Anode
② Cathode

Notes: 1.All dimensions are in millimeters
2.Tolerances unless dimensions ±0.25mm

Absolute Maximum Ratings (Ta=25℃)

Parameter	Symbol	Rating	Units
Continuous Forward Current	I_F	100	mA
Peak Forward Current	I_{FP}	1.0	A
Reverse Voltage	V_R	5	V
Operating Temperature	T_{opr}	-40 ~ +85	℃
Storage Temperature	T_{stg}	-40 ~ +85	℃
Soldering Temperature	T_{sol}	260	℃
Power Dissipation at(or below) 25℃ Free Air Temperature	P_d	150	mW

Notes: *1:I_{FP} Conditions--Pulse Width≦100 μ s and Duty≦1%.
*2:Soldering time≦5 seconds.

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IR333-A

Electro-Optical Characteristics (Ta=25℃)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Radiant Intensity	Ee	I_F=20mA	7.8	20	--	mW/sr
		I_F=100mA Pulse Width≦100μs ,Duty≦1%	--	85	--	
		I_F=1A Pulse Width≦100μs ,Duty≦1%.	--	750	--	
Peak Wavelength	λp	I_F=20mA	--	940	--	nm
Spectral Bandwidth	Δλ	I_F=20mA	--	45	--	nm
Forward Voltage	V_F	I_F=20mA		1.2	1.5	V
		I_F=100mA Pulse Width≦100μs ,Duty≦1%	--	1.4	1.8	
		I_F=1A Pulse Width≦100μs ,Duty≦1%.	--	2.6	4.0	
Reverse Current	I_R	V_R=5V	--	--	10	μA
View Angle	2θ1/2	I_F=20mA	--	20	--	deg

Rank

Condition：I_F=20mA

Unit：mW/sr

Bin Number	M	N	P	Q
Min	7.80	11.0	15.0	21.0
Max	12.5	17.6	24.0	34.0

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ANEXOS

IR333-A

Typical Electro-Optical Characteristics Curves

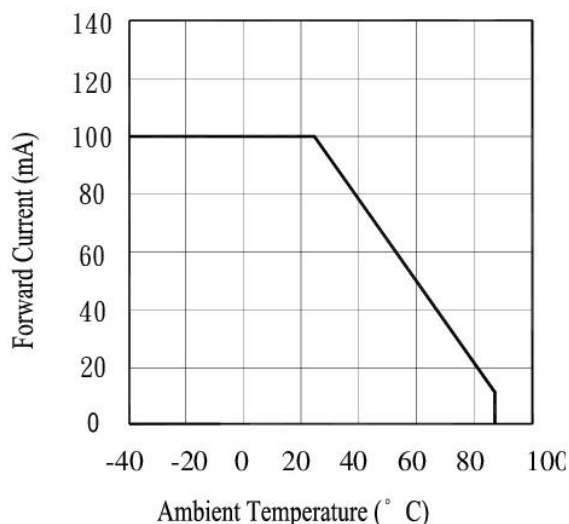Fig.1 Forward Current vs.
   Ambient Temperature

Fig.2 Spectral Distribution

Fig.3   Peak Emission Wavelength
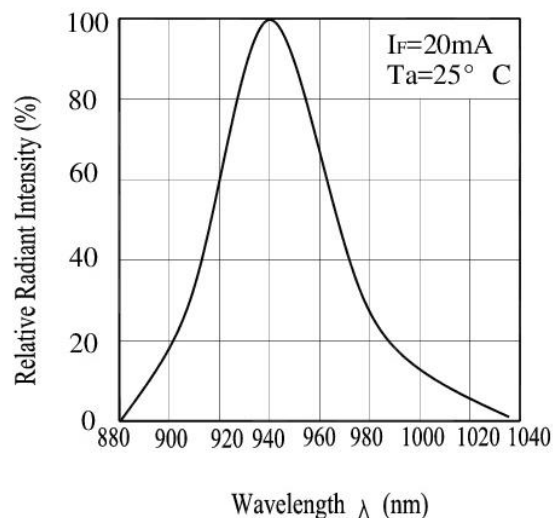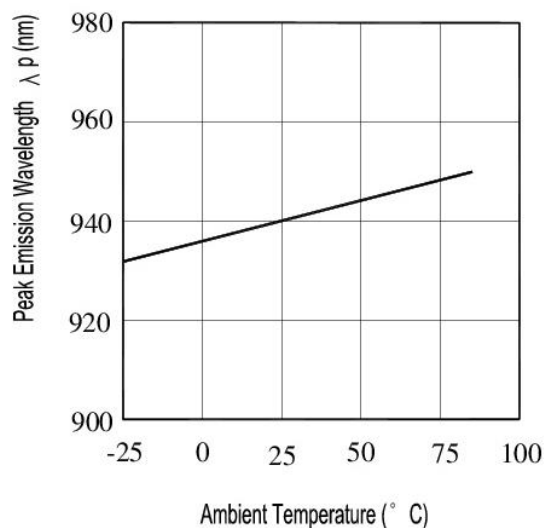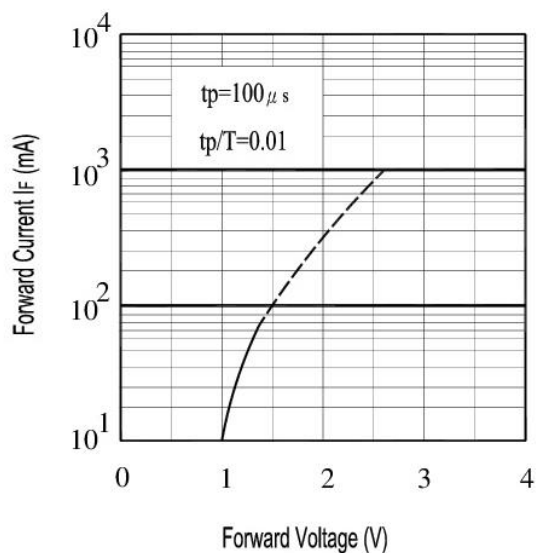   Ambient Temperature

