# DC Power Supply

GPD-2303S/3303S/4303S

**Service MANUAL**

GW INSTEK PART NO.

ISO-9001 CERTIFIED MANUFACTURER

GW INSTEK

The information in this manual was correct at the time of printing. However, Good Will continues to improve its products and therefore reserves the right to change the specifications, equipment, and maintenance procedures at any time without notice.



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# Table of Contents

# SAFETY INSTRUCTIONS

This chapter contains important safety instructions that you should follow when operating the instrument and when keeping it in storage. Read the following before operating this instrument to ensure your safety and to keep the instrument in best condition.

## Safety Symbols

These safety symbols may appear in this manual or on the instrument.

| | |
|---|---|
|  WARNING | Warning: Identifies conditions or practices that could result in injury or loss of life. |
|  CAUTION | Caution: Identifies conditions or practices that could result in damage to the instrument or to other objects. |
|  | DANGER High Voltage |
|  | Attention: Refer to the Manual |
|  | Protective Conductor Terminal |
|  | Earth (ground) Terminal |

## Safety Guidelines

General guidelines

 CAUTION

- Do not place any heavy object on the GPD-x303S series.
- Avoid severe impacts or rough handling that leads to damaging the GPD-x303S series.
- Do not discharge static electricity to the GPD-x303S series.
- Do not block or obstruct the cooling fan vent opening.
- Do not perform measurement at circuits directly. connected to Mains (see note below).
- Do not disassemble the GPD-x303S series unless you are qualified as service personnel.

(Continues to the next page)

(Note) EN 61010-1:2001 specifies the measurement categories and their requirements as follows. This instrument falls under category II.
Measurement category IV is for measurement performed at the source of low-voltage installation. Measurement category III is for measurement performed in the building installation. Measurement category II is for measurement performed on the circuits directly connected to the low voltage installation.

| | |
|---|---|
| Power supply<br>  WARNING | • AC Input voltage: 100V/120V/220V/230V ±10%, 50/60Hz<br>• Connect the protective grounding conductor of the AC power cord to an earth ground, to avoid electrical shock. |
| Fuse<br>  WARNING | • Fuse type: 100V/120V: T6.3A/250V, 220V/230V: T3.15A/250V<br>• Make sure the correct type of fuse is installed before power up.<br>• To ensure fire protection, replace the fuse only with the specified type and rating.<br>• Disconnect the power cord before fuse replacement.<br>• Make sure the cause of fuse blowout is fixed before fuse replacement. |
| Cleaning the instrument | • Disconnect the power cord before cleaning.<br>• Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid.<br>• Do not use chemicals or cleaners containing harsh products such as benzene, toluene, xylene, and acetone. |
| Operating environment | • Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (note below)<br>• Relative Humidity: < 80%<br>• Altitude: < 2000m<br>• Temperature: 0°C to 40°C<br>(Note) EN 61010-1:2001 specifies the pollution degrees and their requirements as follows. This instrument falls under degree 2.<br>Pollution is defined as "addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction in dielectric strength or surface resistivity".<br>Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence.<br>Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation can be expected.<br>Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to the expected condensation. In such conditions, while the equipment is normally protected against exposure to direct sunlight, precipitation, and strong draughts, neither temperature nor humidity is controlled. |

Storage environment

- Location: Indoor
- Relative Humidity: < 70%
- Temperature: −10°C to 70°C

## Power cord for the United Kingdom

When using the instrument in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead / appliance must only be wired by competent persons

⚠WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT: The wires in this lead are coloured in accordance with the following code:

| | |
|---|---|
| Green/ Yellow: | Earth |
| Blue: | Neutral |
| Brown: | Live (Phase) |


As the colours of the wires in mains leads may not correspond with the colour markings identified in your plug/appliance, proceed as follows:
The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with the letter E or by the earth symbol ⏚ or coloured Green or Green & Yellow.
The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black.
The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.
If in doubt, consult the instructions provided with the equipment or contact the supplier.
This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, cable of 0.75mm$^2$ should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.
Any moulded mains connector that requires removal /replacement must be destroyed by removal of any fuse & fuse carrier and disposed of immediately, as a plug with bared wires is hazardous if a engaged in live socket. Any re-wiring must be carried out in accordance with the information detailed on this label.

# How to Use This Manual

If you are not sure what type of service operation you should choose, read the *Service Operation List* section and find the chapter which suits your needs. The *Summary of Each Chapter* section gives you an overview of this service manual's contents.

To find a place in the manual which deals with a specific keyword, refer to the *Index* chapter at the end of this service manual.

## Service Operation List

See the following list, decide which operation you might need, and jump to the introduced chapter.

| I want to… | Go to… | Page |
|---|---|---|
| Verify the specifications | The *Verification* chapter. We recommend you to verify all listed items at once. | Page37 |
| Calibrate the power supply | The *Calibration* chapter. To ensure accuracy, calibrate all listed items at once. We also recommend you to verify the specifications afterward. | Page23 |
| Update the firmware | The *Firmware Update* chapter. | Page62 |
| Replace the fuse | The *Fuse Replacement* chapter. | Page69 |
| Examine the circuits | The *PCB & Circuit Diagrams* chapter. | Page77 |
| Order a part | The *Parts List* chapter. Look up the parts list and find the part name, part number, and quantity. For PCB mounted parts, look into the *PCB & Circuit Diagrams* chapter too. | Page90 |

# Summary of Chapters

This document consists of the following chapters.

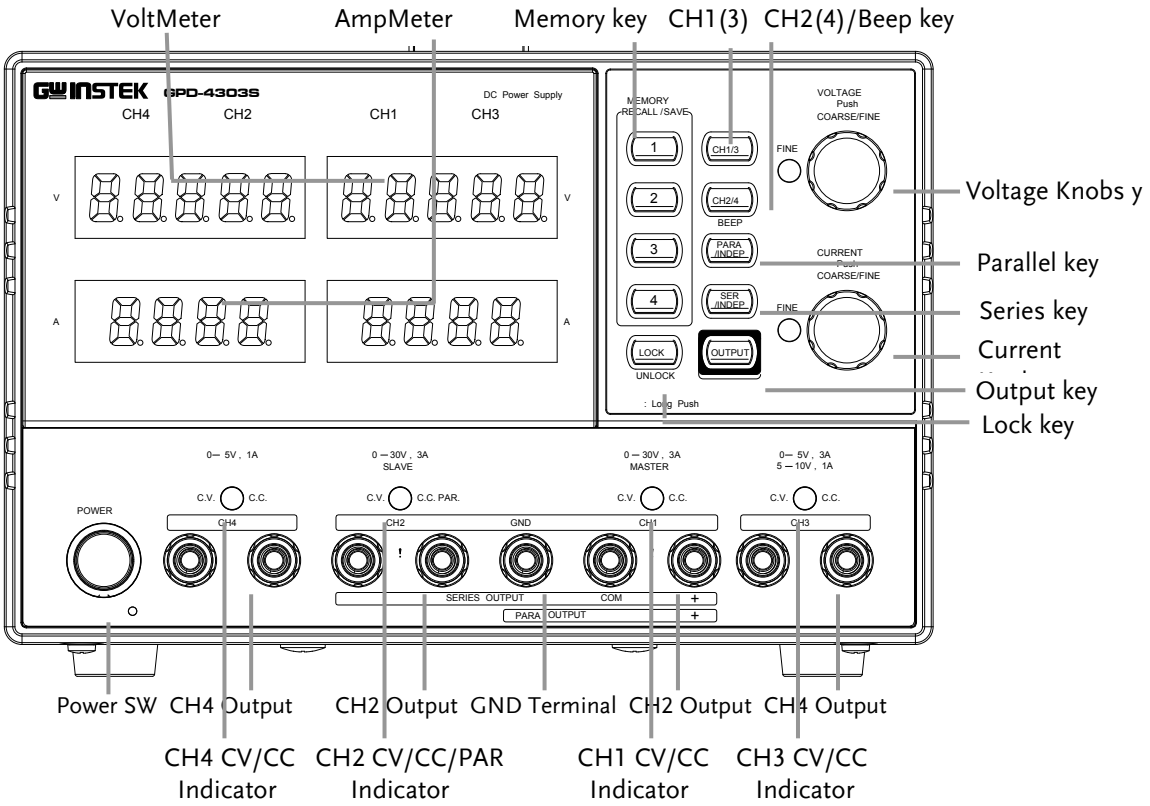
| | |
|---|---|
| Safety Instructions (page6) | Describes the important safety instructions that should be followed before, during, and after operating the power supply. |
| How to Use This Manual (page9) | Provides the summary of each chapter in this service manual and shows where to read for various service operations.<br>• List of service operations<br>• Summary of chapters |
| GPD-x303S series Overview (page12) | Helps service engineers become familiar with the power supply. Panel overview and specifications contain all performance data and functionalities. Operation theory shows how the power supply is internally structured.<br>• Front and Rear panel<br>• Operation theory<br>• CV/CC crossover characteristics<br>• Specifications |
| Preparation (page18) | Describes how to set up the power supply to prepare for various service operations. Also lists all the required tools.<br>• Package contents<br>• Setting up the power supply<br>• List of equipments for various service operations |
| Calibration (page23) | Describes how to calibrate the power supply using its automatic calibration function.<br>GPD-2303S/3303S/4303S:<br>• CH1 output voltage<br>• CH1 output current<br>• CH2 output voltage<br>• CH2 output current<br>GPD-4303S:<br>• CH3 output voltage<br>• CH3 output current<br>• CH4 output voltage<br>• CH4 output current |

| | |
|---|---|
| Verification (page37) | Describes how to verify the power supply's major functionalities, covering the following items:<br>• High voltage insulation<br>• Output current accuracy<br>• Voltage load regulation<br>• Current load regulation<br>• Output voltage accuracy<br>• CH3 overload<br>• Voltage line regulation<br>• Voltage ripple verification |
| Firmware upgrade (page62) | Describes how to upgrade the firmware. |
| Fuse replacement (page69) | Describes how to replace the fuses.<br>• Main fuse (stored in the power cord socket)<br>• Sub fuses (mounted on the power supply PCB) |
| Disassembly (page72) | Shows how to remove major modules from the power supply.<br>• Outer casing and supporting bar<br>• Front panel<br>• Power supply PCB |
| GPD-x303S PCB & Circuit diagrams (page77) | Shows the PCB layout diagrams and circuit diagrams.<br>• Control PCB<br>• Display PCB<br>• Power supply PCB<br>• AC selector PCB<br>• Power switch PCB<br>• USB interface PCB<br>• CH4 Power PCB(for 4303S) |
| Parts List (page90) | Shows the diagrams and replacement parts list for the mechanical components used in the power supply.<br>• Outer casing<br>• Front panel<br>• Internal structures<br>• GPD-x303S PCB parts |
| Appendix (page114) | • Declaration of conformity<br>• Index |

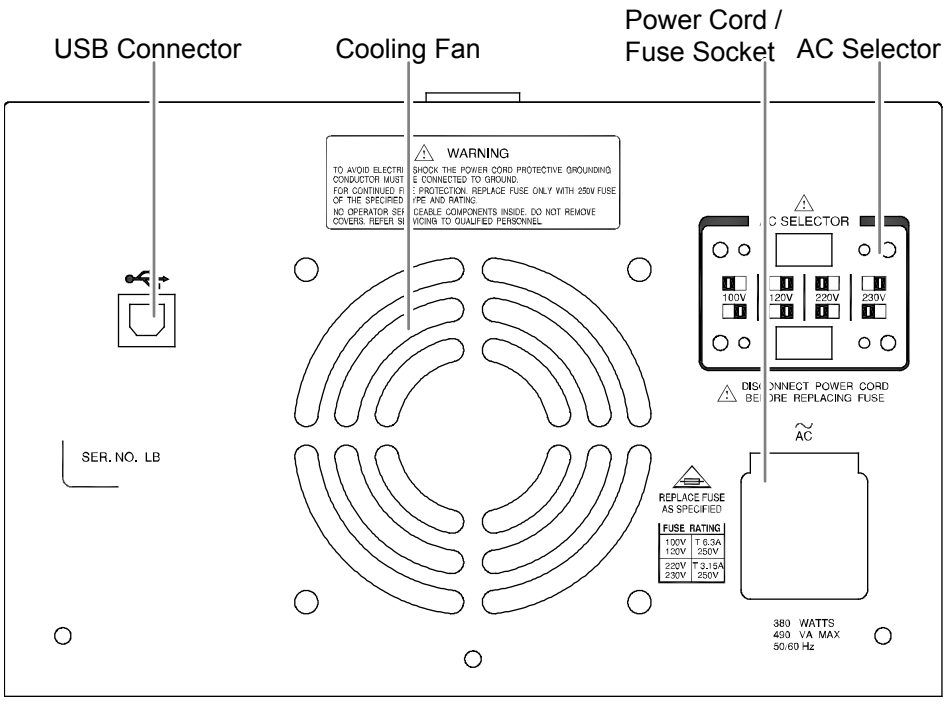
# GPD-x303S Series Overview

The Overview chapter helps you become familiar with the power supply. The front and rear panel diagrams introduce how the panel items are called. The operation theory describes the power supply's internal structure, and how the signals are processed. The specifications section lists technical details of the power supply series.

# Front Panel




# Rear Panel



# Operation Theory

## Overview

The power supply consists of the following modules.

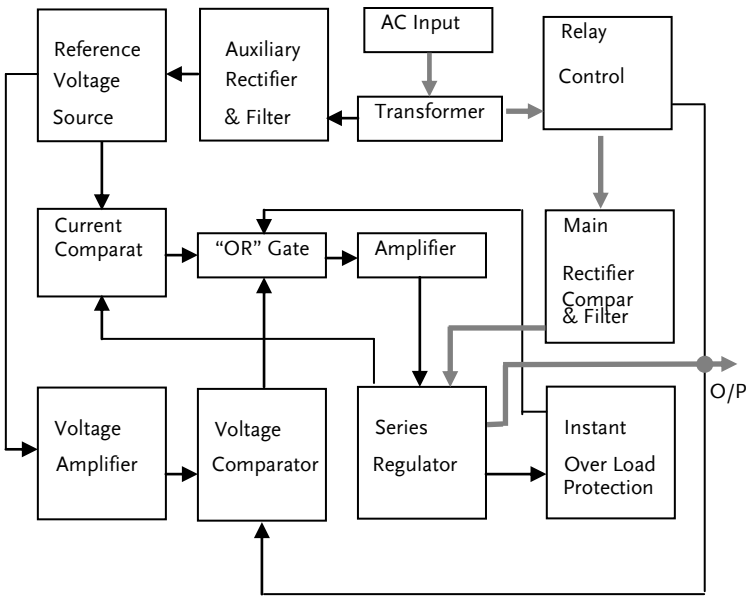
- AC input circuit
- Transformer
- Bias power supply including rectifier, filter, pre-regulator and reference voltage source
- Main regulator circuit including the main rectifier and filter, series regulator, current comparator, voltage comparator, reference voltage amplifier, remote device and relay control circuit

The below block diagram shows the circuit arrangement. The single phase input power is connected to the transformer through the input circuit. Details of each part are described after the block diagram.

For more details regarding the circuits, see page77

## Block diagram

(Example for CH2)




## Auxiliary Rectifier

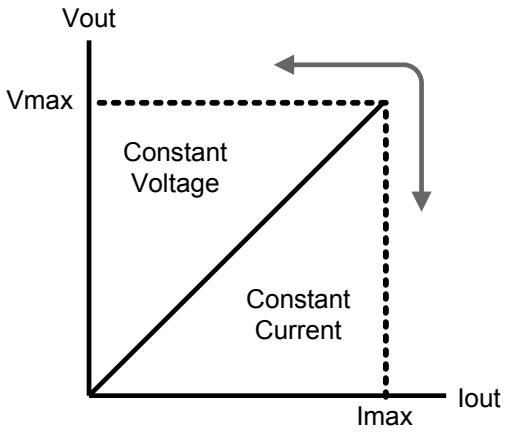
The auxiliary rectifiers provide bias voltage filtered by the capacitors C102 and C103, for the pre-regulators U101 and U102. They provide a regulated voltage for other modules.