Fig.4   Forward Current
   vs. Forward Voltage

Everlight Electronics Co., Ltd.   http:\\www.everlight.com   Rev 3   Page: 4 of 7
Device No：DIR-033-004   Prepared date：07-20-2005   Prepared by：Jaine Tsai

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EVERLIGHT

IR333-A

Typical Electro-Optical Characteristics Curves
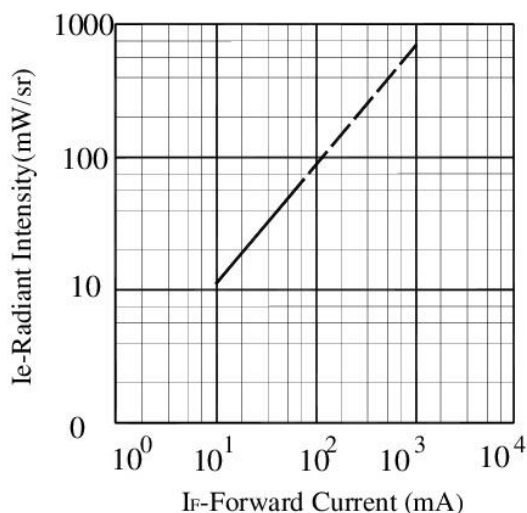
Fig.5 Relative Intensity vs.
Forward Current

Fig.6 Relative Radiant Intensity vs.
Angular Displacement

Fig.7 Relative Intensity vs.
Ambient Temperature(°C)
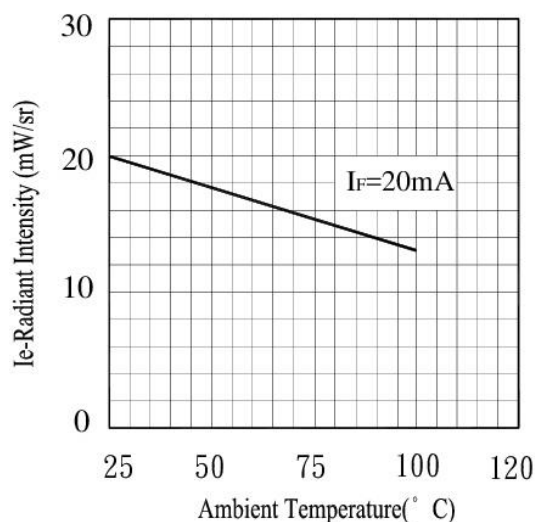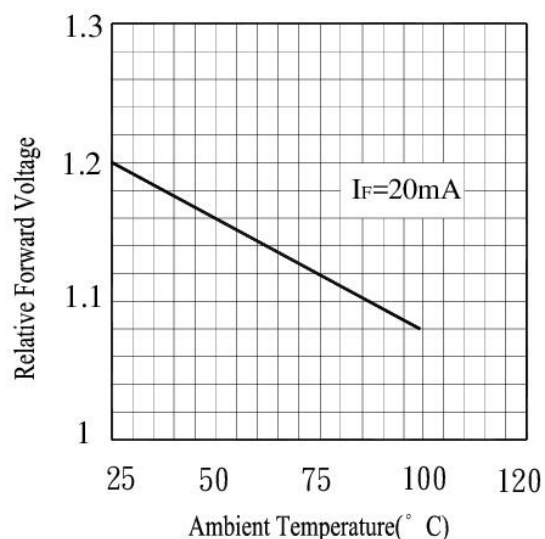
Fig.8 Forward Voltage vs.
Ambient Temperature(°C)

Everlight Electronics Co., Ltd.   http:\\www.everlight.com   Rev 3   Page: 5 of 7
Device No：DIR-033-004   Prepared date：07-20-2005   Prepared by：Jaine Tsai

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IR333-A

Reliability Test Item And Condition

The reliability of products shall be satisfied with items listed below.

Confidence level：90%

LTPD：10%

NO.	Item	Test Conditions	Test Hours/ Cycles	Sample Sizes	Failure Judgement Criteria	Ac/Re
1	Solder Heat	TEMP.：260℃±5℃	10secs	22pcs	$I_R \geqq U \times 2$ $Ee \leqq L \times 0.8$ $V_F \geqq U \times 1.2$ U：Upper Specification Limit L：Lower Specification Limit	0/1
2	Temperature Cycle	H：+100℃ 15mins ↕ 5mins L：-40℃ 15mins	300Cycles	22pcs		0/1
3	Thermal Shock	H：+100℃ 5mins ↕ 10secs L：-10℃ 5mins	300Cycles	22pcs		0/1
4	High Temperature Storage	TEMP.：+100℃	1000hrs	22pcs		0/1
5	Low Temperature Storage	TEMP.：-40℃	1000hrs	22pcs		0/1
6	DC Operating Life	I_F=20mA	1000hrs	22pcs		0/1
7	High Temperature/ High Humidity	85℃ / 85% R.H	1000hrs	22pcs		0/1

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IR333-A

Packing Quantity Specification

1.500PCS/1Bag，5Bags/1Box

2.10Boxes/1Carton

Label Form Specification

CPN: Customer's Production Number

P/N : Production Number

QTY: Packing Quantity

CAT: Ranks

HUE: Peak Wavelength

REF: Reference

LOT No: Lot Number

MADE IN TAIWAN: Production Place

Notes

1. Above specification may be changed without notice. EVERLIGHT will reserve authority on material change for above specification.

2. When using this product, please observe the absolute maximum ratings and the instructions for using outlined in these specification sheets. EVERLIGHT assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets.

3. These specification sheets include materials protected under copyright of EVERLIGHT corporation. Please don't reproduce or cause anyone to reproduce them without EVERLIGHT's

consent.

EVERLIGHT ELECTRONICS CO., LTD.
Office: No 25, Lane 76, Sec 3, Chung Yang Rd,
Tucheng, Taipei 236, Taiwan, R.O.C

Tel: 886-2-2267-2000, 2267-9936
Fax: 886-2267-6244, 2267-6189, 2267-6306
http:\\www.everlight.com

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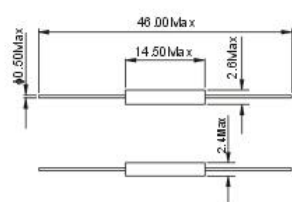ANEXOS

7. Reed Switch

SOWAY

www.sowaytech.cn
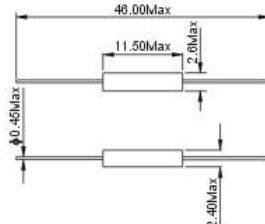
PCB 磁簧开关 PCB Mount Swithes

- 可直接安装于线路板上。
- 常开，常闭可选择。
- 无待机功率消耗。
- 客户可自定义灵敏度。
- 密封设计，可工作于恶劣环境，性能稳定，寿命超长。
- 底部凸脚设计，方便线路板的清洗。

- Be mounted directly into PCB
- Choice of normal open or normal close
- No standby power requirement
- Customer defined sensitivity
- Hermetically sealed, suit to tough environment and long life
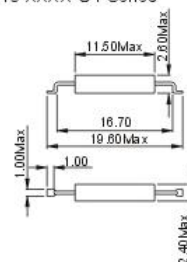- Moulded stand-offs to allow board washing

RA-01C Series
RS-02 Series
RS10-XXXX-G4 Series
RS-01C Series
RS-48 Series
RM-01C Series
RM-02 Series
RM-48 Series

Unit:mm(in)

Electrical Characteristics 电气特性	RS、RM&RA-01C	RM&RS-02 and RS10-XXXX-G4	RS&RM-48
Switched Power (max) 最大开关功率	10W	10W	70W
Switched Voltage (max) 最大开关电压	DC180V AC130V	DC200V AC140V	DC200V AC250V
Breakdown Voltage (min) 最小击穿电压	200V	200V	400V
Switched Current (max) 最大开关电流	0.25A	0.5A	1.0A
Carry Current (max) 最大负载电流	1.0A	0.5A	1.75A
Contact Resistance (initial max) 最大接触阻抗	0.2Ω	0.2Ω	0.2Ω
Insulation Resistance (min) 最小绝缘阻抗	10^8	10^8	10^8
Operating Temperature 工作温度范围	-40 to +125℃	-40 to +125℃	-40 to +125℃

*Consult SOWAY for Customized Product 以上电气参数可按客户要求定制

SOWAY TECH LIMITED   Tel: 86-755-88367005   Fax: 86-755-88366005   Email: soway@sowaytech.cn

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8. Batería

PRODUCT DATASHEET

Energizer

1-800-383-7323 USA/CAN
www.energizer.com

ENERGIZER 522

9V

Specifications

Classification:	Alkaline
Chemical System:	Zinc-Manganese Dioxide (Zn/MnO$_2$)
	No added mercury or cadmium
Designation:	ANSI-1604A, IEC-6LR61
Nominal Voltage:	9.0 volts
Operating Temp:	-18°C to 55°C (0°F to 130°F)
Typical Weight:	45.6 grams (1.6 oz.)
Typical Volume:	21.1 cubic centimeters (1.3 cubic inch)
Jacket:	Metal
Shelf Life:	5 years at 21°C
Terminal:	Miniature Snap

Industry Standard Dimensions

mm (inches)

17.50 (0.689)
15.50 (0.610)

12.95 (0.510)
12.45 (0.490)

26.50 (1.043)
24.50 (0.965)

(−) (+)

46.40 (1.827)
Maximum

48.50 (1.909)
46.50 (1.831)

Milliamp-Hours Capacity
Continuous discharge to 4.8 volts at 21°C

Capacity (mAh) vs Discharge (mA): 25, 100, 300, 500

Device Selection Guide:

Battery Selection Indicator

- Toy
- Baby Monitor
- Garage Opener
- Clock Radio
- Smoke Detector

High Drain Devices

Moderate Drain Devices

Low Drain Devices

Important Notice
This datasheet contains typical information specific to products manufactured at the time of its publication.
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PRODUCT DATASHEET

Energizer
1-800-383-7323 USA/CAN
www.energizer.com

ENERGIZER 522

9V

Constant Resistance Performance
Typical Characteristics (21°C)

Constant Current Performance
Typical Characteristics (21°C)

Industry Standard Tests (21°C)

RADIO
620 ohm 2 hrs/day

TOY
270 ohm 1 hr/day

ACCELERATED SMOKE DETECTOR
10K/620 ohm 1 sec/hr pulse

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9. Conector macho 3 pines 90º

PLEASE CHECK WWW.MOLEX.COM FOR LATEST PART INFORMATION

This document was generated on 01/19/2015

Part Number:	22-05-7038
Status:	Active
Overview:	KK® Interconnect System - Molex
Description:	KK® 254 Wire-to-Board Header, Right Angle, with Friction Lock, 3 Circuits

Documents:
3D Model
Drawing (PDF)
Product Specification PS-10-07 (PDF)
Product Specification PS-99020-0088 (PDF)
RoHS Certificate of Compliance (PDF)

Agency Certification
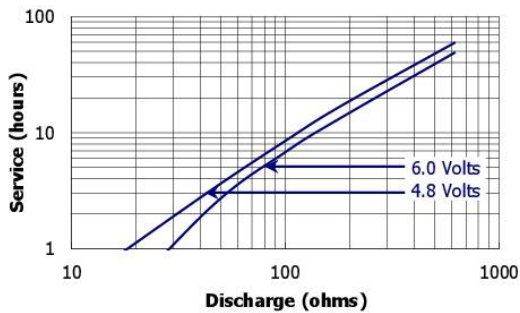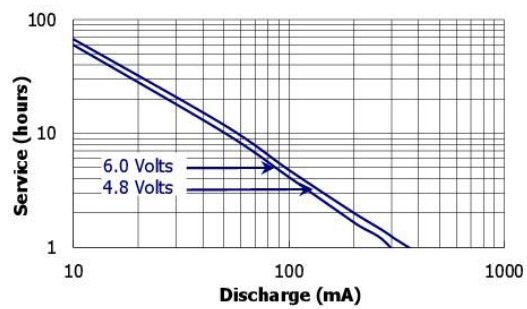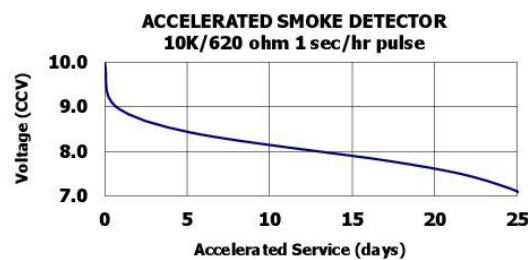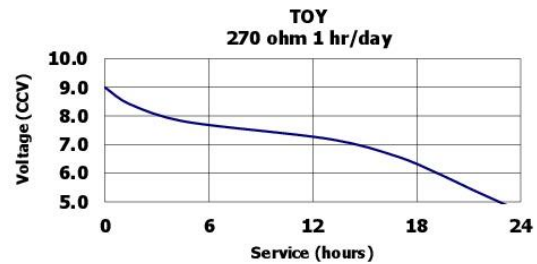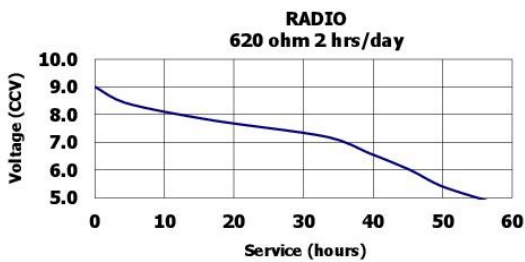| CSA | LR19980 |
| UL | E29179 |