## Main Rectifier

The main rectifier is a full wave bridge rectifier. It provides the power after the rectifier is filtered by the capacitor C101, and then regulated via a series-wound regulator, which is finally delivered to the output terminal.

| | |
|---|---|
| Current Limiter | U104 acts as a current limiter. When the current is over predetermined rating, U104 is activated and decreases the current. U208 provides a reference voltage. U206 is the inverter amplifier. U103 is a comparator amplifier which compares reference voltage and feedback voltage, and then delivers to Q101, Q102, which then calibrates the output voltage. |
| Overload | When the unit is overloaded, Q107 activates to control the current magnitude of Q101, to limit the output current. The relay control circuit controls the power dissipation in the series-wound regulated circuit. |

# CV/CC Crossover Characteristics

| | |
|---|---|
| Background | The GPD-x303S series automatically switches between constant voltage mode (CV) and constant current mode (CC), according to load condition. |
| CV mode | When the current level is smaller than the output setting, the GPD-x303S series operates in Constant Voltage mode. The indicator on the front panel turns green (C.V.) The Voltage level is kept at the setting and the Current level fluctuates according to the load condition until it reaches the output current setting. |
| CC mode | When the current level reaches the output setting, the GPD-x303S series starts operating in Constant Current mode. The indicator on the front panel turns red (C.C.) The Current level is kept at the setting but the Voltage level becomes lower than the setting, in order to suppress the output power level from overload. When the current level becomes lower than the setting, the GPD-x303S series goes back to the Constant Voltage mode. |
| Diagram |  |

# Specifications

The following specifications apply when the power supply is powered on for at least 30 minutes within +20°C to +30°C.

| | | |
|---|---|---|
| Output Ratings | CH1/CH2 Indep. | 0 to 30V / 0 to 3A |
| | CH1/CH2 Series | 0 to 60V / 0 to 3A |
| | CH1/CH2 Parallel | 0 to 30V / 0 to 6A |
| | CH3 | 2.5V/3.3V/5.0V， 0 ~ 3A(3303S)<br>0~5V,0~3A / 5.001~10V,0~1A(4303S) |
| | CH4 | 0~5V,0~1A |
| Voltage Regulation | Line | ≤ 0.01% + 3mV |
| | Load | ≤ 0.01% + 3mV (rating current ≤ 3A)<br>≤ 0.02% + 5mV (rating current > 3A) |
| | Ripple & Noise | ≤ 1mVrms (5Hz ~ 1MHz) |
| | Recovery Time | ≤ 100μs (50% load change, min load 0.5A) |
| | Temp Coefficient | ≤ 300ppm/°C |
| Current Regulation | Line | ≤ 0.2% + 3mA |
| | Load | ≤ 0.2% + 3mA |
| | Ripple & Noise | ≤ 3mArms |
| Tracking Operation | Tracking Error | ≤ 0.1% + 10mV of Master (0 to 30V)<br>(No Load, with load add load regulation ≤100mV) |
| | Parallel Regulation | Line: ≤ 0.01% + 3mV<br>Load: ≤ 0.01% + 3mV (rating current ≤ 3A)<br>Load: ≤ 0.02% + 5mV (rating current > 3A) |
| | Series Regulation | Line: ≤ 0.01% + 5mV, Load: ≤ 100mV |
| Meter | Resolution | Voltage: 1mV (0 to 30V)<br>Current: 1mA (0 to 3A) |
| | A Meter | 3.2A full scale, 4 digits 0.4" LED display |
| | V Meter | 32V full scale, 5 digits 0.4" LED display |
| | Program Accuracy | ± (0.03% of reading + 10mV)<br>± (0.3% of reading + 10mA) |
| | Readback Accuracy | ± (0.03% of reading + 10mV)<br>± (0.3% of reading + 10mA) |
| CH3 of 3303S | Output Voltage | 2.5V/3.3V/5.0V， ±5% |
| | Output Current | 3A |
| | Line Regulation | ≤ 3mV |
| | Load Regulation | ≤ 5mV |
| | Ripple & Noise | ≤ 1mVrms (5Hz ~ 1MHz) |
| Insulation | Chassis and Terminal | 20MΩ or above (DC 500V) |
| | Chassis and Ground | 30MΩ or above (DC 500V) |
| Operating Environment | Indoor use, Altitude: ≤ 2000m<br>Ambient temperature 0 ~ 40°C<br>Relative humidity ≤ 80% | |
| Storage Environment | Ambient temperature -10 ~ 70°C<br>Relative humidity ≤ 70% | |
| Power Source | AC 100V/120V/220V/230V±10%, 50/60Hz | |
| Accessories | User manual x1<br>Test lead GTL-104A x 2<br>GTL-105A x 1(3303S); x 2(4303S)<br>(Europe) Test lead GTL-204 x 2<br>GTL-203 x 1 (3303S), x2(4303S) | |
| Dimensions | 210 (W) x 130 (H) x 265 (D) mm, Approx. 7kg | |

# Options

| | | |
|---|---|---|
| USB cable | GTL-246 | USB 2.0, Type A-B |

# PREPARING FOR SERVICE OPERATIONS

The Preparation chapter describes the What (package contents, required equipments) and How (setting up the power supply) to prepare for various service operations.



## Package Contents

The list below shows the components included in the purchased power supply.

| | |
|---|---|
| Main unit | GPD-2303S, GPD-3303S, or GPD-4303S |
| Cables (non-European model) | • GTL-104A x 2 (screw clip – alligator clip, maximum 10A)<br>• GTL-105A x 1 (3303S), x2(4303S) (banana plug – alligator clip, maximum 3A)<br>• Power cord x 1 |
| Cables (European model) | • GTL-201 x 1 (ground lead)<br>• GTL-203 x 1 (3303S), x2(4303S) (test lead, maximum 3A)<br>• GTL-204 x 2 (test lead, maximum 10A)<br>• Power cord x 1 |
| Manual | User manual x 1 |
| PC interface | The following items are not included in the package but are additionally required when using the GPD-x303S's PC interface functionalities.<br>• USB cable x 1, Type A (host, PC) – Type B (slave, power supply) |

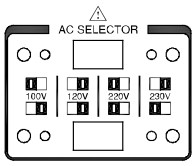
# Setting Up the Power Supply

Follow these instructions to properly set up the power supply. Refer to the user manual for more details regarding other operations.

## Powering up the power supply

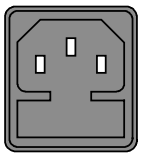
1. Selecting the AC voltage

Before powering up the power supply, select the AC input voltage from the rear panel.



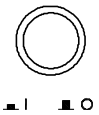

2. Connecting the AC power cord

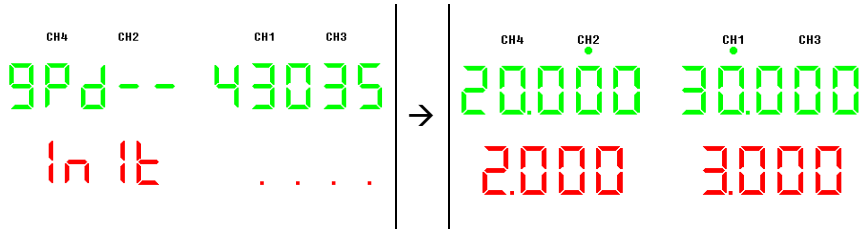
Connect the AC power cord to the rear panel socket.



3. Powering up

Press the Power switch to turn on the power. The display shows the initialization screen with the model name, followed by the last recalled settings. To turn off the power, press the Power switch again.
(for example:4303S)

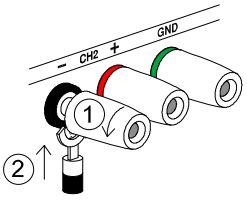




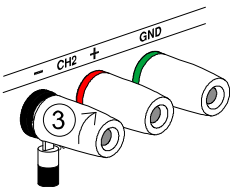

## Connecting the load cables

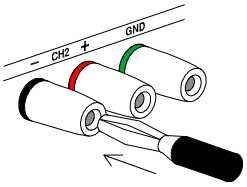
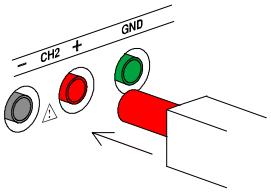
GTL-104A

1. Turn the terminal counterclockwise and loosen the screw.
2. Insert the cable terminal.




3. Turn the terminal clockwise and tighten the screw.



| | | |
|---|---|---|
| GTL-105A | Insert the plug into the socket. |  |
| GTL-201, 203, 204 | Insert the plug into the terminal. |  |

**Wire type**

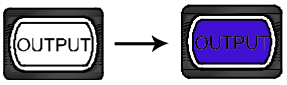
When using load cables other than the attached, make sure they have enough current capacity for minimizing cable loss and load line impedance. Voltage drop across a wire should not excess 0.5V. The following list is the wire current rating at 450A/cm$^2$.

| Wire size (AWG) | Maximum current (A) |
|---|---|
| 20 | 2.5 |
| 18 | 4 |
| 16 | 6 |
| 14 | 10 |
| 12 | 16 |

## Turning on the output

**Panel operation**

Pressing the Output key turns on all outputs.




The key LED also turns on. Pressing the Output key again turns off the output and the key LED.

**Automatic output off**

Any of the following actions automatically turns the output off, since they might suddenly change the output level in harmful ways.

- Change the operation mode between independent / tracking series / tracking parallel
- Recalling other setups from the memory
- Storing the setup into the memory

Setting up the power supply is completed

# List of Equipments

Here is the list of all equipments used in the service operations.

| Item | Requirements | Used in |
|---|---|---|
| Digital multimeter | • DCV accuracy: ± (0.005%+0.0006)<br>• DCA accuracy: ± (0.1%)<br>• Recommended model: Agilent-34401 | All verification items except for insulation<br>Calibration |
| Multimeter – power supply cable | • DCV: ≥ 100V<br>• DCA: ≥ 10A | |
| DC electronic load | • DCV: 3 – 60V<br>• DCA: 6mA – 60A<br>• Power: 1 – 300W<br>• Recommended model: PEL-300 | Load regulation, line regulation, ripple voltage verification |
| Electronic load – power supply cable | • DCV: ≥ 100V<br>• DCA: ≥ 10A | |
| AC millivolt meter | • DCV: 0.3mV – 60V<br>• Frequency: 10Hz – 1MHz<br>• Recommended model: GVT-417B | Ripple voltage verification |
| Millivolt meter – power supply cable | • DCV: ≥ 100V<br>• DCA: ≥ 10A | |
| Hi-pot tester | • DC power: 0.1 – 5kV<br>• AC power: 0.1 – 5kV<br>• Insulation resistance: 1 – 50MΩ<br>• Recommended model: GPI-735A | Insulation verification |
| Hi-pot tester – power supply cable | • Standard accessory attached to the hi-pot tester | |
| PC software | • Terminal application for GPIB commands | Firmware upgrade |
| PC | • Windows2000 or XP based PC | Firmware upgrade |

| | | |
|---|---|---|
| USB cable | • TypeA (host, PC) – TypeB (slave, power supply) | Firmware upgrade |

# CALIBRATION

The Calibration chapter describes how to calibrate the power supply using its automatic calibration feature. We recommend you to verify the specifications (page37) after completing the calibrations.



## Preparing for Calibration

| | |
|---|---|
| Note ⚠ | In order to ensure performance accuracy, we recommend you to calibrate all items listed in this chapter at once. |
| Calibration item | GPD-2303S/3303S/4303S:<br>• CH1 output voltage<br>• CH2 output voltage<br>• CH1 output current<br>• CH2 output current<br>• PARA output current |
| | GPD-4303S:<br>• CH3 output voltage<br>• CH4 output voltage<br>• CH3 output current<br>• CH4 output current |
| When to calibrate the power supply | • When using the power supply in a new environment<br>• After replacing one of the major internal modules, such as the front panel or power supply PCB |
| Pre-calibration test | To make the calibration more effective, we recommend you to run the following test beforehand.<br>• Burn-in test: 4 hours, 45~47°C, RH 65% |

| | |
|---|---|
| Calibration environment | • Location: Indoor, no direct sunlight, dust free<br>• Relative Humidity: < 80%<br>• Temperature: +20°C~+30°C<br>• Warm-up time: ≥ 30 minutes |
| Calibration equipments | • Digital multimeter<br>• Digital multimeter – power supply cable<br>For detailed requirements for the equipments, see page21. |

# Calibration Log

Print out these pages and record the results. Keep it with the power supply.

| | | | |
|---|---|---|---|
| Model | ☐ GPD-2303S | ☐ GPD-3303S | ☐ GPD-4303S |
| Serial number | _____ | | |
| Date | Year_____ | Month_____ | Date_____ |
| Verified by | Name_____ | | |
| | Company/Contact_____ | | |
| Environment | Temperature_____°C | Humidity_____% | |

## GPD-x303S(CH1/CH2)

**CH1 output voltage**

| Range | DMM reading | Acceptance range | Pass/Fail |
|---|---|---|---|
| 30V | _____V | ±0.3mV | ☐ Pass ☐ Fail |
| 0V | _____V | | ☐ Pass ☐ Fail |

**CH2 output voltage**

| Range | DMM reading | Acceptance range | Pass/Fail |
|---|---|---|---|
| 30V | _____V | ±0.3mV | ☐ Pass ☐ Fail |
| 0V | _____V | | ☐ Pass ☐ Fail |

**CH1 output current**

| Range | DMM reading | Acceptance range | Pass/Fail |
|---|---|---|---|
| 3.0A | _____A | ±0.5mA | ☐ Pass ☐ Fail |
| 0A | _____A | | ☐ Pass ☐ Fail |

**CH2 output current**

| Range | DMM reading | Acceptance range | Pass/Fail |
|---|---|---|---|
| 3.0A | _____A | ±0.5mA | ☐ Pass ☐ Fail |
| 0A | _____A | | ☐ Pass ☐ Fail |

## GPD-4303S(CH3/CH4)

**CH3 output voltage**

| Range | DMM reading | Acceptance range | Pass/Fail |
|---|---|---|---|
| 10V | _____V | ±0.3mV | ☐ Pass ☐ Fail |
| 0V | _____V | | ☐ Pass ☐ Fail |

CH4 output voltage

| Range | DMM reading | Acceptance range | Pass/Fail |
|---|---|---|---|
| 5V | _____V | ±0.3mV | ☐ Pass ☐ Fail |
| 0V | _____V | | ☐ Pass ☐ Fail |

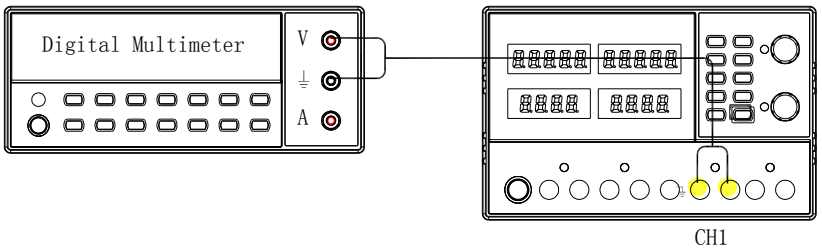
CH3 output current

| Range | DMM reading | Acceptance range | Pass/Fail |
|---|---|---|---|
| 3.0A | _____A | ±0.5mA | ☐ Pass ☐ Fail |
| 0A | _____A | | ☐ Pass ☐ Fail |

CH4 output current

| Range | DMM reading | Acceptance range | Pass/Fail |
|---|---|---|---|
| 1.0A | _____A | ±0.5mA | ☐ Pass ☐ Fail |
| 0A | _____A | | ☐ Pass ☐ Fail |

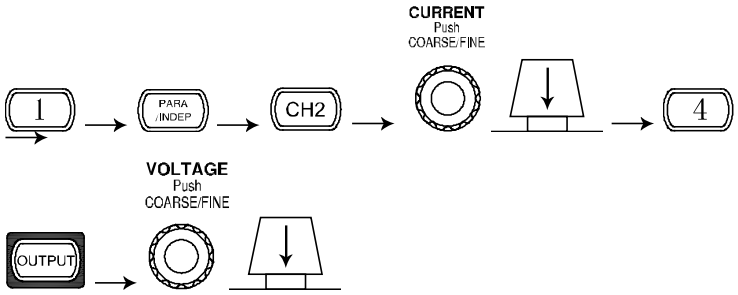
# Calibrating CH1/2 Output Voltage/Current

| | |
|---|---|
| Accepted range | GPD-x303S ±0.3mV, ±0.5mA |
| Equipment | • Multimeter<br>• Multimeter – Power supply cable |
| Connection |  |
| Configurations | Power supply: N/A<br>Multimeter: DC voltage mode |
| Keypad Controls | When calibrating, the keypad keys are used as number keys (0 to 9). The keypad keys correspond to the following numbers. |

| | | | | | |
|---|---|---|---|---|---|
| 1 | → | 1 | CH1 | → | 6 |
| 2 | → | 2 | CH2 | → | 7 |
| 3 | → | 3 | PARA /INDEP | → | 8 |
| 4 | → | 4 | SER /INDEP | → | 9 |
| LOCK | → | 5 | OUTPUT | → | 0 |

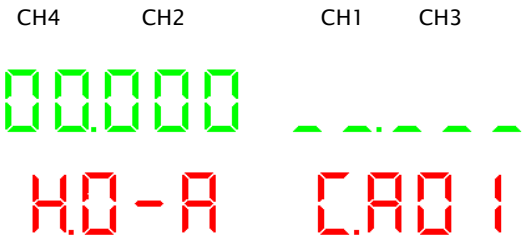
**Entering the calibration mode**

1. Press the power supply's front panel keys and knobs in the following order.
   (MEMORY) 1 key → PARA/INDEP key → CH2 key → CURRENT knob → (MEMORY) 4 key → OUTPUT key → VOLTAGE knob




(Do not turn the knob; press them)

2. The display enters into the calibration mode as in the figure below (First into Burn in mode).

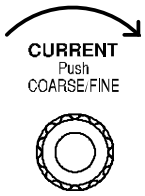



---

CA01 :
Exit Burn in mode

The default value is 00.000 (you can check the last default value by turning the VOLTAGE knob).

1. Input any digit from 1~9, press the CURRENT knob to exit Burn in mode and automatically go to the next step; (or turn the CURRENT knob right to go the next step, the same as below)

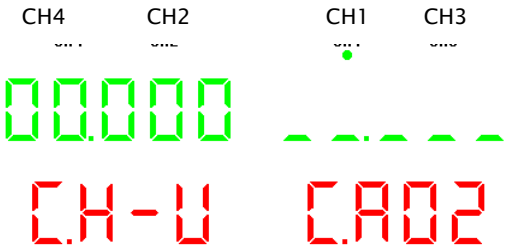



Input 0 (OUTPUT key), Press the CURRENT knob to preserve Burn in mode and automatically go to the next step;

2. Press the VOLTAGE knob twice to exit calibration mode (same below)

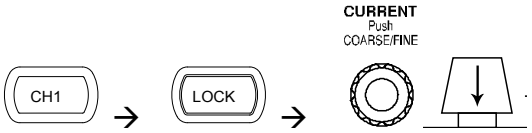
---

CA02 :
Calibrating CH1 output voltage (0V)



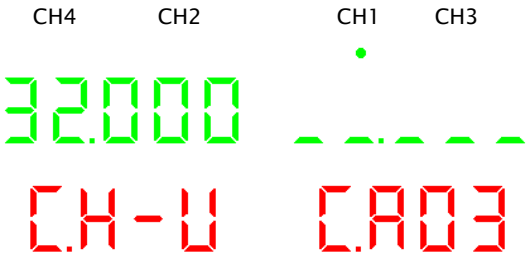

1. Read the voltage value of CH1 with the DMM (Unit is V). Record the 3 digits after the decimal point.

2. Input the DMM reading. For example for 0.065V, enter digits “6” and”5”. The system will automatically save and go to the next step. (No need to input decimal point. The same process is shown below)



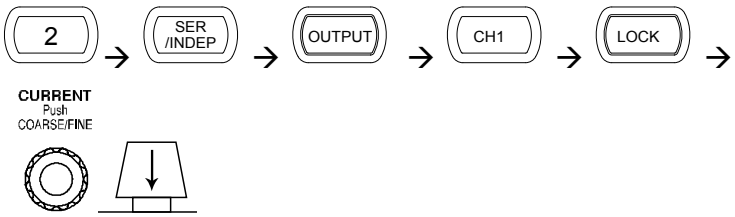

CA03:

Calibrating CH1 output voltage (30V)




1. Read the voltage value of the CH1 on the DMM (Unit is V). Record the 3 digits after decimal point. For example 29.065V.