General
Product Family	PCB Headers
Series	7395
Application	Signal, Wire-to-Board
Overview	KK® Interconnect System - Molex
Product Name	KK® 254
UPC	800753592773

Physical
Breakaway	No
Circuits (Loaded)	3
Circuits (maximum)	3
Color - Resin	Natural (White)
Durability (mating cycles max)	25
First Mate / Last Break	No
Flammability	94V-0
Glow-Wire Compliant	No
Guide to Mating Part	No
Keying to Mating Part	None
Lock to Mating Part	Yes
Material - Metal	Brass
Material - Plating Mating	Tin
Material - Plating Termination	Tin
Material - Resin	Nylon
Net Weight	462.000/mg
Number of Rows	1
Orientation	Right Angle
PC Tail Length	3.80mm
PCB Locator	No
PCB Retention	None
PCB Thickness - Recommended	1.60mm
Packaging Type	Bag
Pitch - Mating Interface	2.54mm
Pitch - Termination Interface	2.54mm
Plating min - Mating	5.080µm
Plating min - Termination	5.080µm
Polarized to Mating Part	Yes
Polarized to PCB	No
Shrouded	No
Stackable	No
Surface Mount Compatible (SMC)	No
Temperature Range - Operating	See Product Specification

| Termination Interface: Style | Through Hole |

Electrical
| Current - Maximum per Contact | 4A |
| Voltage - Maximum | 250V |

Solder Process Data
Duration at Max. Process Temperature (seconds)	5
Lead-free Process Capability	Wave Capable (TH only)
Max. Cycles at Max. Process Temperature	1
Process Temperature max. C	235

Material Info
| Old Part Number | A-7395-3B |

Reference - Drawing Numbers
| Product Specification | PS-10-07, PS-99020-0088 |
| Sales Drawing | SD-7395-001 |

EU RoHS
ELV and RoHS
Compliant
REACH SVHC
Not Reviewed
Low-Halogen Status
Low-Halogen

China RoHS

Need more information on product environmental compliance?

Email productcompliance@molex.com
For a multiple part number RoHS Certificate of Compliance, click here

Please visit the Contact Us section for any non-product compliance questions.

Search Parts in this Series
7395Series

Mates With
2695 KK® Crimp Terminal Housing, 6471 KK® Crimp Terminal Housing, 7720 KK® IDT Double Cantilever

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10. Conector macho 3 pines recto

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Part Number:	22-27-2031
Status:	Active
Overview:	KK® Interconnect System - Molex
Description:	KK® 254 Wire-to-Board Header, Vertical, with Friction Lock, 3 Circuits, Tin (Sn) Plating

Documents:
3D Model	Product Specification PS-99020-0088 (PDF)
Drawing (PDF)	RoHS Certificate of Compliance (PDF)

Agency Certification
CSA	LR19980
UL	E29179

General
Product Family	PCB Headers
Series	6410
Application	Signal, Wire-to-Board
Overview	KK® Interconnect System - Molex
Product Name	KK® 254
UPC	800753589636

Physical
Breakaway	No
Circuits (Loaded)	3
Circuits (maximum)	3
Color - Resin	Natural (White)
First Mate / Last Break	No
Flammability	94V-0
Glow-Wire Compliant	No
Guide to Mating Part	No
Keying to Mating Part	None
Lock to Mating Part	Yes
Material - Metal	Brass
Material - Plating Mating	Tin
Material - Plating Termination	Tin
Material - Resin	Nylon
Net Weight	0.408/g
Number of Rows	1
Orientation	Vertical
PC Tail Length	3.56mm
PCB Locator	No
PCB Retention	None
PCB Thickness - Recommended	1.60mm
Packaging Type	Bag
Pitch - Mating Interface	2.54mm
Pitch - Termination Interface	2.54mm
Plating min - Mating	5.080µm
Plating min - Termination	5.080µm
Polarized to Mating Part	Yes
Polarized to PCB	No
Shrouded	Partial
Stackable	No
Surface Mount Compatible (SMC)	No
Temperature Range - Operating	See Product Specification
Termination Interface: Style	Through Hole

Electrical
Current - Maximum per Contact	4A
Voltage - Maximum	250V

Solder Process Data
Duration at Max. Process Temperature (seconds)	5
Lead-free Process Capability	Wave Capable (TH only)
Max. Cycles at Max. Process Temperature	1
Process Temperature max. C	235

Material Info
Old Part Number	AE-6410-03A(222)

Reference - Drawing Numbers
Product Specification	PS-99020-0088
Sales Drawing	SDAE-6410-N

EU RoHS
ELV and RoHS Compliant
REACH SVHC
Contains SVHC: No
Low-Halogen Status
Low-Halogen

China RoHS

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Email productcompliance@molex.com
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Search Parts in this Series
6410 Series

Mates With
KK® Crimp Terminal Housing 2695 , 6471

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11. Conector macho 2 pines 90º

Part Number:	22-05-7028
Status:	**Active**
Overview:	KK® Interconnect System - Molex
Description:	KK® 254 Wire-to-Board Header, Right Angle, with Friction Lock, 2 Circuits

Documents:
3D Model	Product Specification PS-99020-0088 (PDF)
Drawing (PDF)	RoHS Certificate of Compliance (PDF)
Product Specification PS-10-07 (PDF)	

Agency Certification
CSA	LR19980
UL	E29179

General
Product Family	PCB Headers
Series	7395
Application	Signal, Wire-to-Board
Overview	KK® Interconnect System - Molex
Product Name	KK® 254
UPC	800753739451

Physical
Breakaway	No
Circuits (Loaded)	2
Circuits (maximum)	2
Color - Resin	Natural (White)
Durability (mating cycles max)	25
First Mate / Last Break	No
Flammability	94V-0
Glow-Wire Compliant	No
Guide to Mating Part	No
Keying to Mating Part	None
Lock to Mating Part	Yes
Material - Metal	Brass
Material - Plating Mating	Tin
Material - Plating Termination	Tin
Material - Resin	Nylon
Net Weight	0.254/g
Number of Rows	1
Orientation	Right Angle
PC Tail Length	3.80mm
PCB Locator	No
PCB Retention	None
PCB Thickness - Recommended	1.60mm
Packaging Type	Bag
Pitch - Mating Interface	2.54mm
Pitch - Termination Interface	2.54mm
Plating min - Mating	5.080µm
Plating min - Termination	5.080µm
Polarized to Mating Part	Yes
Polarized to PCB	No
Shrouded	No
Stackable	No
Surface Mount Compatible (SMC)	No
Temperature Range - Operating	See Product Specification
Termination Interface: Style	Through Hole

Electrical
Current - Maximum per Contact	4A
Voltage - Maximum	250V

Solder Process Data
Duration at Max. Process Temperature (seconds)	5
Lead-free Process Capability	Wave Capable (TH only)
Max. Cycles at Max. Process Temperature	1
Process Temperature max. C	235

Material Info
Old Part Number	A-7395-2B

Reference - Drawing Numbers
Product Specification	PS-10-07, PS-99020-0088
Sales Drawing	SD-7395-001

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12. Conector hembra 3 pines

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Part Number:	**22-01-2035**
Status:	**Active**
Overview:	KK® Interconnect System - Molex
Description:	KK® 254 Crimp Housing, Friction Ramp, 3 Circuits

Documents:
3D Model
Drawing (PDF)
Product Specification PS-10-07 (PDF)
Product Specification PS-99020-0088 (PDF)
RoHS Certificate of Compliance (PDF)

image - Reference only
Series

Agency Certification
CSA	LR19880
UL	E29179

General
Product Family	Crimp Housings
Series	6471
Application	Signal, Wire-to-Board
Overview	KK® Interconnect System - Molex
Product Name	KK® 254
UPC	800753594098

Physical
Circuits (maximum)	3
Color - Resin	Natural (White)
Flammability	94V-0
Gender	Female
Glow-Wire Compliant	No
Lock to Mating Part	Yes
Material - Resin	Nylon
Net Weight	0.320/g
Number of Rows	1
Packaging Type	Bag
Panel Mount	No
Pitch - Mating Interface	2.54mm
Pitch - Termination Interface	2.54mm
Polarized to Mating Part	Yes
Stackable	No
Temperature Range - Operating	See Product Specification

Solder Process Data
Lead-free Process Capability	Wave Capable (TH only)

Material Info
Old Part Number	6471-03(I)

Reference - Drawing Numbers
Product Specification	PS-10-07, PS-99020-0088
Sales Drawing	SD-6471-N*-**

EU RoHS — China RoHS
ELV and RoHS Compliant
REACH SVHC
Contains SVHC: No
Low-Halogen Status
Low-Halogen

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Email productcompliance@molex.com
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Search Parts in this Series
6471Series

Mates With
KK®254 PCB Headers 42375 , 42377 , 42376 , 4030 , 6373 , 6410

Use With
2759 , 4809 KK® Crimp terminal

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Escuela de
Ingeniería y Arquitectura
Universidad Zaragoza

13. Conector hembra 2 pines

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Part Number: 22-01-2025
Status: Active
Overview: KK® Interconnect System - Molex
Description: KK® 254 Crimp Housing, Friction Ramp, 2 Circuits

Documents:
3D Model
Drawing (PDF)
Product Specification PS-10-07 (PDF)
Product Specification PS-99020-0088 (PDF)
RoHS Certificate of Compliance (PDF)

Series
image - Reference only

Agency Certification
CSA   LR19880
UL   E29179

General
Product Family   Crimp Housings
Series   6471
Application   Signal, Wire-to-Board
Overview   KK® Interconnect System - Molex
Product Name   KK® 254
UPC   800753594074

Physical
Circuits (maximum)   2
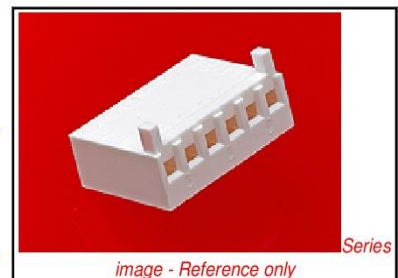Color - Resin   Natural (White)
Flammability   94V-0
Gender   Female
Glow-Wire Compliant   No
Lock to Mating Part   Yes
Material - Resin   Nylon
Net Weight   0.230/g
Number of Rows   1
Packaging Type   Bag
Panel Mount   No
Pitch - Mating Interface   2.54mm
Pitch - Termination Interface 2.54mm
Polarized to Mating Part   Yes
Stackable   No
Temperature Range - Operating See Product Specification

Material Info
Old Part Number   6471-02(I)

Reference - Drawing Numbers
Product Specification   PS-10-07, PS-99020-0088
Sales Drawing   SD-6471-N*-**

EU RoHS   **China RoHS**
ELV and RoHS
Compliant
REACH SVHC
Contains SVHC: No
Low-Halogen Status
Low-Halogen

Need more information on product environmental compliance?

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Please visit the Contact Us section for any non-product compliance questions.