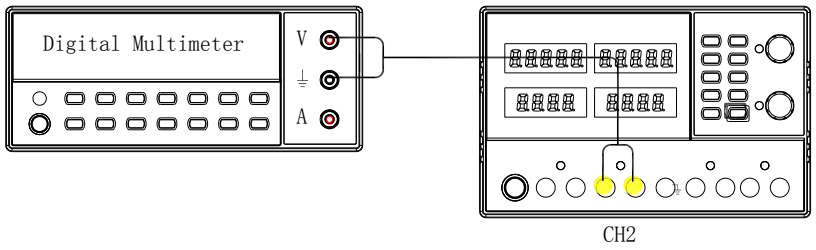
2. Input the reading of the DMM. For example, 29.065V.Enter digits “2”, “9”, “0”, “6” and “5”, the the system will automatically save and enter to the next step.



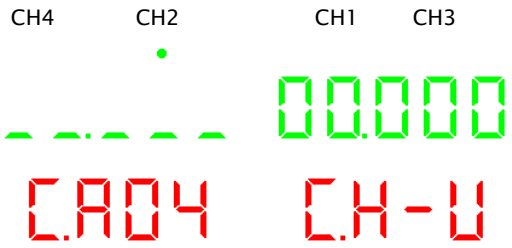

Switching to CH2 output voltage calibration

Connect the multimeter cable to the CH2 output terminals.

Connection



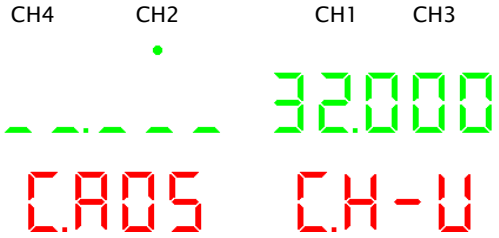
CA04:
Calibrating CH2 output voltage (0V)




1. Read the voltage value on CH2 with the DMM (Unit is V).
2. Input the reading of the DMM and go to the next step.

---

CA05:
Calibrating CH2 output voltage (30V)



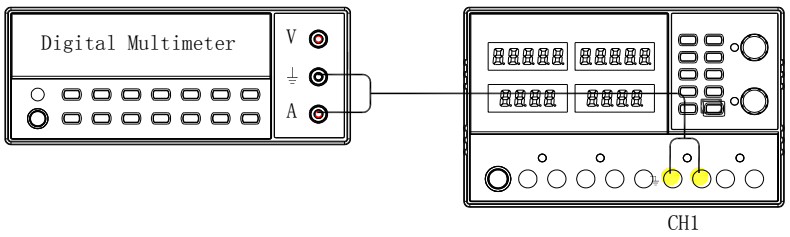

1. Read the voltage value on CH2 with the DMM (Unit is V).
2. Input the reading of the DMM and enter to next step.

---

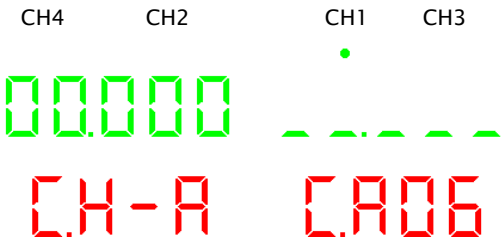
Switching to CH1 output current calibration

Connect the multimeter cable to the CH1 output terminals.

Connection



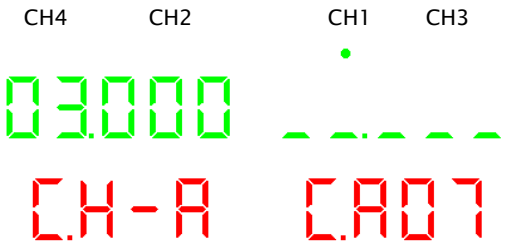

CA06:
Calibrating CH1 output current (0A)




1. Read the current value on CH1 with the DMM (Unit is A).Record 3 digits after decimal point. For example 0.265A.

2. Input the DMM reading. For example, 0.265A. Enter digits “2”, “6”and“5”. The the system will automatically save and go to the next step. (No need to input the decimal point. The same process is shown below)

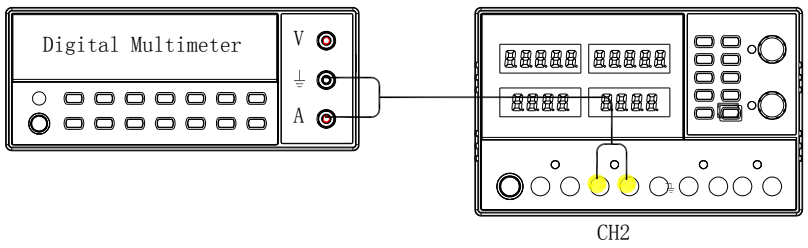
CA07:
Calibrating CH1
output current (3A)



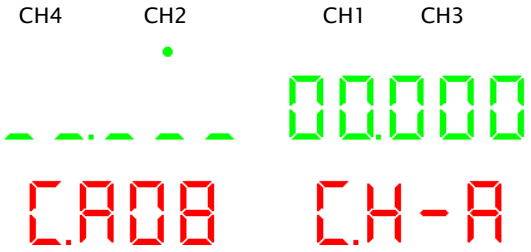

1. Read the current value on CH1 with the DMM (Unit is A). For example, 2.965A.
2. Input the DMM reading. Enter digits “2”, “9”, “6”and“5” and go to the next step.

Switching to CH2 output current calibration

Connect the multimeter cable to the CH2 output terminals.

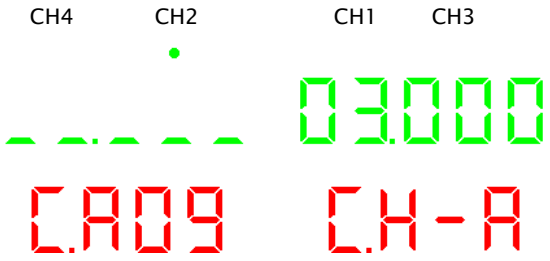



CA08:
Calibrating CH2
output current (0A)




1. Read the current value on CH2 with the DMM (Unit is A).
2. Input the DMM reading and enter the next step.

CA09:
Calibrating CH2 output current (3A)

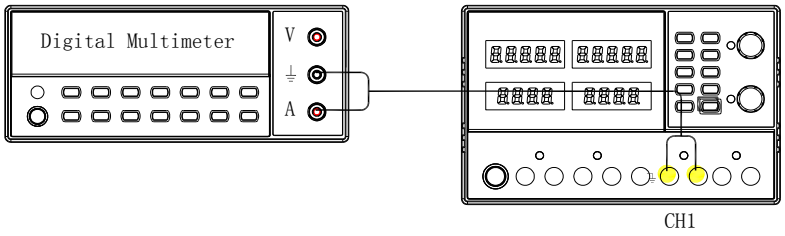



1. Read the current value on CH2 port with the DMM (Unit is A).
2. Input the DMM reading and go to the next step.

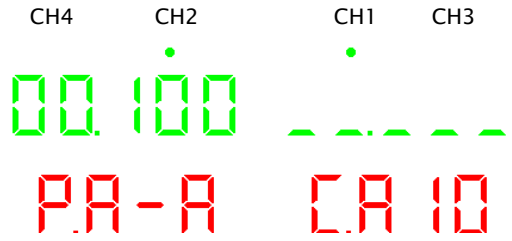
Switching to PARA output current calibration

Connect the multimeter cable to the CH1 output terminals.

Connection

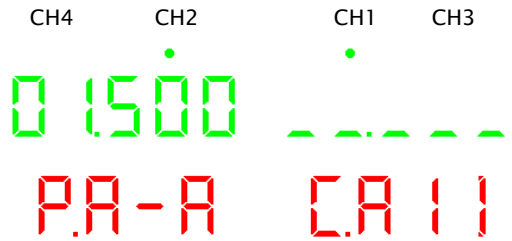



CA10:
Calibrating PARA output current (100mA)




1. Read the current value on CH1 with the DMM (Unit is A).
2. Input the DMM reading and go to the next step.

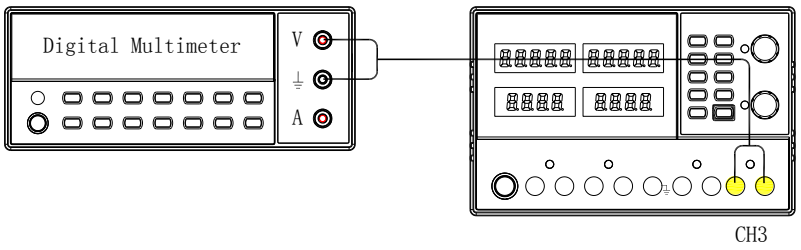
CA11:
Calibrating PARA output current (1.5A)




1. Read the current value on CH1 with the DMM (Unit is A).
2. Input the DMM reading and go to the next step.

Calibrating the CH1, CH2 output voltage/current is completed

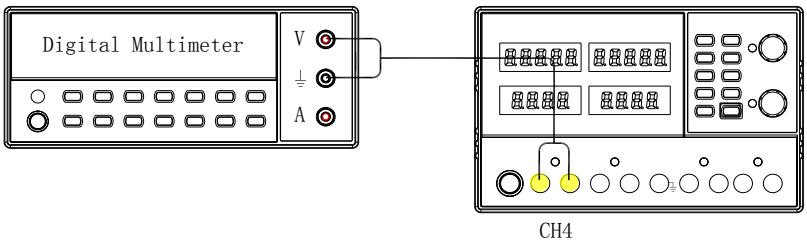
# Calibrating CH3/4 Output voltage/Current(4303S)

| | | |
|---|---|---|
| Accepted range | GPD-x303S | ±0.3mV,±0.5mA |
| Equipment | • Multimeter<br>• Multimeter – Power supply cable | |
| Switching to CH3 output voltage calibration | Connect the multimeter cable to the CH3 output terminals. | |
| Connection |  | |
| CA12: Calibrating CH3 output voltage (0V) | CH4 CH2 CH1 CH3<br>00.000<br>CH-U CA 12<br>1. Read the voltage value on CH3 with the DMM (Unit is V).<br>2. Input the DMM reading and go to the next step. | |
| CA13: Calibrating CH3 output voltage (10V) | CH4 CH2 CH1 CH3<br>10.000<br>CH-U CA 13<br>1. Read the voltage value on CH3 with the DMM (Unit is V).<br>2. Input the DMM reading and go to the next step. | |

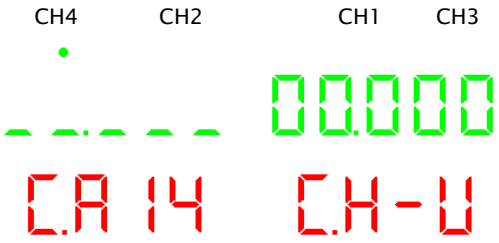
Switching to CH4 output voltage calibration

Connect the multimeter cable to the CH4 output terminals.

Connection

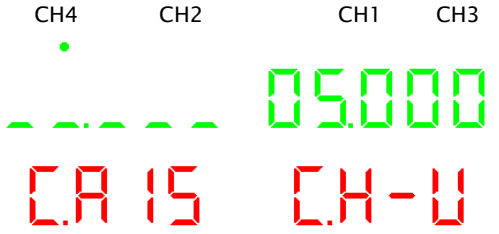



CA14: Calibrating CH4 output voltage (0V)




1. Read the voltage value on CH4 with the DMM (Unit is V).
2. Input the DMM reading and go to the next step.

CA15: Calibrating CH4 output voltage (5V)

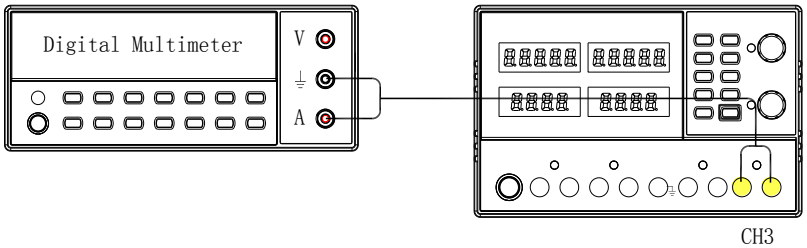



1. Read the voltage value on CH4 with the DMM (Unit is V).
2. Input the reading on the DMM and go to the next step.

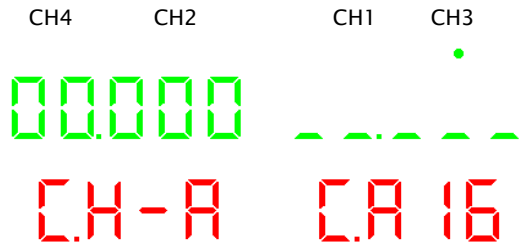
Switching to CH3 output current calibration

Connect the multimeter cable to the CH3 output terminals.

Connection

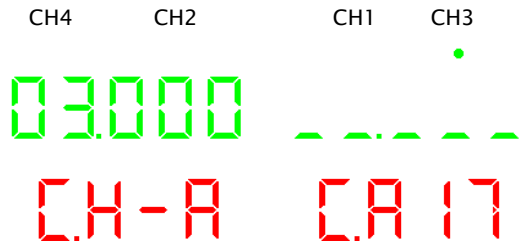


CA016:
Calibrating CH3
output current (0A)




1. Read the current value on CH3 with the DMM (Unit is A).
2. Input the reading on the DMM and go to the next step.

CA17:
Calibrating CH3
output current (3A)

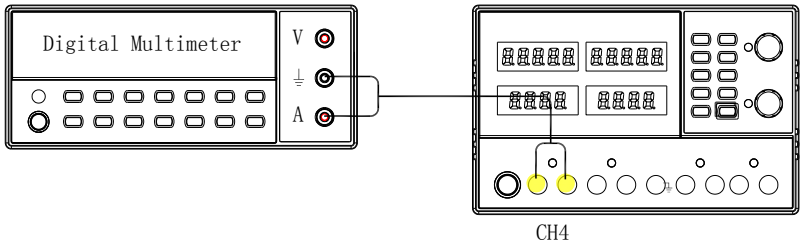



1. Read the current value on CH3 with the DMM (Unit is A).
2. Input the reading on the DMM and go to the next step.

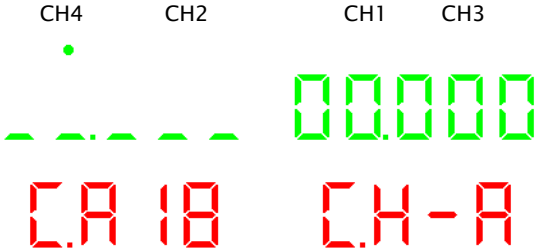
Switching to CH4 output current calibration

Connect the multimeter cable to the CH4 output terminals.

Connection

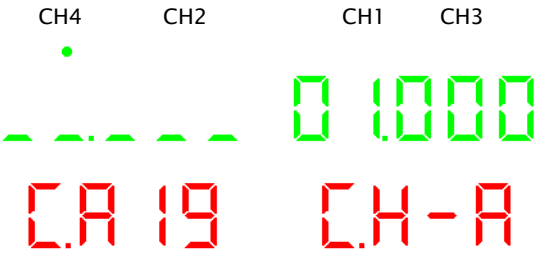



CA18:
Calibrating CH4
output current (0A)




1. Read the current value on CH4 with the DMM (Unit is A).
2. Input the reading on the DMM and go to the next step.

CA19:
Calibrating CH4
output current (1A)




1. Read the current value on CH4 with the DMM (Unit is A).
2. Input the reading on the DMM and press the VOLTAGE knob twice to exit the calibration mode.

Calibrating the CH3, CH4 output voltage/current is completed

# VERIFICATION

The Verification chapter describes how to make sure the power supply is operating properly by verifying its major functionalities. The verification is intended for a full performance inspection before shipping the power supply to the end user, after major component replacements, or a firmware upgrade.

# Preparing for Verification

| | |
|---|---|
| Note ⚠ | In order to ensure performance accuracy, we recommend you to verify all items listed in this chapter at once. |
| When to verify the specification | • When using the power supply in a new environment<br>• After replacing one of the major internal modules, such as front panel or power supply PCB<br>• After updating the firmware<br>• When you need to make sure that the power supply is malfunctioning or not |
| Pre-verification test | To make verification more effective, the following test is recommended before the verification.<br>• Burn-in test: 4 hours, 45~47°C, RH 65% |
| Verification Environment | • Location: Indoor, no direct sunlight, dust free<br>• Relative Humidity: < 80%<br>• Temperature: +20°C~+30°C<br>• Warm-up time: ≥ 30 minutes |
| Verification equipments | • Hi-pot tester with cable<br>• Digital multimeter with cable<br>• Electronic load with cable<br>• AC power supply with cable<br>For detailed requirements for the equipments, see page21. |
| When the verification fails… | • For CH1/CH2 output voltage and current, calibrate the power supply (page23).<br>• For CH3/CH4 (4303S) output voltage and current, calibrate the power supply (page33).<br>• For other items, send the power supply back to the factory for repair. |

# Verification Log

Print out these pages and record the results. Keep it with the power supply.

| | |
|---|---|
| Model | ☐ GPD-2303S ☐ GPD-3303S ☐ GPD-4303S |
| Serial number | _____ |
| Date | Year_____ Month_____ Date_____ |
| Verified by | Name_____ |
| | Company/Contact_____ |
| Environment | Temperature_____°C Humidity_____% |

### Voltage insulation

| Item | Location | Result | Pass/Fail | |
|---|---|---|---|---|
| Insulation resistance | CH1(+) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | CH1(–) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | CH2(+) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | CH2(–) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | CH3(+) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | CH3(–) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | CH4(+) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | CH4(–) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | AC socket(N) – GND | _____Ω | ☐ Pass | ☐ Fail |
| | AC socket(L) – GND | _____Ω | ☐ Pass | ☐ Fail |

Insulation resistance range: > 20MΩ (CH-GND), > 30MΩ (AC-GND)

| Item | Location | Result | Pass/Fail | |
|---|---|---|---|---|
| Withstanding | CH1(+) – GND | _____mA | ☐ Pass | ☐ Fail |
| | CH2(+) – GND | _____mA | ☐ Pass | ☐ Fail |
| | CH3(+) – GND | _____mA | ☐ Pass | ☐ Fail |
| | CH4(+) – GND | _____mA | ☐ Pass | ☐ Fail |

Withstanding range: 3mA

### Output voltage accuracy

| Item | DMM reading | GPD reading | Delta | Pass/Fail | |
|---|---|---|---|---|---|
| CH1 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH2 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH3 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH4 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |

GPD-x303S :CH1/CH2 Range: 0.03% of rdg + 10mV

GPD-4303S :CH3/CH4 Range: 0.03% of rdg + 10mV

GPD-3303S :CH3 Range: 5% of rdg

### Output current accuracy

| Item | DMM reading | GPD reading | Delta | Pass/Fail | |
|---|---|---|---|---|---|
| CH1 | _____A | _____A | _____mA | ☐ Pass | ☐ Fail |
| CH2 | _____A | _____A | _____mA | ☐ Pass | ☐ Fail |
| CH3 | _____A | _____A | _____mA | ☐ Pass | ☐ Fail |
| CH4 | _____A | _____A | _____mA | ☐ Pass | ☐ Fail |

GPD-x303S :CH1/CH2 range: 0.3% of rdg + 10mA

GPD-4303S :CH3/CH4 range: 0.3% of rdg + 10mA

### Voltage load regulation

| Item | DMM load on | DMM load off | Delta | Pass/Fail | |
|---|---|---|---|---|---|
| CH1 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH2 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH3 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH4 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| Tracking series | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| Tracking parallel | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |

GPD-x303S :CH1/CH2 range:0.01%+3mV

GPD-3303S :CH3 range: 5mV

GPD-4303S :CH3/CH4 range: 0.01%+3mV

Tracking series range: 0.1%+10mV of Master (0~30V)
(No Load, with load add load regulation≤100mV)

Tracking parallel range: 0.01%+3mV

### Voltage line regulation

| Item | DMM AC-10% | DMM AC+10% | Delta | Pass/Fail | |
|---|---|---|---|---|---|
| CH1 | _____V_ | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH2 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH3 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH4 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |

GPD-x303S :CH1/CH2 range: 0.01% ± 3mV

GPD-3303S :CH3 range: 3mV

GPD-4303S :CH3/CH4 range: 0.01% ± 3mV

### Current load regulation

| Item | DMM load on | DMM load off | Delta | Pass/Fail | |
|---|---|---|---|---|---|
| CH1 | _____A | _____A | _____mA | ☐ Pass | ☐ Fail |
| CH2 | _____A | _____A | _____mA | ☐ Pass | ☐ Fail |
| CH3 | _____A | _____A | _____mA | ☐ Pass | ☐ Fail |
| CH4 | _____A | _____A | _____mA | ☐ Pass | ☐ Fail |

Range: 0.2% + 3mA

### Voltage ripple

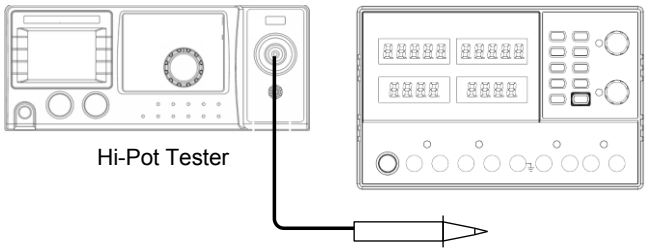
| Item | DMM load on | DMM load off | Delta | Pass/Fail | |
|---|---|---|---|---|---|
| CH1 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH2 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH3 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| CH4 | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| Tracking series | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |
| Tracking parallel | _____V | _____V | _____mV | ☐ Pass | ☐ Fail |

CH1/CH2/CH3/CH4 range: 1mVrms

Tracking series range: 2mVrms

Tracking parallel range: 1mVrms

# Verifying High Voltage Insulation

| | | |
|---|---|---|
| Accepted range | Insulation | 20MΩ (Channel output – ground)<br>30MΩ (AC cord – ground) |
| | Withstanding | 3mA (AC 2000V, 10 seconds) |
| Equipment | • Hi-pot tester<br>• Testing cable | |
| Connection |  | |
| Configurations | • Power supply: power off (power cord not connected)<br>• Hi-pot tester: Insulation resistance test mode, DC 500V | |
| Verifying insulation resistance | Apply the insulation resistance test between the following points and record the result into the log.<br>• CH1 + output → GND terminal<br>• CH1 – output → GND terminal<br>• CH2 + output → GND terminal<br>• CH2 – output → GND terminal<br>• CH3 + output → GND terminal(3303S/4303S)<br>• CH3 – output →GND terminal(3303S/4303S)<br>• CH4 + output →GND terminal(4303S)<br>• CH4 – output →GND terminal(4303S)<br>• AC socket N terminal → AC socket GND terminal<br>• AC socket L terminal → AC socket GND terminal | |
| Verifying withstanding | 1. Power up the power supply.<br>2. Change the hi-pot tester configuration as follows. Withstanding test, AC 2000V, 10 seconds<br>3. Apply the withstanding test between the following points and record the result into the log.<br>• CH1 + output → GND terminal<br>• CH2 + output → GND terminal<br>• CH3 + output → GND terminal (3303S/4303S)<br>• CH4 + output →GND terminal (4303S) | |

Verifying the high voltage insulation is completed

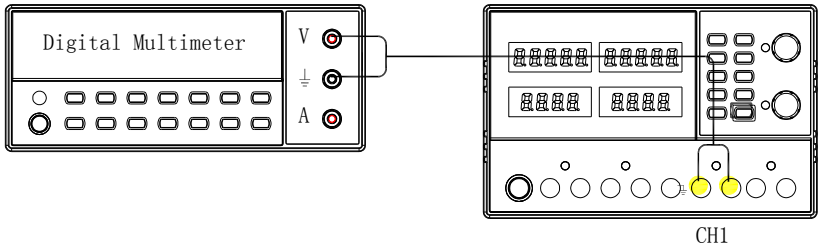
# Verifying Output Voltage Accuracy

| | | |
|---|---|---|
| Accepted range | CH1, CH2 | 0.03% of rdg + 10mV |
| | CH3 | 5% of rdg (3303S)<br>0.03% of rdg + 10mV (4303S) |
| | CH4 | 0.03% of rdg + 10mV (4303S) |

**Equipment**

- Multimeter
- Multimeter – Power supply cable

**Connection**




**Configurations**

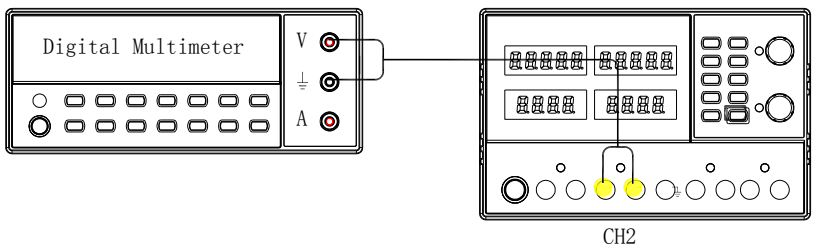
- Power supply: CH1, 10V/3A output, independent mode
- Multimeter: DC voltage mode

**Verifying CH1 output voltage**

1. Record both the power supply and multimeter voltage readings into the log.
2. Calculate the difference between the two readings and record it as the output voltage accuracy (CH1, 10V).
3. Change the power supply output voltage to 30V.
4. Record both the power supply and multimeter voltage readings into the log.
5. Calculate the difference between the two readings and record it as the output voltage accuracy (CH1, 30V).

**Verifying CH2 output voltage**

1. Connect the CH2 output to the multimeter.

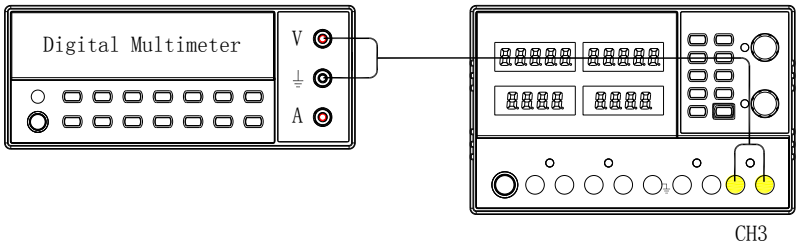


2. Set the output voltage to 10V.
3. Record both the power supply and multimeter voltage readings into the log.
4. Calculate the difference between the two readings and record it as the output voltage accuracy (CH2, 10V).
5. Change the power supply output voltage to 30V.
6. Record both the power supply and multimeter voltage readings into the log.
7. Calculate the difference between the two readings and record it as the output voltage accuracy (CH2, 30V).

---

Verifying CH3 output voltage (4303S)

1. Connect the CH3 output to the multimeter.

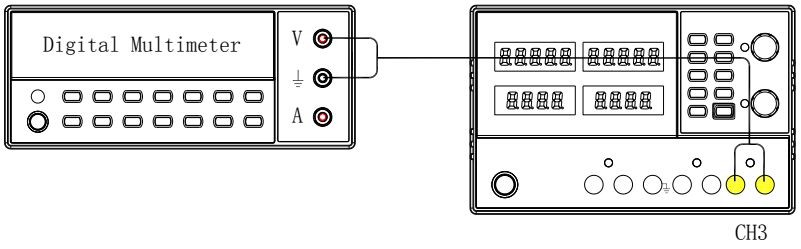



2. Set the output voltage to 5V.
3. Record both the power supply and multimeter voltage readings into the log.
4. Calculate the difference between the two readings and record it as the output voltage accuracy (CH3, 5V).
5. Change the power supply output voltage to 10V.
6. Record both the power supply and multimeter voltage readings into the log.
7. Calculate the difference between the two readings and record it as the output voltage accuracy (CH3, 10V).

---

Verifying CH3 output voltage (3303S)

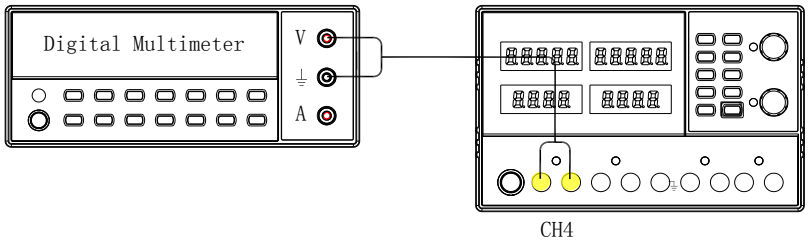
1. Connect the CH3 output to the multimeter.



2. Select 2.5V as the CH3 output voltage.
3. Record both the power supply and multimeter voltage readings into the log.
4. Calculate the difference between the two readings and record it as the output voltage accuracy (CH3, 2.5V).
5. Select 3.3V as the CH3 output voltage and repeat measuring the output voltage accuracy.
6. Select 5V as the CH3 output voltage and repeat measuring the output voltage accuracy.

Verifying CH4 output voltage (4303S)

1. Connect the CH4 output to the multimeter.




2. Select 2.5V as the CH4 output voltage.
3. Record both the power supply and multimeter voltage readings into the log.
4. Calculate the difference between the two readings and record it as the output voltage accuracy (CH4, 2.5V).
5. Select 5V as the CH4 output voltage and repeat measuring the output voltage accuracy.

Verifying the output voltage accuracy is completed

# Verifying Output Current Accuracy

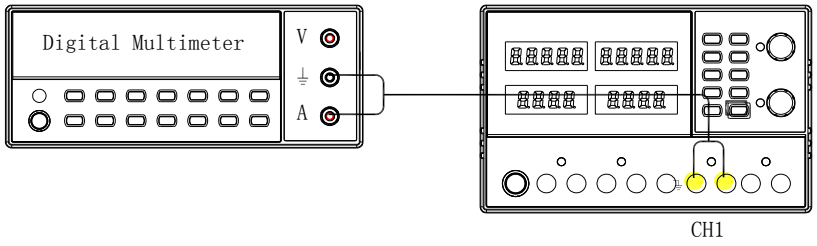
| | | |
|---|---|---|
| Accepted range | CH1, CH2 | 0.3% of reading + 10mA |
| | CH3, CH4 | 0.03% of reading + 10mV (4303S) |

**Equipment**

- Multimeter
- Multimeter – Power supply cable

**Connection**

1. Connect the CH1 output to the multimeter.




**Configurations**

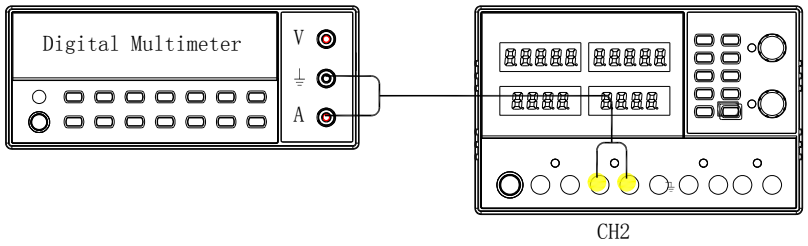
- Power supply: CH1, 30V/3A output, independent mode
- Multimeter: DC current mode

**Verifying CH1 output current**

2. Record both the power supply and multimeter current readings into the log.
3. Calculate the difference between the two readings and record it as the output current accuracy (CH1).

**Connection**

1. Connect the CH2 output to the multimeter.



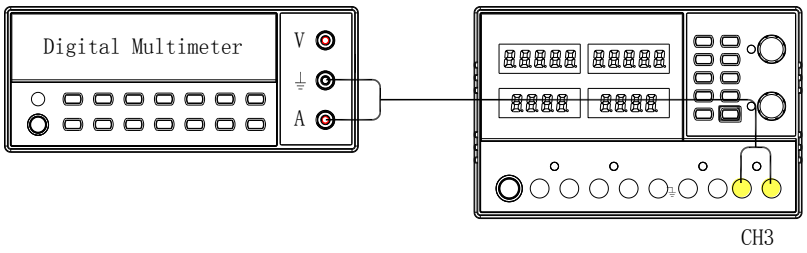

**Configurations**

- Power supply: CH2, 30V/3A output, independent mode
- Multimeter: DC current mode

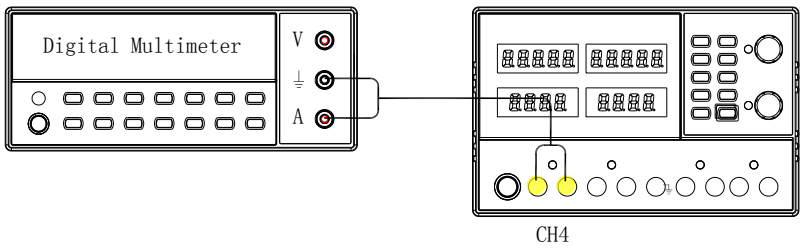
**Verifying CH2 output current**

2. Record both the power supply and multimeter current readings into the log.
3. Calculate the difference between the two readings and record it as the output current accuracy (CH2).

| | |
|---|---|
| Connection | 1. Connect the CH3 output to the multimeter. |




| | |
|---|---|
| Configurations | • Power supply: CH3, 5V/3A output, independent mode<br>• Multimeter: DC current mode |
| Verifying CH3 output current (4303S) | 2. Record both the power supply and multimeter current readings into the log.<br>3. Calculate the difference between the two readings and record it as the output current accuracy (CH3). |
| Connection | 1. Connect the CH4 output to the multimeter. |




| | |
|---|---|
| Configurations | • Power supply: CH4, 5V/1A output, independent mode<br>• Multimeter: DC current mode |
| Verifying CH4 output current (4303S) | 2. Record both the power supply and multimeter current readings into the log.<br>3. Calculate the difference between the two readings and record it as the output current accuracy (CH4). |

Verifying the output current accuracy is completed

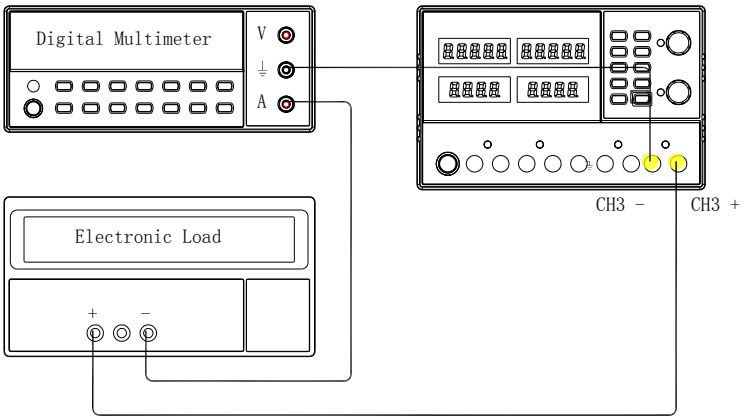
# Verifying CH3 Overload (3303S)

| | | |
|---|---|---|
| Accepted range | Overload threshold | 3.25±0.2A |

**Equipment**

- Multimeter
- Multimeter – Power supply cable
- Electronic load
- Electronic load – Power supply cable

**Connection**




**Configurations**

- Power supply: CH3, 5V output
- Multimeter: DC current mode

**Verifying CH3 overload indicator threshold**

1. Adjust the amount of load and record the multimeter reading when the CH3 overload indicator turns on.
2. Record the multimeter current readings into the log.
3. Record it as the output overload threshold (CH3).

Verifying the CH3(3303S) overload is completed

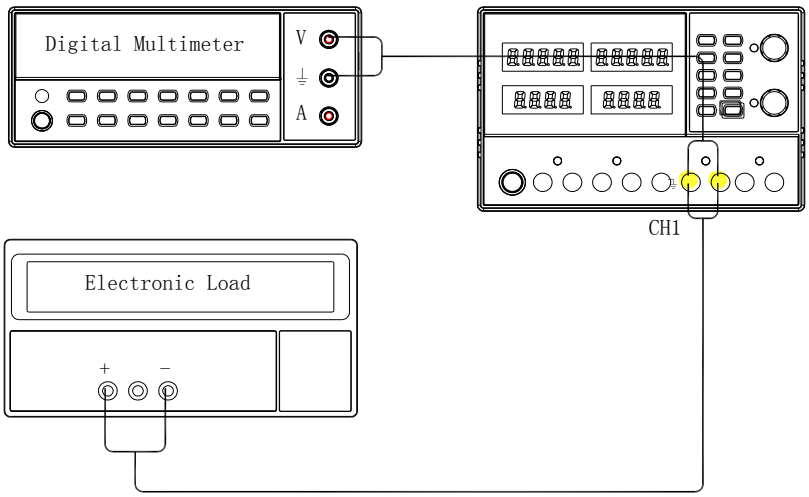
# Verifying Voltage Load Regulation

| | | |
|---|---|---|
| Accepted range | CH1, CH2 independent | 0.01% + 3mV |
| | CH3 | (3303S): 5mV<br>(4303S): 0.01% + 3mV |
| | CH4 | 0.01% + 3mV |
| | Tracking series | 100mV |
| | Tracking parallel | 0.01% + 3mV |

**Equipment**

- Multimeter
- Multimeter – Power supply cable
- Electronic load
- Electronic load – Power supply cable

**Connection**




**Configurations**

- Power supply: CH1, 30V/3.2A output, independent mode
- Multimeter: DC voltage mode
- Electronic load: 30V, 3A, load on

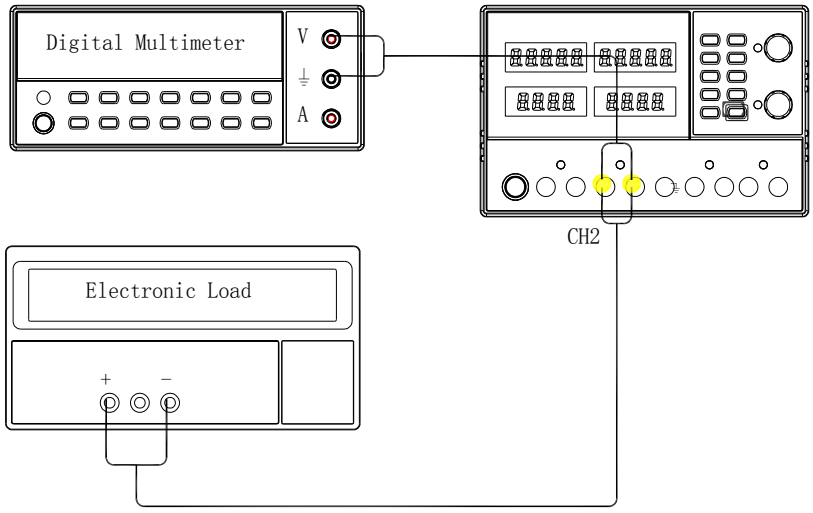
**Verifying CH1 voltage load regulation**

1. Record the multimeter voltage reading into the log.
2. Turn off the electronic load.
3. Record the multimeter voltage reading into the log.