Search Parts in this Series
6471Series

Mates With
KK®254 PCB Headers 42375 , 42377 , 42376 , 4030 , 6373 , 6410

Use With
2759 , 4809 KK® Crimp terminal

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14. tira de pines

CONECTOR 1X36 CONTACTOS HEMBRA

Especificaciones

- Tiras de contactos hembra.
- Pin torneado.
- 36 contactos paso 2.54 mm.

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15. LED visible amarillo

Kingbright

T-1 3/4 (5mm) SOLID STATE LAMP

Part Number: L-7113YD-LC27SF1.5   YELLOW

Features

- LOW POWER CONSUMPTION.
- POPULAR T-1 3/4 DIAMETER PACKAGE.
- GENERAL PURPOSE LEADS.
- RELIABLE AND RUGGED.
- LONG LIFE - SOLID STATE RELIABILITY.
- AVAILABLE ON TAPE AND REEL.
- RoHS COMPLIANT.

Description

The Yellow source color devices are made with Gallium Arsenide Phosphide on Gallium Phosphide Yellow Light Emitting Diode.

Package Dimensions

Notes:
1. All dimensions are in millimeters (inches).
2. Tolerance is ±0.25(0.01") unless otherwise noted.
3. Lead spacing is measured where the lead emerge from the package.
4. Specifications are subject to change without notice.

SPEC NO: DSAG7289	REV NO: V.1	DATE: AUG/09/2006	PAGE: 1 OF 3
APPROVED: J. Lu	CHECKED: Allen Liu	DRAWN: Y.L.LI	

Plataforma electrónica para incluir juguetes
convencionales en juegos de realidad mixta
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Kingbright

Selection Guide

Part No.	Dice	Lens Type	Iv (mcd) [2] @ 10mA		Viewing Angle [1]
			Min.	Typ.	2θ1/2
L-7113YD-LC27SF1.5	YELLOW (GaAsP/GaP)	YELLOW DIFFUSED	5	20	30°

Notes:
1. θ1/2 is the angle from optical centerline where the luminous intensity is 1/2 the optical centerline value.
2. Luminous Intensity / Luminous Flux: +/-15%.

Electrical / Optical Characteristics at T_A=25°C

Symbol	Parameter	Device	Typ.	Max.	Units	Test Conditions
λpeak	Peak Wavelength	Yellow	590		nm	I_F=20mA
λD [1]	Dominant Wavelength	Yellow	588		nm	I_F=20mA
Δλ1/2	Spectral Line Half-width	Yellow	35		nm	I_F=20mA
C	Capacitance	Yellow	20		pF	V_F=0V;f=1MHz
V_F [2]	Forward Voltage	Yellow	2.1	2.5	V	I_F=20mA
I_R	Reverse Current	Yellow		10	uA	V_R = 5V

Notes:
1. Wavelength: +/-1nm.
2. Forward Voltage: +/-0.1V.

Absolute Maximum Ratings at T_A=25°C

Parameter	Yellow	Units
Power dissipation	75	mW
DC Forward Current	30	mA
Peak Forward Current [1]	140	mA
Reverse Voltage	5	V
Operating / Storage Temperature	-40°C To +85°C	
Lead Solder Temperature [2]	260°C For 3 Seconds	
Lead Solder Temperature [3]	260°C For 5 Seconds	

Notes:
1. 1/10 Duty Cycle, 0.1ms Pulse Width.
2. 2mm below package base.
3. 5mm below package base.

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RELATIVE INTENSITY Vs. WAVELENGTH

Yellow   L-7113YD-LC27SF1.5

FORWARD CURRENT Vs. FORWARD VOLTAGE

LUMINOUS INTENSITY Vs. FORWARD CURRENT

FORWARD CURRENT DERATING CURVE

LUMINOUS INTENSITY Vs. AMBIENT TEMPERATURE

SPATIAL DISTRIBUTION

SPEC NO: DSAG7289	REV NO: V.1	DATE: AUG/09/2006	PAGE: 3 OF 3
APPROVED: J. Lu	CHECKED: Allen Liu	DRAWN: Y.L.LI	

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16. Pulsador capacitivo

Digital Touch Sensor Module Sensor Switch for Arduino AVR Touch Sensor

Product Details

Key Specifications/Special Features:

- Simple touch, used TTP223 touch detector IC
- Customers can use to replace traditional physical push button, add some cool element to customer's project
- 1-touchkey, 1-linear touch sensor and detection interface
- TOPS technology focuses on design and application of 8-bit MCU's hardware and software
- Talent team including number of hardware and software engineers, who have rich developmental experience with 8-bit single-chip
- Can be provide low cost applications and technical support according to customer's requirements
- ODM orders are welcome
- Applications:
  - Power supply: mobile power supply/power bank, switching power supply and AC/DC power supply
  - Home appliances: automobile electric water heater and control panel for soybean milk machine
  - Touch: touch control panel for all kinds of small household electrical appliances
  - Medical equipment: thermometer, intelligent thermometer, LCD display sphygmomanometer and control panel for treadmill
  - Meter: thermometer, hygrometer, counter, timer, electronic watch, clock and calendar
  - Consumer gifts: music book, MCU control voice/audio electronic gifts

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17. Potenciómetro de ruleta

Electronic brick - Rotary angle sensor (Analog)

Description

Electronic Bricks?

Yes! We can build electronics projects just as easy as piling bricks. Arduino and community have made the programming much easier than ever before. How about some elixir on hardware part? Maybe it is not yet convenient to make complex interfaces, but we can at least start from the most commonly used modules.

By using electronic bricks, you may connect Arduino compatible boards easily with various digital, analog and I2C/Uart interfaces. These the breadboard-less firm connection are prepared to extensive modules like poteniometers, sensors, relays, servos...even buttons, just plug and play.

Each terminal module has buckled port with VCC, GND and Output, which has corresponding port on the sensing board, with a plain 2.54mm dual-female cable you may start playing already. Buckled brick cables are like cement for bricks, make the connections easier, secure and more professional looking.

Rotary angle sensing brick

This brick is based on a poteniometer, rotary angle from 0-300 degree.

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B. Planos

1. Diagrama de bloques

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2. Esquema general del circuito

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3. Pistas de los circuitos impresos (cara TOP)

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PROYECTO: PLATAFORMA ELECTRÓNICA PARA INCLUIR JUGUETES CONVENCIONALES EN JUEGOS DE REALIDAD MIXTA
TÍTULO: PISTAS DE LOS CIRCUITOS IMPRESOS (CARA TOP)
AUTOR: ADRIÁN VILLALBA
HOJA: 3
REVISIÓN: ADRIÁN VILLALBA
ESCALA: 1 : 1
FECHA: 5/8/2016

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4. Pistas de los circuitos impresos (cara BOTTOM)

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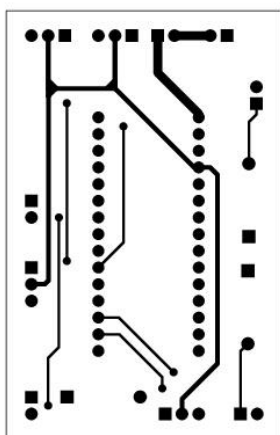PROYECTO: PLATAFORMA ELECTRÓNICA PARA INCLUIR JUGUETES CONVENCIONALES EN JUEGOS DE REALIDAD MIXTA

TÍTULO: PISTAS DE LOS CIRCUITOS IMPRESOS (CARA BOTTOM)

AUTOR: ADRIÁN VILLALBA

HOJA: 4

REVISIÓN: ADRIÁN VILLALBA

ESCALA: 1 : 1

FECHA: 5/8/2016

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5. Serigrafía de componentes

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6. Mascarilla (cara TOP)

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7. Mascarilla (cara BOTTOM)

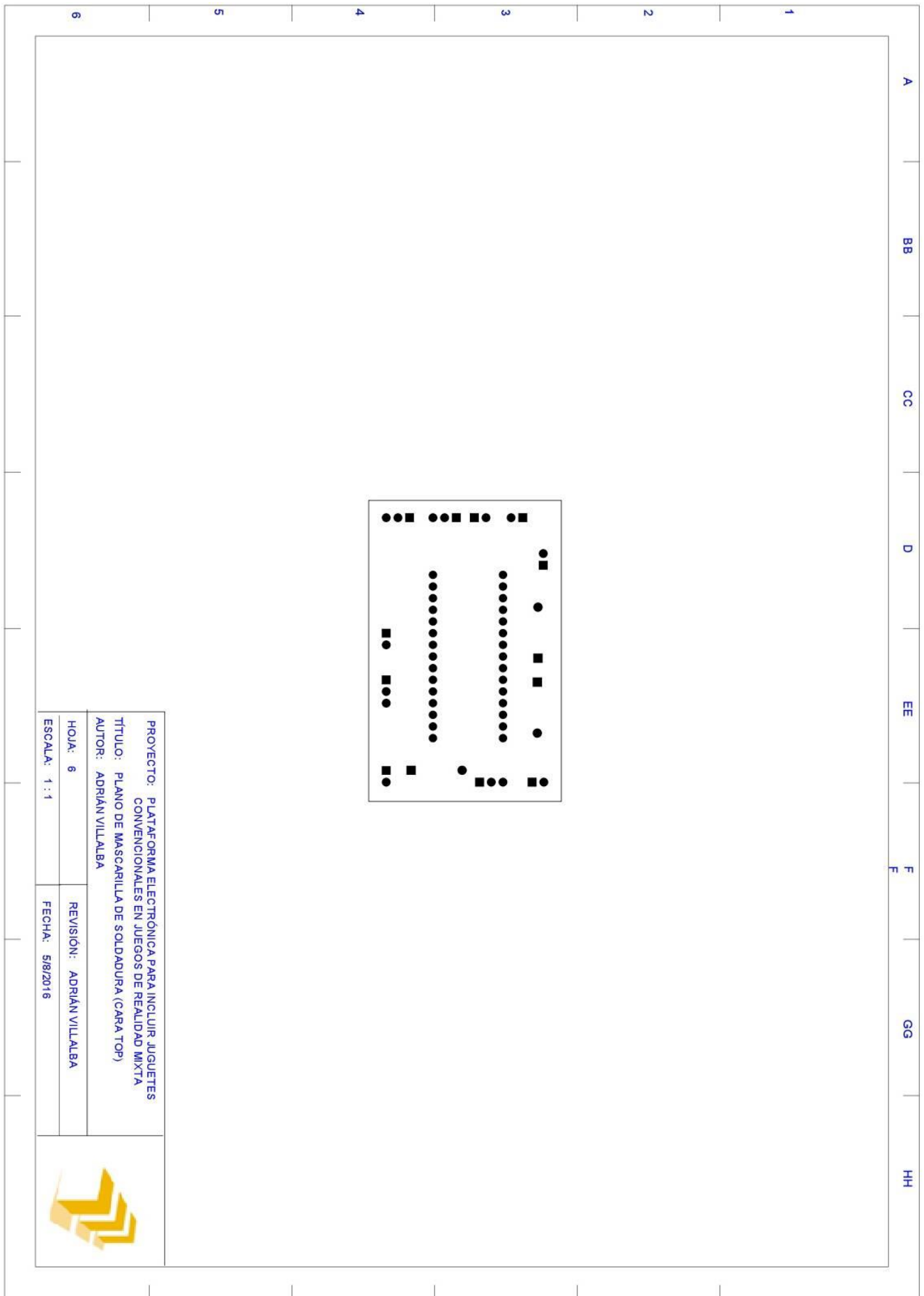Plataforma electrónica para incluir juguetes
convencionales en juegos de realidad mixta
ANEXOS

PROYECTO: **PLATAFORMA ELECTRÓNICA PARA INCLUIR JUGUETES CONVENCIONALES EN JUEGOS DE REALIDAD MIXTA**

TÍTULO: **PLANO DE MASCARILLA DE SOLDADURA (CARA BOTTOM)**

AUTOR: **ADRIÁN VILLALBA**

HOJA: **7**

REVISIÓN: **ADRIÁN VILLALBA**

ESCALA: **1 : 1**

FECHA: **5/8/2016**

Plataforma electrónica para incluir juguetes
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ANEXOS