4. Calculate the difference between the two readings and record it as the voltage load regulation (CH1, 3A).

Verifying CH2 voltage load regulation

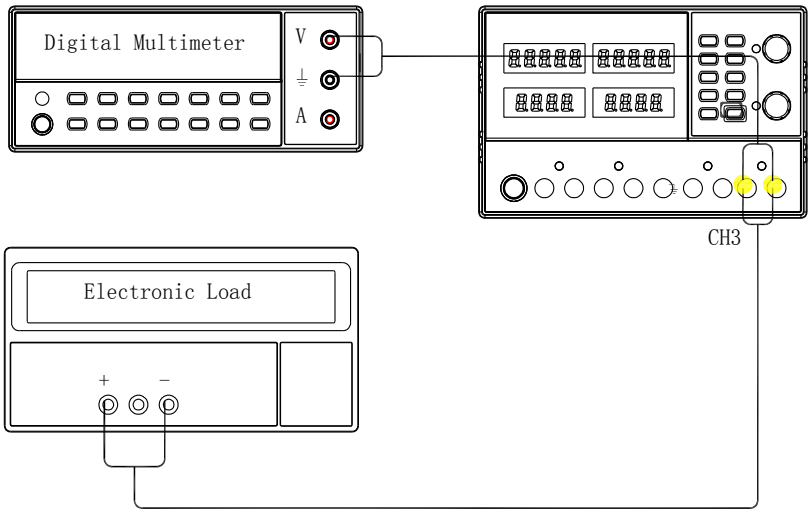
1. Connect the CH2 output to the multimeter and load.




2. Change the configuration as follows.
   Power supply output current: 30V/3.2A
   Electronic load settings: 30V, 3A, load on
3. Record the multimeter voltage reading into the log.
4. Turn off the electronic load.
5. Record the multimeter voltage reading into the log.
6. Calculate the difference between the two readings and record it as the voltage load regulation (CH2, 3A).

Verifying CH3 voltage load regulation

1. Connect the CH3 output to the multimeter and load.

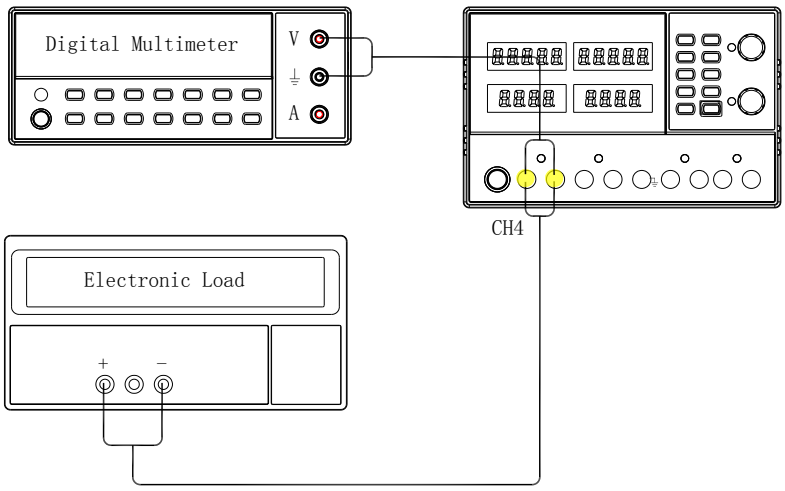


2. Change the configuration as follows.
   Power supply output voltage: 5V/3.2A
   Electronic load settings: 5V, 3A, load on
3. Record the multimeter voltage reading into the log.
4. Turn off the electronic load.
5. Record the multimeter voltage reading into the log.
6. Calculate the difference between the two readings and record it as the voltage load regulation (CH3).

---

Verifying CH4 voltage load regulation

1. Connect the CH4 output to the multimeter and load.

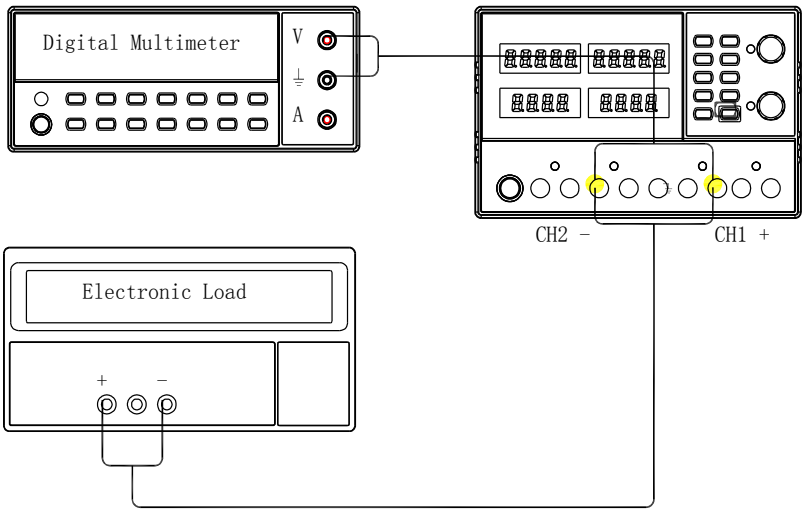



2. Change the configuration as follows.
   Power supply output voltage: 5V/1.2A
   Electronic load settings: 5V, 1A, load on
3. Record the multimeter voltage reading into the log.
4. Turn off the electronic load.
5. Record the multimeter voltage reading into the log.
6. Calculate the difference between the two readings and record it as the voltage load regulation (CH4).

---

Verifying Tracking series load regulation

1. Connect the power supply output to the multimeter and load in the tracking series mode:
   CH1 + terminal → Electronic load + terminal
   CH2 – terminal → Electronic load – terminal

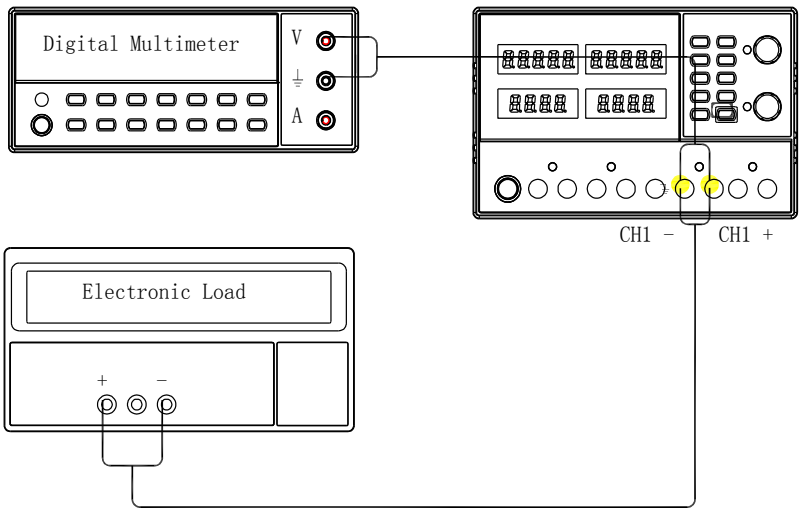



2. Change the configuration as follows.
   Power supply settings: Tracking series, 60V, 3.2A
   Electronic load settings: 60V, 3A, load on
3. Record the multimeter voltage reading into the log.
4. Turn off the electronic load.
5. Record the multimeter voltage reading into the log.
6. Calculate the difference between the two readings and record it as the voltage load regulation (tracking series).

---

Verifying Tracking parallel load regulation

1. Connect the power supply output to the multimeter and load in the tracking series mode:
   CH1 + terminal → Electronic load + terminal
   CH1 – terminal → Electronic load – terminal



2. Change the configuration as follows.
   Power supply settings: Tracking parallel, 30V, 6.4A
   Electronic load settings: 30V, 6A, load on

3. Record the multimeter voltage reading into the log.

4. Turn off the electronic load.

5. Record the multimeter voltage reading into the log.

6. Calculate the difference between the two readings and record it as the voltage load regulation (tracking parallel).

Verifying the voltage load regulation is completed

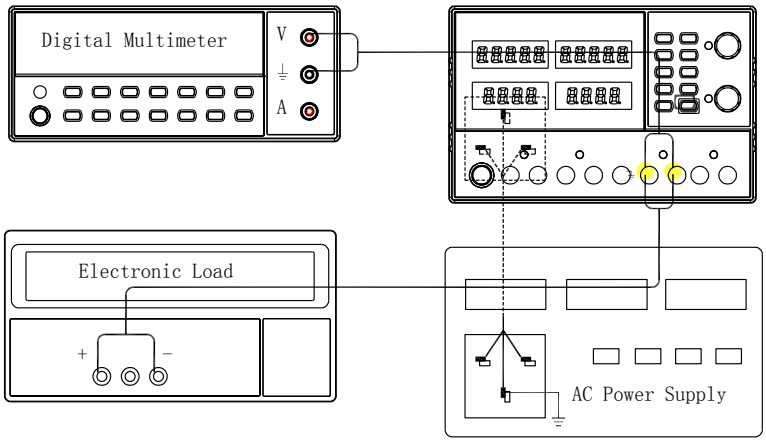
# Verifying Voltage Line Regulation

| | | |
|---|---|---|
| Accepted range | CH1, CH2, CH3, CH4) | 0.01% + 3mV |

**Equipment**

- Multimeter
- Multimeter – Power supply cable
- Electronic load
- Electronic load – Power supply cable
- AC power supply

**Connection**




**Configurations**

- Power supply: CH1, 30V/3.2A output, independent mode
- Multimeter: DC voltage mode
- Electronic load: 30V, 3A, load on
- AC power supply: rating voltage – 10%

**Verifying CH1 voltage line regulation**

1. Record the multimeter voltage reading into the log.
2. Increase the AC power supply voltage to (rating voltage + 10% or -10%).
   220V rating example: 198V →220V→ 242V
3. Record the multimeter voltage reading into the log.
4. Calculate the difference between the two readings and record it as the voltage line regulation (CH1, 3A).

**Verifying other channels voltage line regulation**

Connection method and setting for other channels are similar to CH1.

Verifying the voltage line regulation is completed

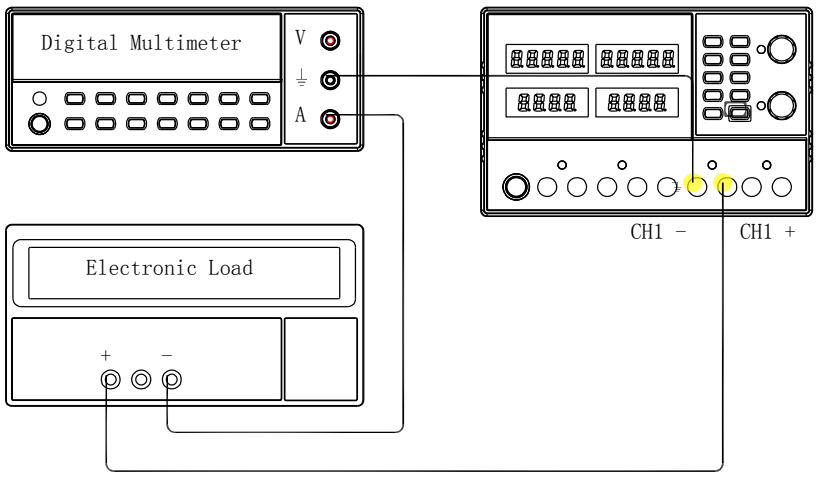
# Verifying Current Load Regulation

| | | |
|---|---|---|
| Accepted range | CH1, CH2, CH3, CH4(4303S) | 0.2% + 3mA |

**Equipment**

- Multimeter
- Multimeter – Power supply cable
- Electronic load
- Electronic load – Power supply cable

**Connection**




**Configurations**

- Power supply: CH1, 30V/3A output, independent mode
- Multimeter: DC current mode
- Electronic load: 30V, 3A, load on

**Verifying CH1 current load regulation**

1. Record the multimeter current reading into the log, when the CH1 CC light turns on.
2. Decrease the electronic load level to CH1 CV light turns on.
3. Record the multimeter current reading into the log.
4. Calculate the difference between the two readings and record it as the current load regulation (CH1).

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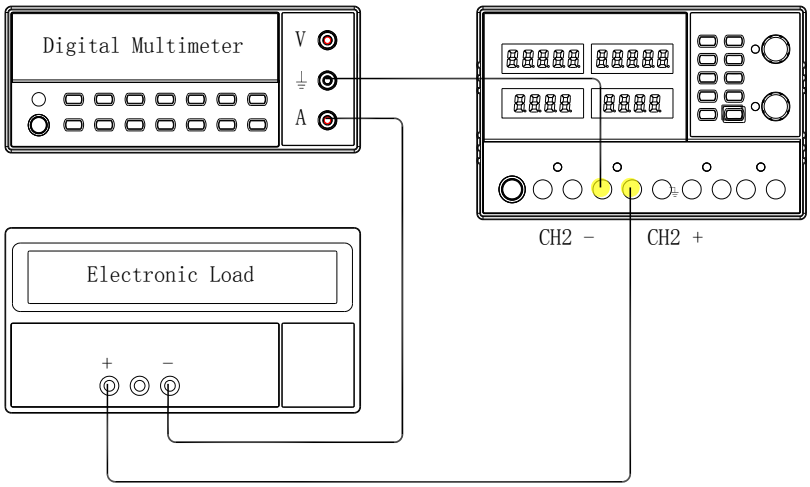
Connection

1. Connect the CH2 output to the multimeter and load.




Configurations

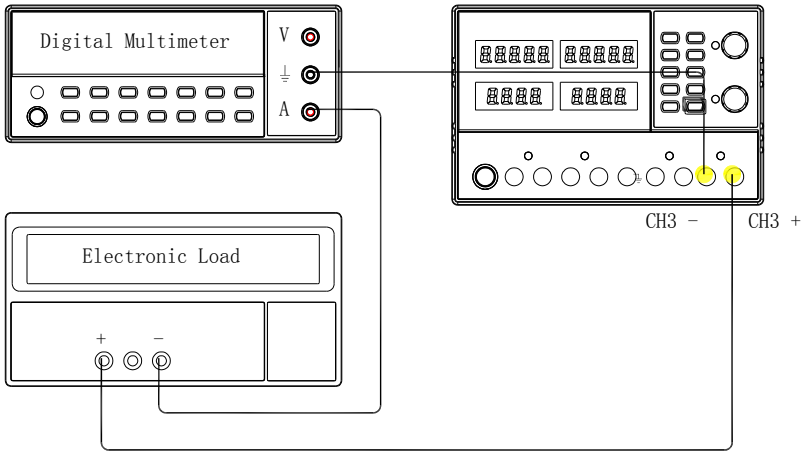
- Power supply: CH2, 30V/3A output, independent mode
- Multimeter: DC current mode
- Electronic load: 30V, 3A, load on

Verifying CH2 current load regulation

2. Record the multimeter current reading into the log, when the CH2 CC light turns on.
3. Decrease the electronic load level to CH2 CV light turns on.
4. Record the multimeter current reading into the log.
5. Calculate the difference between the two readings and record it as the current load regulation (CH2).

Connection

1. Connect the CH3 output to the multimeter and load.



Configurations

- Power supply: CH3, 5V/3A output, independent mode
- Multimeter: DC current mode
- Electronic load: 30V, 3A, load on

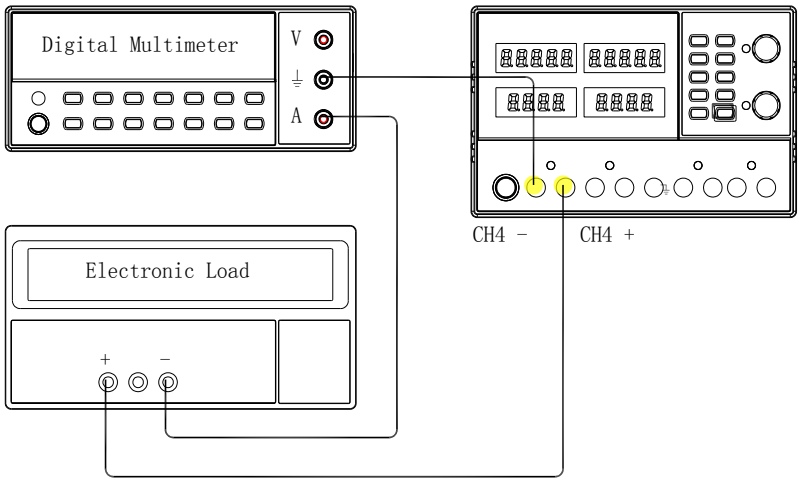
Verifying CH3 current load regulation

(4303S)

2. Record the multimeter current reading into the log, when the CH3 CC light turns on.
3. Decrease the electronic load level to CH3 CV light turns on.
4. Record the multimeter current reading into the log.
5. Calculate the difference between the two readings and record it as the current load regulation (CH3).

Connection

1. Connect the CH4 output to the multimeter and load.




Configurations

- Power supply: CH4, 5V/1A output, independent mode
- Multimeter: DC current mode
- Electronic load: 30V, 1A, load on

Verifying CH4 current load regulation

(4303S)

2. Record the multimeter current reading into the log, when the CH4 CC light turns on.
3. Decrease the electronic load level to CH4 CV light turns on.
4. Record the multimeter current reading into the log.
5. Calculate the difference between the two readings and record it as the current load regulation (CH4).

Verifying the current load regulation is completed

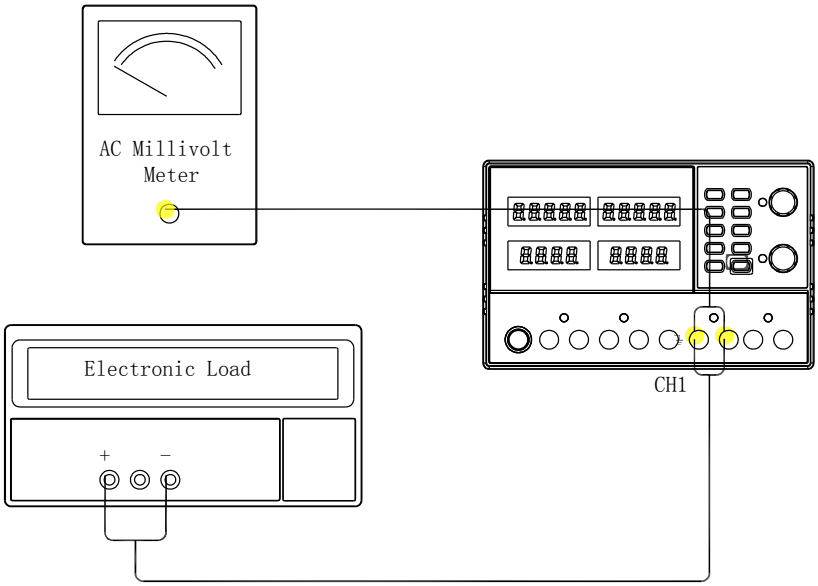
# Verifying Ripple Voltage

| | | |
|---|---|---|
| Accepted range | CH1, CH2, CH3, CH4 independent | 1mVrms |
| | Tracking series | 2mVrms |
| | Tracking parallel | 1mVrms |

**Equipment**

- AC millivolt meter
- AC millivolt meter – Power supply cable
- Electronic load
- Electronic load – Power supply cable

**Connection**




**Configurations**

- Power supply: CH1/CH2, 30V/3.2A output, independent mode
- Multimeter: DC voltage mode
- Electronic load: 30V, 3A, load on

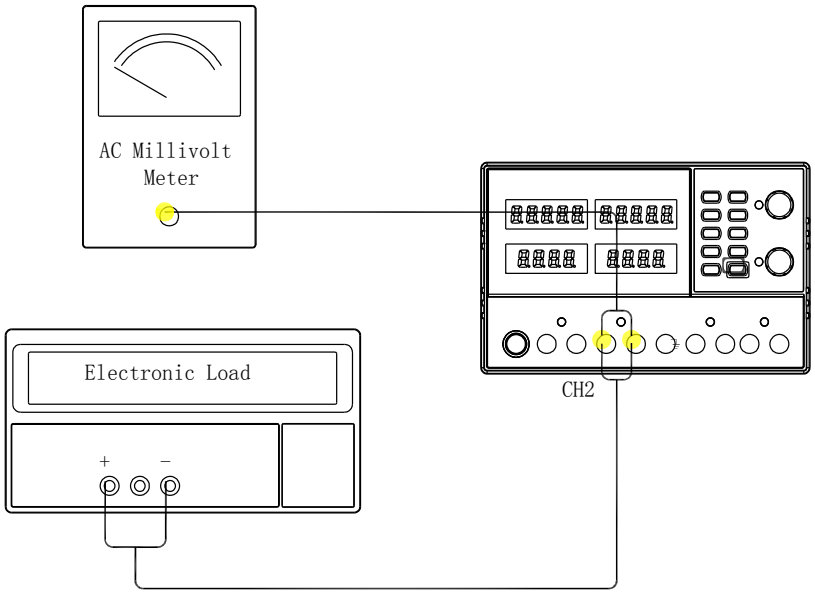
**Verifying CH1 ripple voltage**

1. Record the millivolt meter voltage reading into the log as the ripple voltage (CH1).

**Verifying CH2 ripple voltage**

2. Connect the CH2 output to the millivolt meter and load.

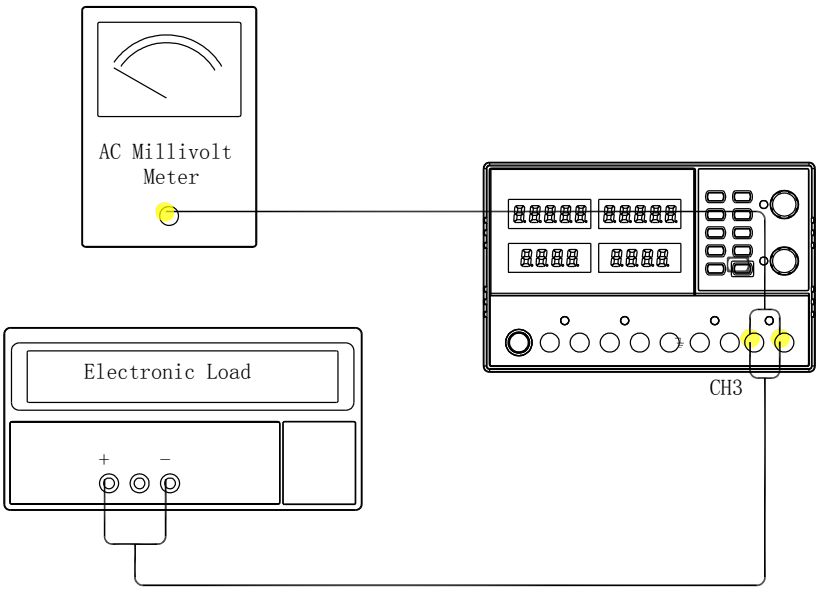
(Continues to the next page)




3. Record the millivolt meter voltage reading into the log as the ripple voltage (CH2).

Verifying CH3 ripple voltage

1. Connect the CH3 output to the millivolt meter and load.

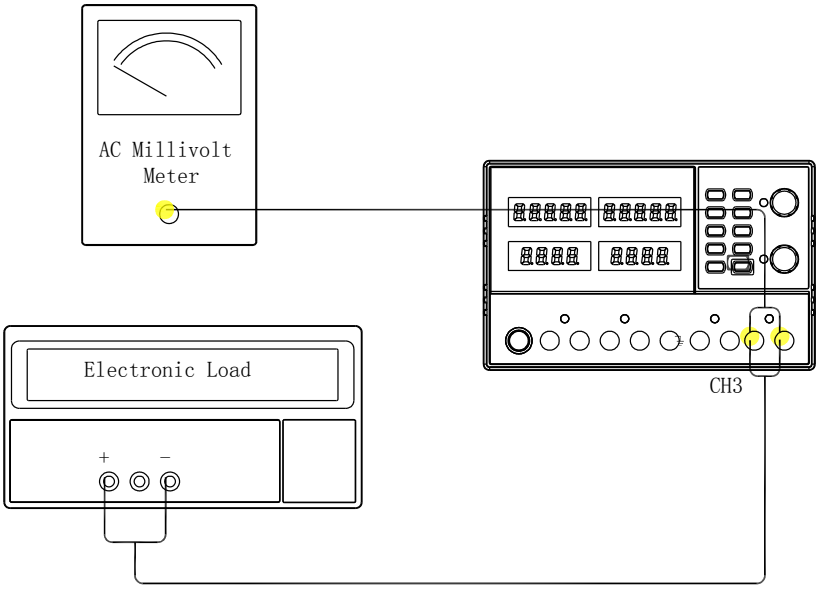



2. Change the configuration as follows.
   Power supply output voltage: 5V/3.2A
   Electronic load settings: 5V, 3A, load on

3. Record the millivolt meter voltage reading into the log as the ripple voltage (CH3).

Verifying CH4 ripple voltage

1. Connect the CH4 output to the millivolt meter and load.

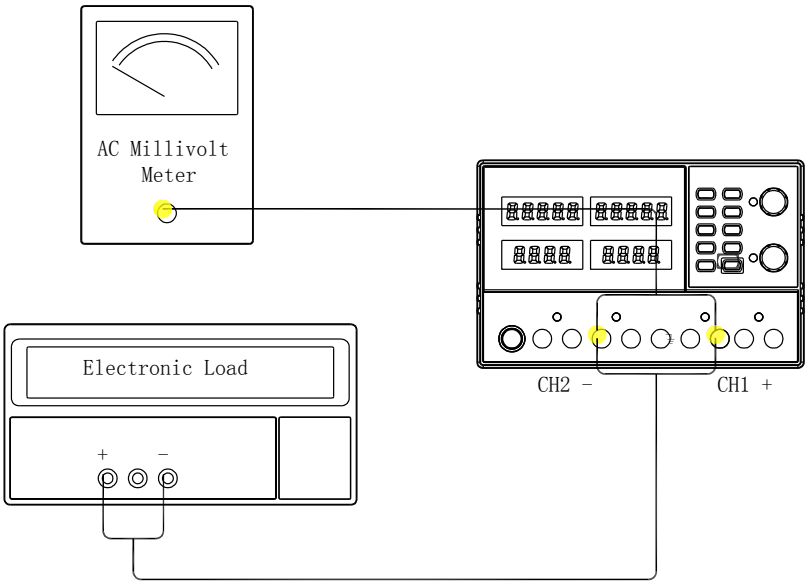



2. Change the configuration as follows.
   Power supply output voltage: 5V/1.2A
   Electronic load settings: 5V, 1A, load on

3. Record the millivolt meter voltage reading into the log as the ripple voltage (CH4).

Verifying Tracking series ripple voltage

1. Connect the power supply output to the millivolt meter and load in the tracking series mode:
   CH1 + terminal → Electronic load + terminal
   CH2 – terminal → Electronic load – terminal

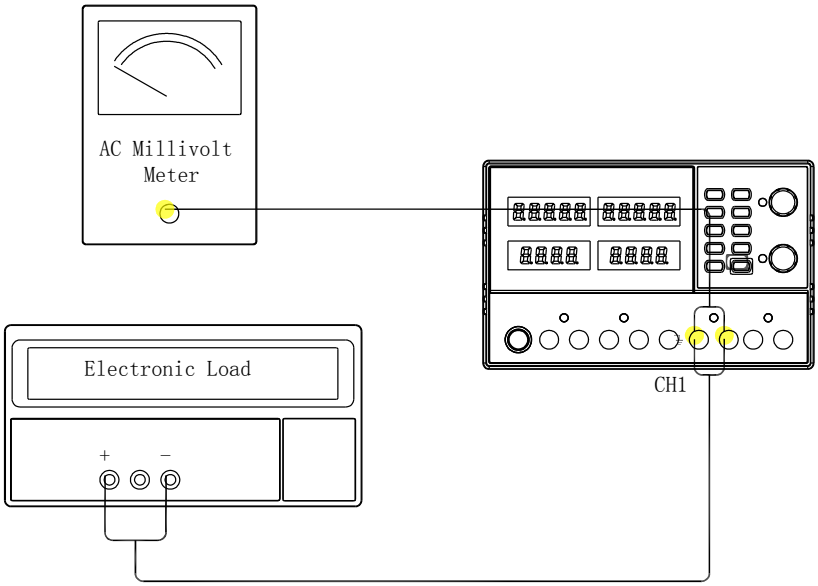


2. Change the configuration as follows.
   Power supply settings: Tracking series, 60V, 3.2A
   Electronic load settings: 60V, 3A, load on

3. Record the millivolt meter voltage reading into the log as the ripple voltage (tracking series).

Verifying Tracking parallel ripple voltage

1. Connect the power supply output to the multimeter and load in the tracking series mode:
   CH1 + terminal → Electronic load + terminal
   CH1 – terminal → Electronic load – terminal




2. Change the configuration as follows.
   Power supply settings: Tracking parallel, 30V, 6.4A
   Electronic load settings: 30V, 6A, load on

3. Record the millivolt meter voltage reading into the log as the ripple voltage (tracking parallel).

Verifying the ripple voltage is completed

# UPDATING THE FIRMWARE

The Firmware update chapter describes how to overwrite (update) the GPD-x303S firmware via the USB interface. For GPD-x303S, send the power supply back to GW Instek in case you need to update its firmware.



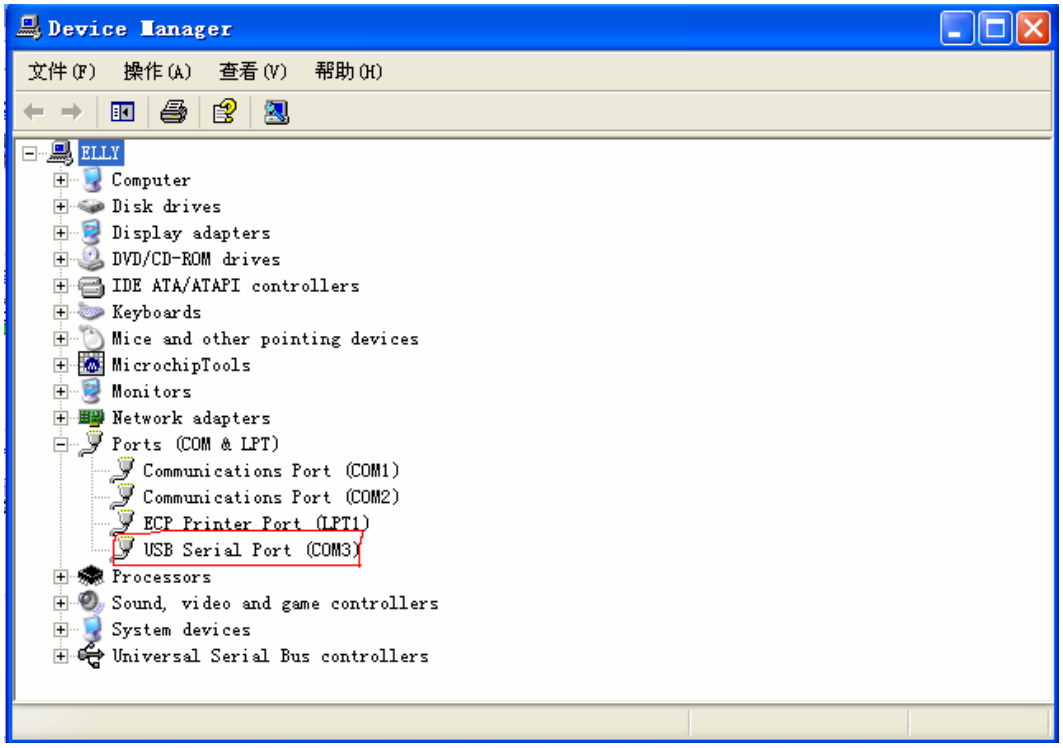
## Preparing for Firmware Update

| | |
|---|---|
| When to update the firmware | You might need to update the firmware in the following cases.<br>• The GPD-x303S system malfunction<br>• Firmware update request from GW Instek or customers |
| Tools for updating the firmware | • Firmware file (provided from GW Instek)<br>• Password for entering the firmware update mode (provided from GW Instek)<br>• GPD-x303S USB driver (details in page63)<br>• Terminal application (Hyperterminal or similar software)<br>• Windows 2000 or XP based PC<br>• USB cable, TypeA (host, PC) to Type B (slave, GPD) |
| Updating procedures (details follow) | 1. Installing the USB driver to the PC<br>2. Configuring the interface<br>3. Updating the firmware<br>If you have already installed the USB driver, go directly to step 2 (page64).<br>If you have already installed the USB driver and configured the interface, go directly to step 3 (page66). |

# Installing the USB Driver to the PC

If the USB driver has already been installed, skip this section and go to the *Configuring the Interface* section, page64.

| | |
|---|---|
| Downloading the USB driver | Access the following website and download the USB driver for FT232R, the USB device chip used in the GPD.<br>http://www.ftdichip.com/Drivers/VCP.htm |
| Installing the driver | 1. Power up the GPD-x303S and the PC.<br>2. Connect the GPD-x303S and the PC using the USB cable. A dialog window appears, requesting the driver file.<br>3. Point to the downloaded driver and install it. |
| Verifying the installation | 1. Open the Device Manager in the Control Panel.<br>2. Select the Hardware tab and open the System properties.<br>3. The USB driver should be recognized as one of the COM ports. |




Installing the USB driver is completed. Move on to the next step, *Configuring the Interface*.

# Installing the bootloader software to the PC

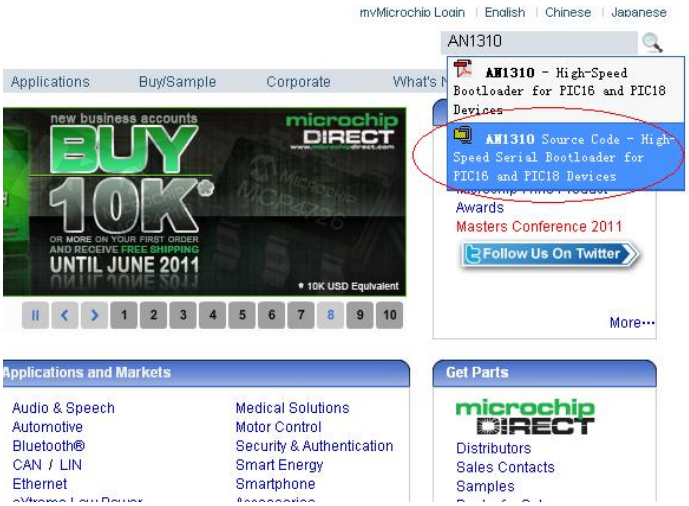
If the bootloader software has already been installed, skip this section and go to the *Configuring the Interface* section, page64.