C. Presupuesto

Descripcion	Identificador Particular	Fabricante	Proveedor	Referencia	Cantidad	Precio Unitario	Total (€)
Resistencia	220 Ω	TE Connectivity	RS	CFR100J220R	2	0,059	0,118
Resistencia	180 Ω	TE Connectivity	RS	CFR25J180R	1	0,184	0,184
Resistencia	10 KΩ	RS Pro	RS	707-7745	1	0,015	0,015
Potenciómetro	POT	seeed studio	Seeed Studio	ELB107C5M	1	3,2	3,2
Pulsador capacitivo	PULS	seeed studio	Seeed Studio	ELB107C5M	1	5,04	5,04
Reed Switch	RS	Soway	cooking-hacks	RS-01C	1	2,4	2,4
Altavoz	Speaker	Cover	cooking-hacks	-	1	1,2	1,2
LED infrarrojo	IR LED	Everlight	RS	IR333-A	2	0,13	0,26
LED visible	Amarillo	Kingbright	RS	L-53YD-12V	1	0,194	0,194
Micro servo	µservo	Tower Pro	Cooking-hacks	SG90	1	4,6	4,6
Receptor IR	IR Rec	DFRobot	Cooking-hacks	DFR0094	1	3,6	3,6
Placa de circuito impreso	PCB	eurocircuits	Eurocircuits	-	1	6,875	6,875
Interruptor	SW	C&K	Digikey	OS102011MS2QS1	1	0,375	0,375
Batería 9V	Batería	Energizer	Ferreteria Mercadal	522	1	4,8	4,8
Portapilas 9V	Portapilas	-	Diotronic	33090	1	0,27	0,27
Tira de contactos hembra	Tira	Winslow	Diotronic	W35532TRC	2	2,12	4,24
Conector Macho 3 pines Recto	CM3	Molex	Diotronic	22-27-2031	1	0,12	0,12
Conector Macho 3 pines 90º	CM3C	Molex	Diotronic	22-05-7038	3	0,15	0,45
Conector Macho 2 pines 90º	CM2C	Molex	Diotronic	22-05-7028	1	0,1	0,1
Conector hembra 3 pines	CH3	Molex	Diotronic	22-01-2035	4	0,07	0,28
Conector hembra 2 pines	CH2	Molex	Diotronic	22-01-2025	1	0,05	0,05
Terminal para conector hembra	Terminal	Molex	Diotronic	08-65-0814	14	0,04	0,56
Arduino Nano V3.1	Arduino Nano	Arduino	RS	A000005	1	18,36	18,36
					Coste total componentes prototipo		57,291

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D. Planificación

-Nota: Por razones ajenas, el presente proyecto estuvo interrumpido desde comienzos de septiembre de 2016 hasta finales de marzo de 2017.

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E. Código de programación del Arduino

```
#include <Servo.h>
#include <IRremote.h>


Servo motorcico;
int intensidad;
int signalIR;
int RECV_PIN = 11;
IRrecv irrecv(RECV_PIN);
decode_results results;
int tiempoSonido;
char puedeSonar;
int mascaraJuguete = 0b1110000000000000;
int juguete = 0b000; int jugueteOLD = 0b000;
int mascaraActuador = 0b0001100000000000;
int actuador = 0b00; int actuadorOLD = 0b00;
int mascaraValor = 0b0000011111111000;
int valor = 0b00000000; int valorOLD = 0b00000000;
int mascaraTono = 0b0000000000000111;
int tono = 0b000; int tonoOLD = 0b000;

void setup() {

  puedeSonar=1;
  pinMode(12, OUTPUT);
  irrecv.enableIRIn(); // Activa el receptor (puerto 11)
  pinMode(10, OUTPUT);
  motorcico.attach(9); // El micro servo
  pinMode(8, INPUT);   // Reed Switch 1
  pinMode(7, OUTPUT);  // LED IR 1
  pinMode(6, OUTPUT);  // LED (normal, verde)
  pinMode(4, OUTPUT);  // LED IR 2
  pinMode(3, INPUT);   // Reed Switch 2

  intensidad = 0;
  signalIR = 0;

}

void suena(int ton, int tiempo){ //Hay 5 tonos ordenados de agudo a
grave siendo 1 el más agudo. El tiempo de duración aún no se controla
bien.

  for(int cont1 = 0; cont1<tiempo; cont1++){
    digitalWrite(10, HIGH);
    delay(ton);
    digitalWrite(10, LOW);
    delay(ton);
  }
    puedeSonar = 0;
}
```

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```cpp
void leeTrama(){ //Lee la trama y la traduce.
  if (irrecv.decode(&results)){

    juguete = ((results.value & mascaraJuguete)>>13);
    actuador = ((results.value & mascaraActuador)>>11);
    valor = ((results.value & mascaraValor)>>3);
    tono = (results.value & mascaraTono);
    irrecv.resume(); // Receive the next value
    //si es comando repetido se ignora, si no, se ejecuta
    if ((juguete!=jugueteOLD) || (actuador!=actuadorOLD) ||
        (valor!=valorOLD) || (tono!=tonoOLD))
      actua();
  }
}


void actua(){  //Hace que ESTE ARDUINO actue o no dependiendo si la
trama se dirigía a él o no. Diremos que ESTE ES EL JUGUETE 1 y hay
juguetes del 0 al 7.

  if (juguete == 1){
    if (actuador == 0){ //Este es el micro-Servo
      motorcico.write(valor);
    }
    if (actuador == 1){ //Este es un Diodo-LED o un vibrador (en este
caso un LED). Si fuera un vibrador el código cambiaría.
      analogWrite(6,valor);
    }
    if (actuador == 2){ //Este es un Speaker (8ohm)
      suena(tono, valor);
    }
  }
  jugueteOLD=juguete;
  actuadorOLD=actuador;
  valorOLD=valor;
  tonoOLD=tono;
}

void loop() {

  if (digitalRead(8) == HIGH){
    digitalWrite(7, HIGH);
  }
  if (digitalRead(8) == LOW){
    digitalWrite(7, LOW);
  }

  if (digitalRead(3) == HIGH){
    digitalWrite(4, HIGH);
  }
  if (digitalRead(3) == LOW){
    digitalWrite(4, LOW);
  }

  leeTrama();
}
```