## Downloading the bootloader software

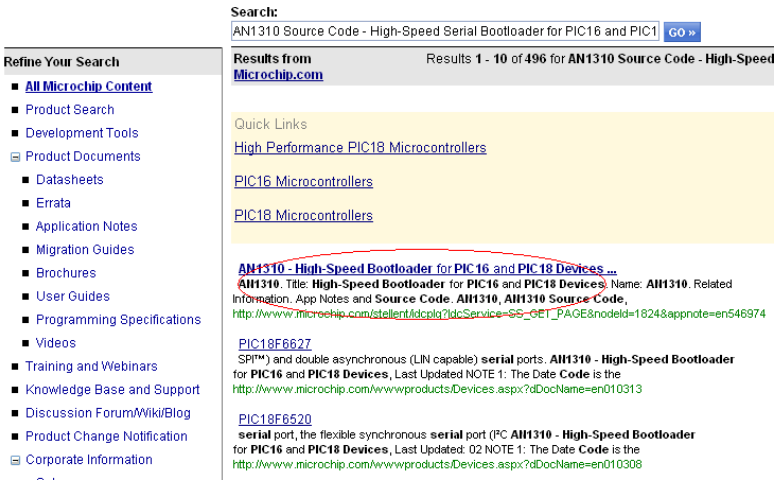
The AN1310 high-speed serial bootloader software package (including full source code) can be downloaded from the following website.

http:// www.microchip.com/applicationnotes.

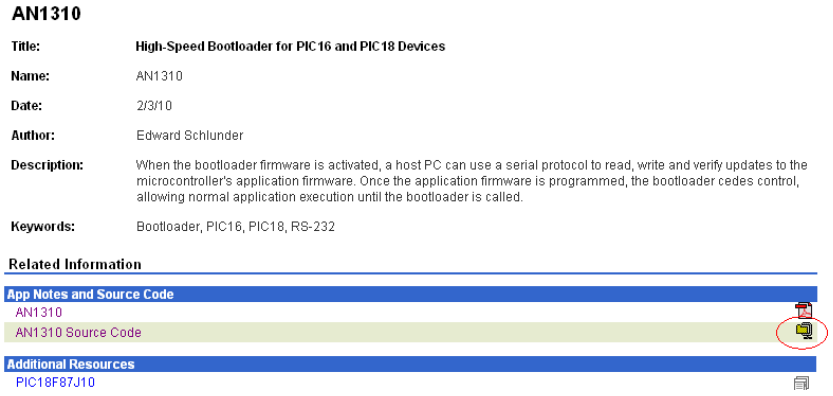
1. Enter the Microchip website. In the search bar, type AN1310. The AN1310 documentation and source code should appear. Select AN1310 Source Code.




2. Select the link showed in red below.



3. You will be shown page shown below.



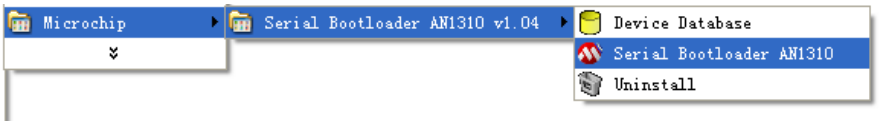

4. Click on the download icon, shown in red above.

## Installation

Unzip the download package and install.

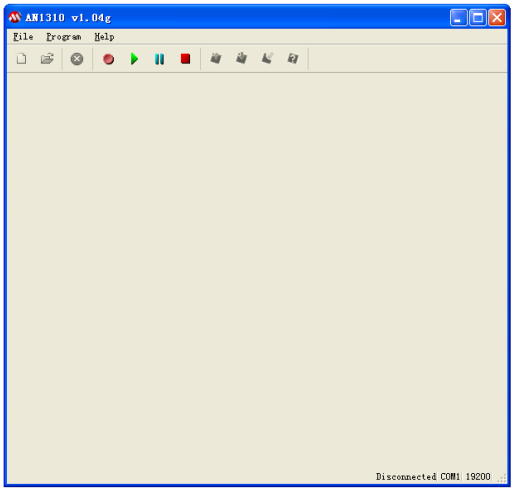
## Verifying the installation

You can confirm the installation by looking in the Start menu, as shown below.

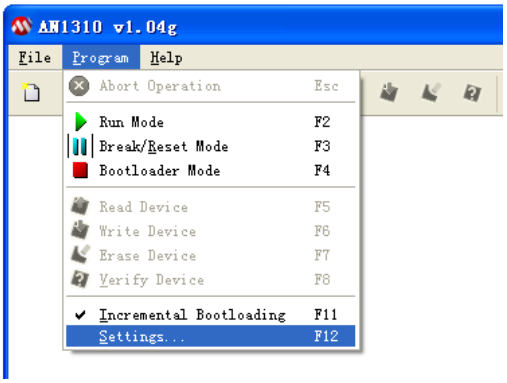



## Set Parameters

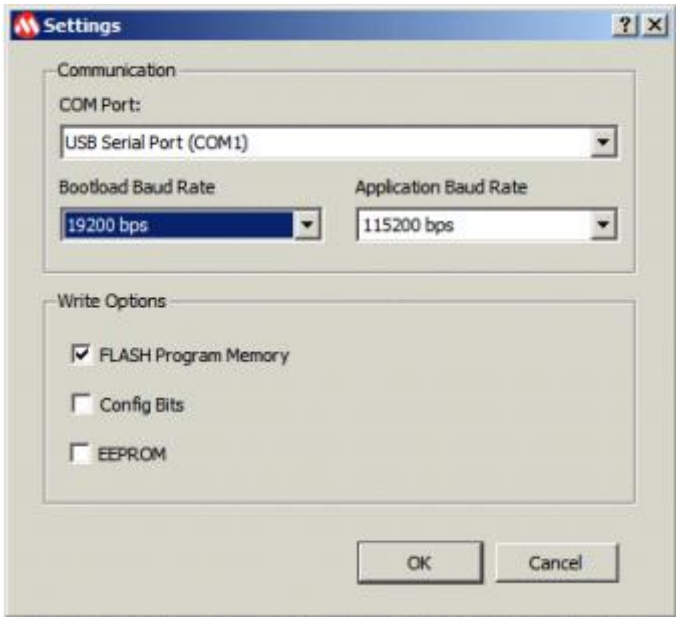
1. Click on the Serial Bootloader AN1310 icon, as shown above. The following screen appears.




2. If this is the first time you have used the bootloader program, the serial port settings and baud rate must first be configured.




3. Clicking Program→Settings will make the following screen appear.



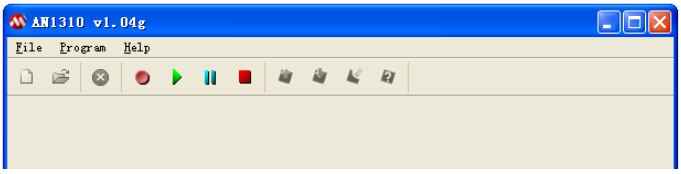

4. Select the COM port number and the Bootload Baud Rate, and then click OK.

Installing the bootloader software is completed. Move on to the next step, *Updating the firmware*.

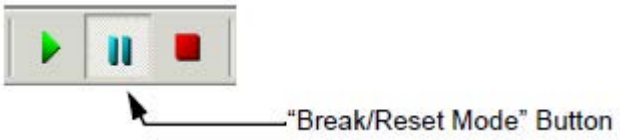
# Updating the Firmware

Steps

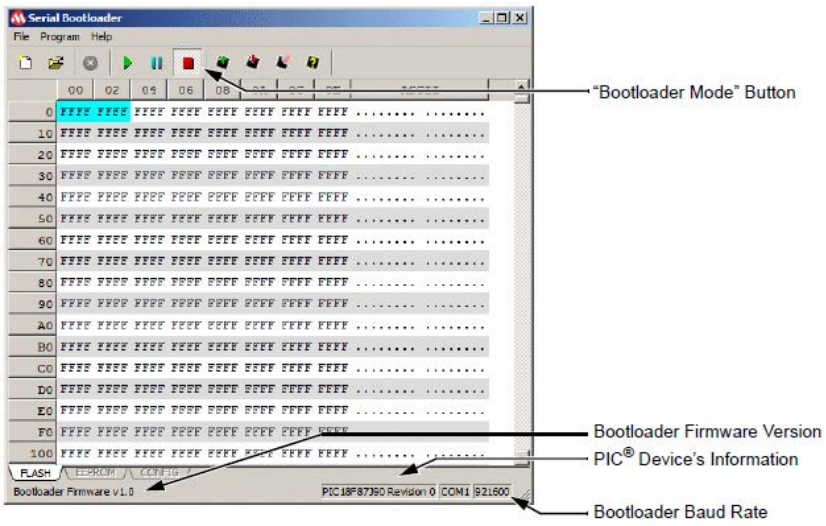
1. Power up the GPD-x303S.
2. Connect the GPD-x303S to the PC using the USB cable.
3. Below shows the AN1310 bootloader program toolbar.




4. Click the Break/Reset Mode button or press F3 until "Break asserted" appears.

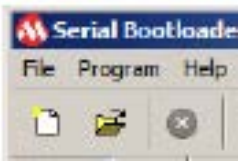



5. Turn on the GPD-x303s.
6. To enter the bootstrap mode, click the red "Bootloader Mode" button or press the F4 key. If communication is established, the PC will display the firmware version of the bootstap program and the PIC device information. This is shown below.




Selecting the firmware file

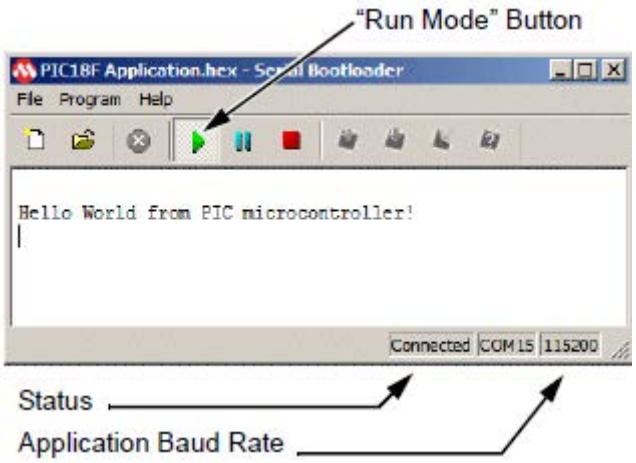
7. Load the HEX update file.



Updating the firmware

8. After the file is loaded, click the icon with the red arrow pointing down or press the F6 button.

9. Click the green "Run Mode" icon or press the F2 key to run the software on the GPD-x303S.




10. The GPD will shut down after completion. Remove the USB cable.

Updating the firmware is completed.

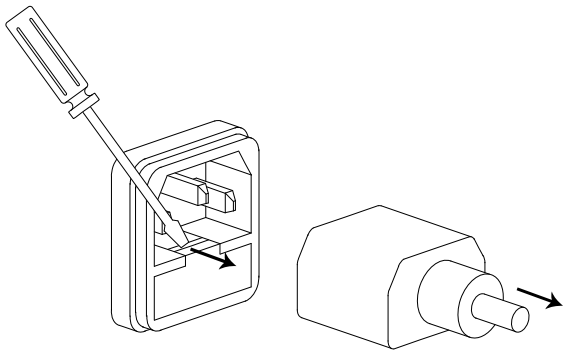
# REPLACING THE FUSE

Two types of fuse are inserted in the power supply. The primary fuse, located in the power cord socket, and the secondary fuses, mounted on the power supply PCB.

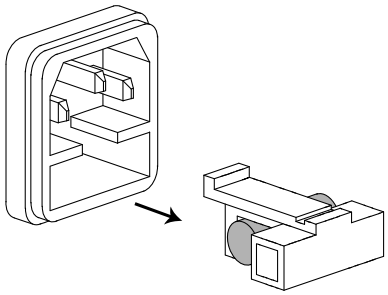


## Replacing the Primary Fuse

| | |
|---|---|
| ⚠ WARNING | Make sure the cause of fuse blowout is fixed before replacing the fuse. |
| Rating | • 100V/120V:T6.3A/250V<br>• 220V/230V:T3.15A/250V |
| Procedures | 1. Take off the power cord and remove the fuse socket using a minus driver. |



2. Replace the fuse in the holder.



Replacing the primary fuse is completed

# Replacing the Secondary Fuses

⚠ WARNING Make sure the cause of fuse blowout is fixed before replacing the fuse.

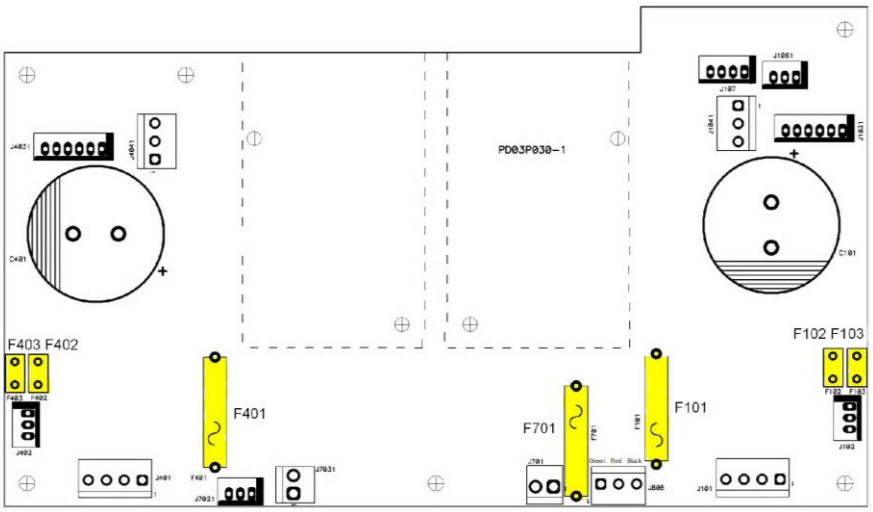
Procedures

1. Take off the outer casing and the supporting bar. For details, see page72.
2. Locate the secondary fuses on the power supply PCB and replace the blown fuse.

Rating

Power supply PCB（Yellow area):

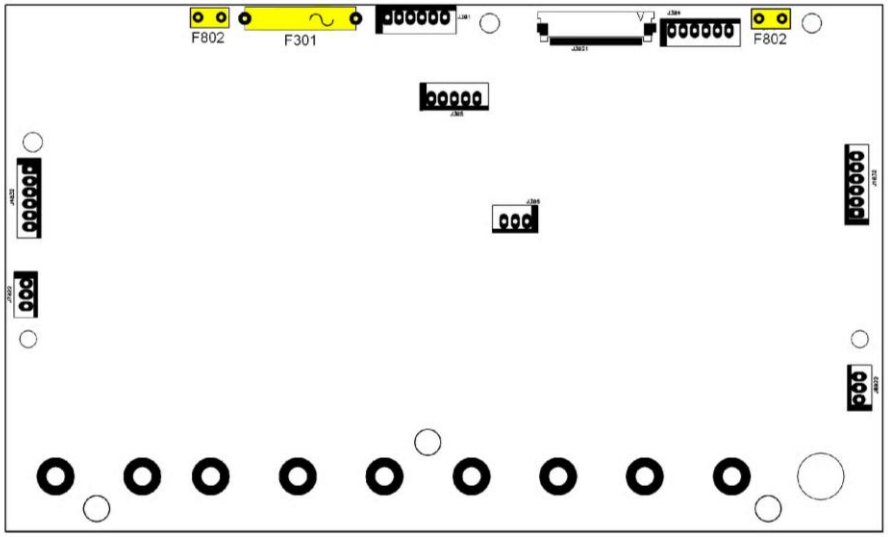
- F101/F401:T6.3A/250V
- F102/F103/F402/F403:T315mA/250V
- F701: T6.3A/250V (3303S,4303S)




Rating

Control PCB（Yellow area):

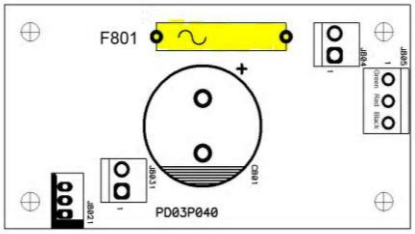
- F301: T2A/250V
- F702: T315mA/250V (3303S,4303S)
- F802: T315mA/250V (4303S)




Rating

CH4 Power PCB（Yellow area):

- F801: T2A/250V (4303S)




Replacing the secondary fuses is completed

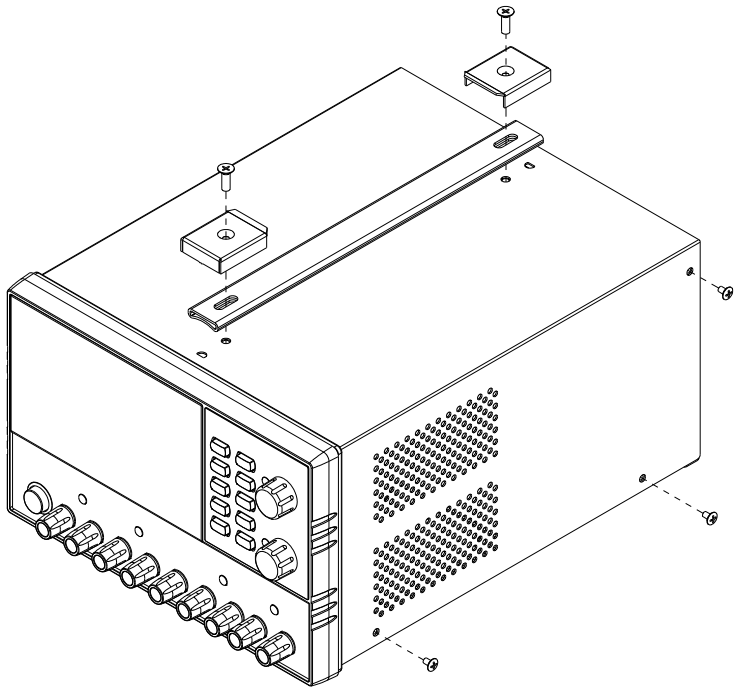
# DISASSEMBLING THE POWER SUPPLY

The Disassembly chapter shows how to remove the major units, PCBs, panels, and outer casing, from the power supply. The procedures described in this chapter are intended for parts replacement and board adjustment. The Parts List chapter (page90) shows more details about the mechanical structures of the power supply and thus can be used as a reference.

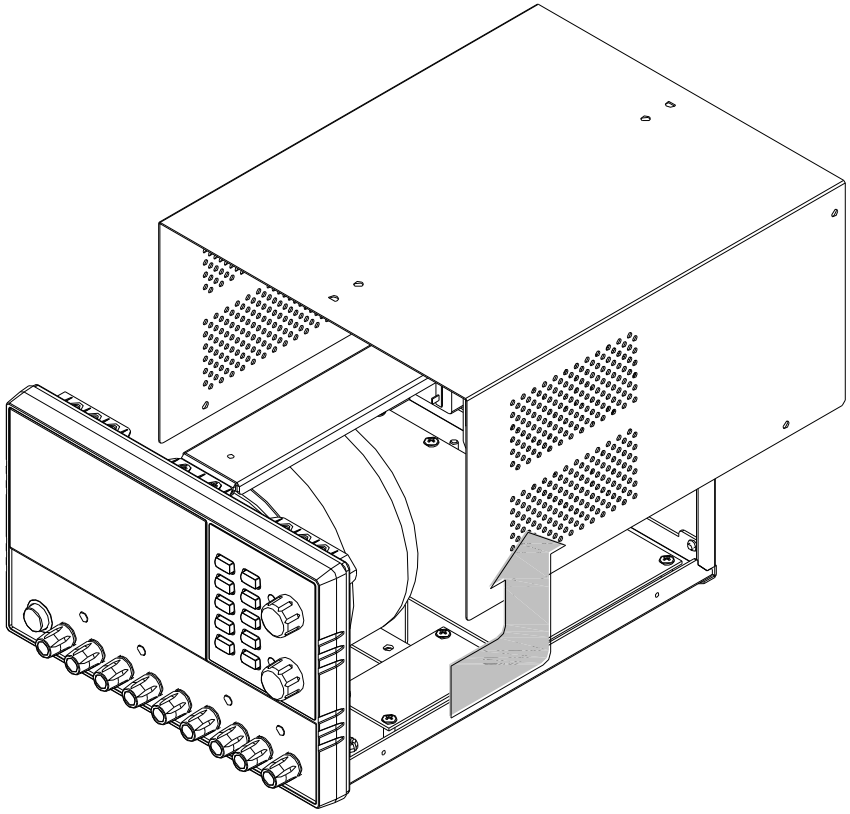


## Outer Casing & Supporting Bar

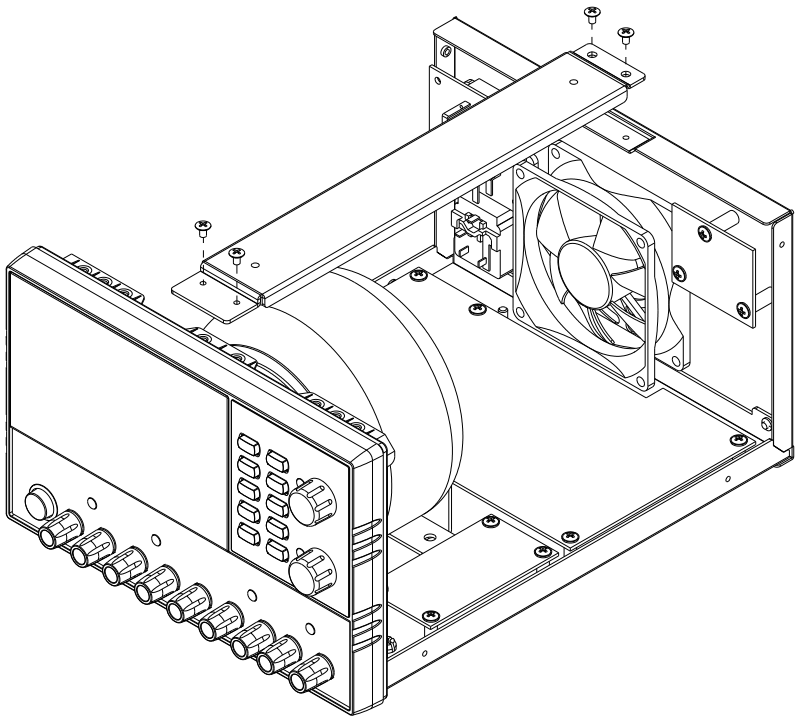
1. Take off two screws from the top handle and six screws from the side panels and remove it from the outer casing.



2. Slide the outer casing backward and remove it.



3. Take off four screws from the supporting bar and remove it.

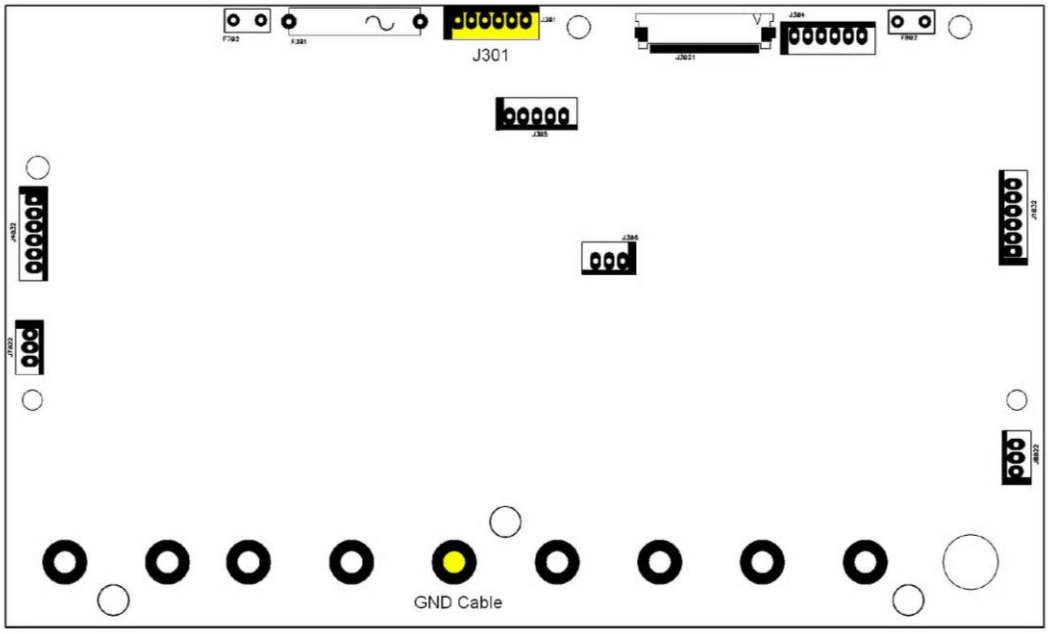


Disassembling the outer casing and supporting bar is completed

# Front Panel

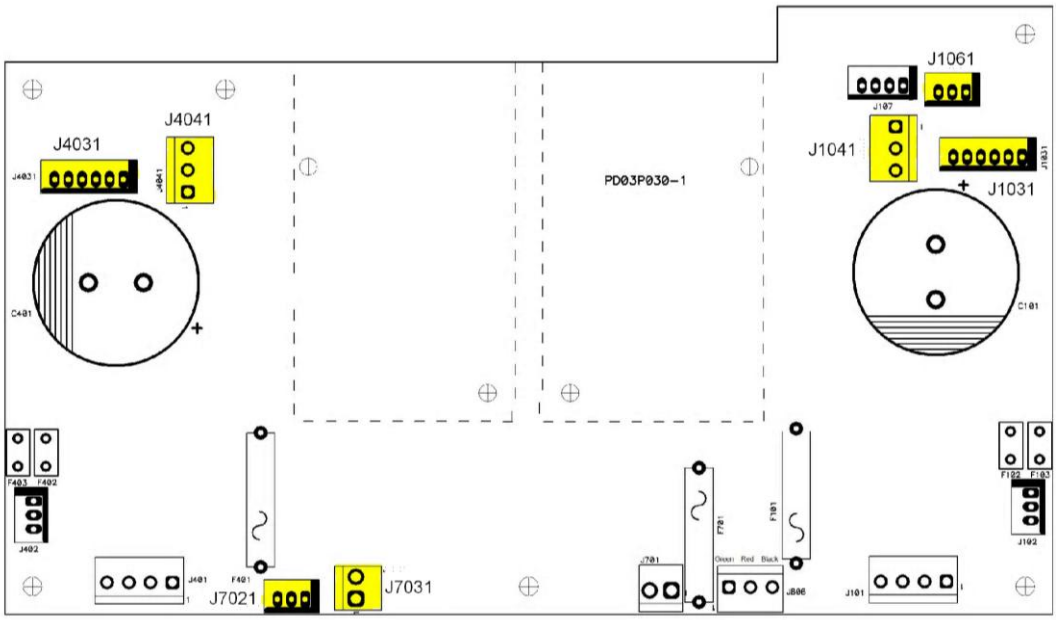
1. Take off the outer casing and supporting bar. For details, see page72.
2. Disconnect the cables from the front panel.

Control PCB：J301, GND Cable（Yellow area)

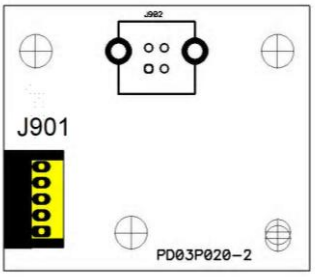



3. Disconnect the rest of the cables.

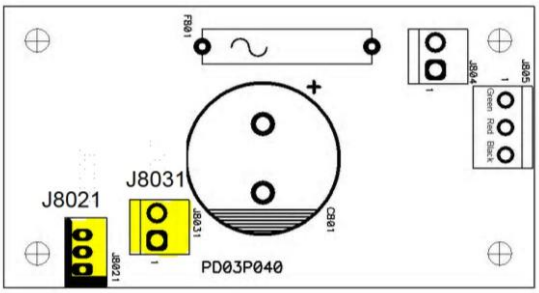
a, Power PCB:J1031, J1041, J1061, J4031, J4041, J7021, J7031（Yellow area).



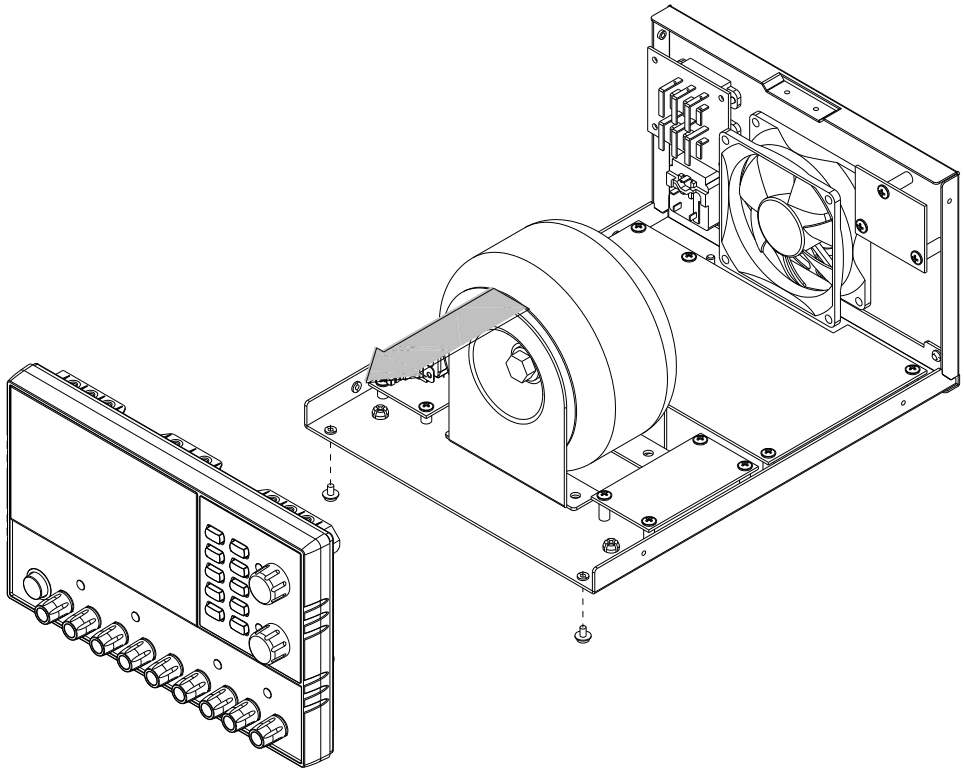
b, USB PCB：J901（Yellow area).




c, CH4 power PCB：J8021, J8031（Yellow area).



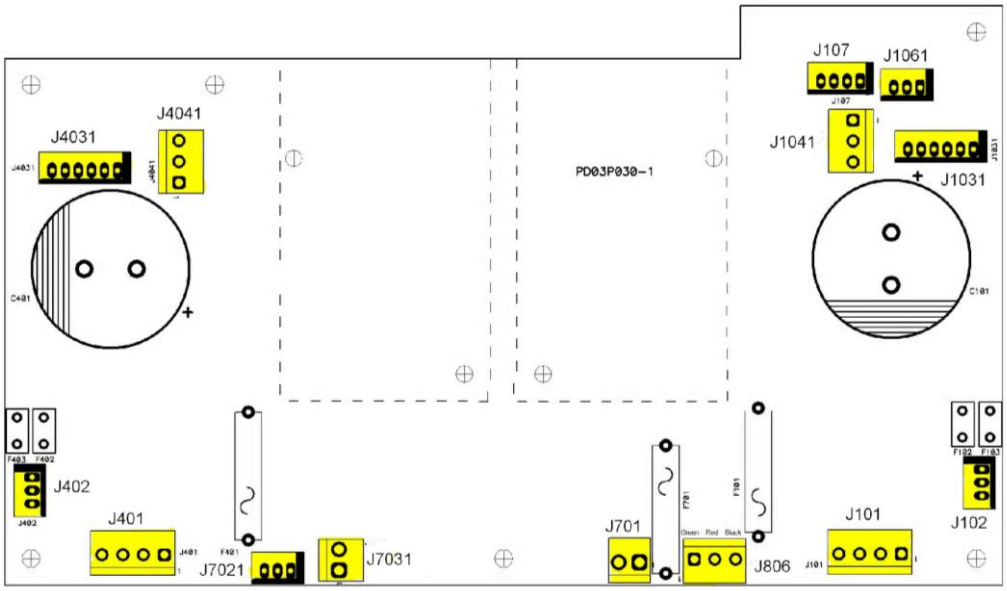

4. Take off two screws from the bottom of the front panel and pull the front panel out.



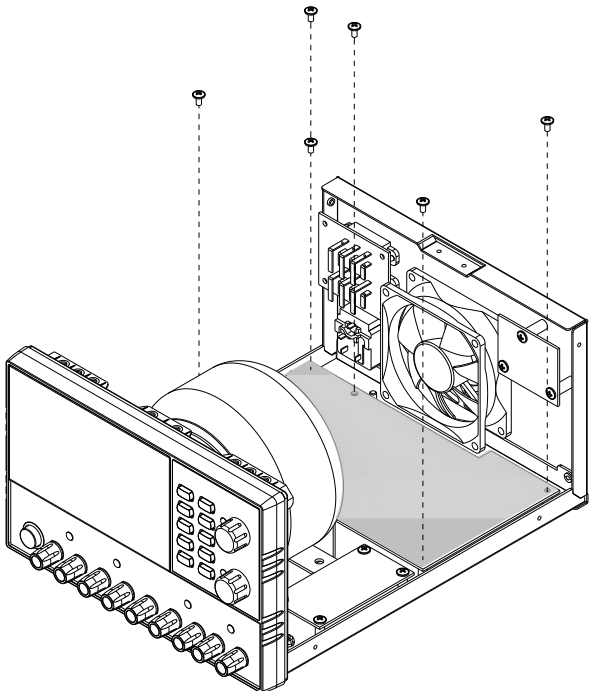
Front panel disassembly is completed

# Power Supply PCB

1. Take off the outer casing and supporting bar. For details, see page72.
2. Disconnect all the cables connected to the power supply PCB: J101, J102, J1031, J1041, J1061, J107, J401, J402, J4031, J4041, J701, J7021, J7031, J806. （Yellow area)




3. Take off six screws from the power supply PCB and remove it.

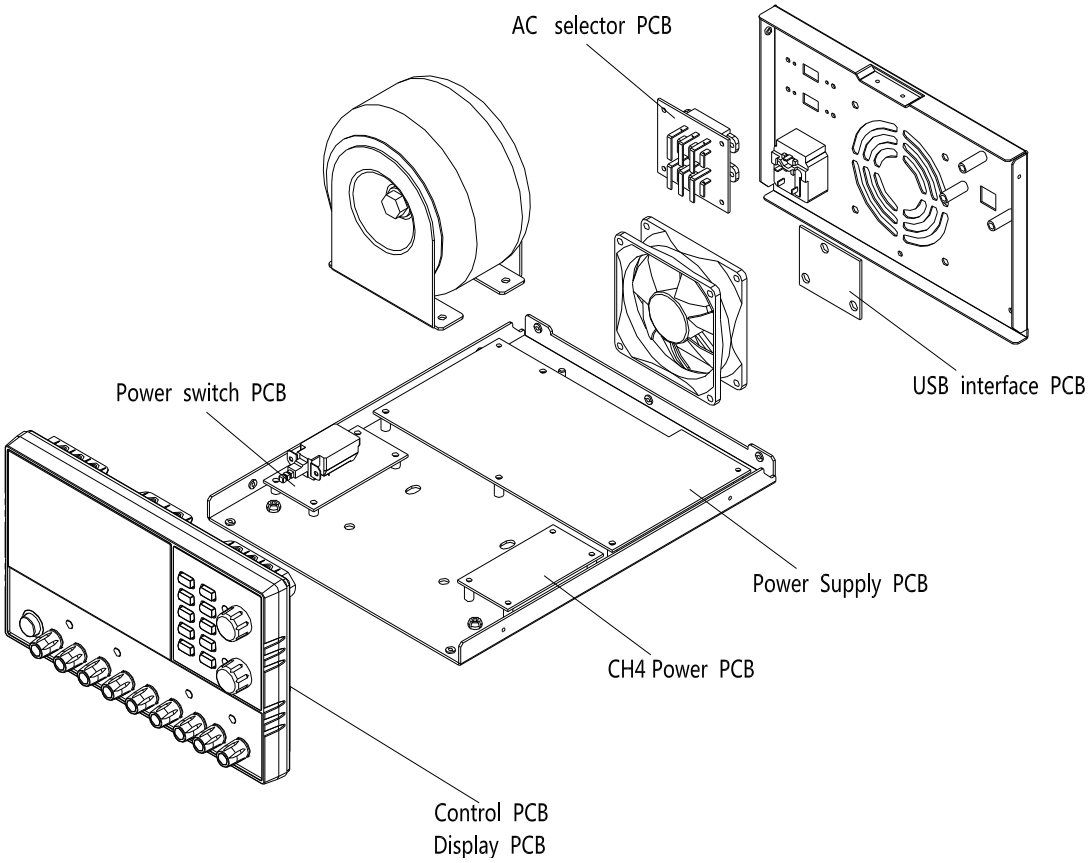


Disassembling the power supply PCB is completed

# GPD-x303S PCB & Circuit Diagram

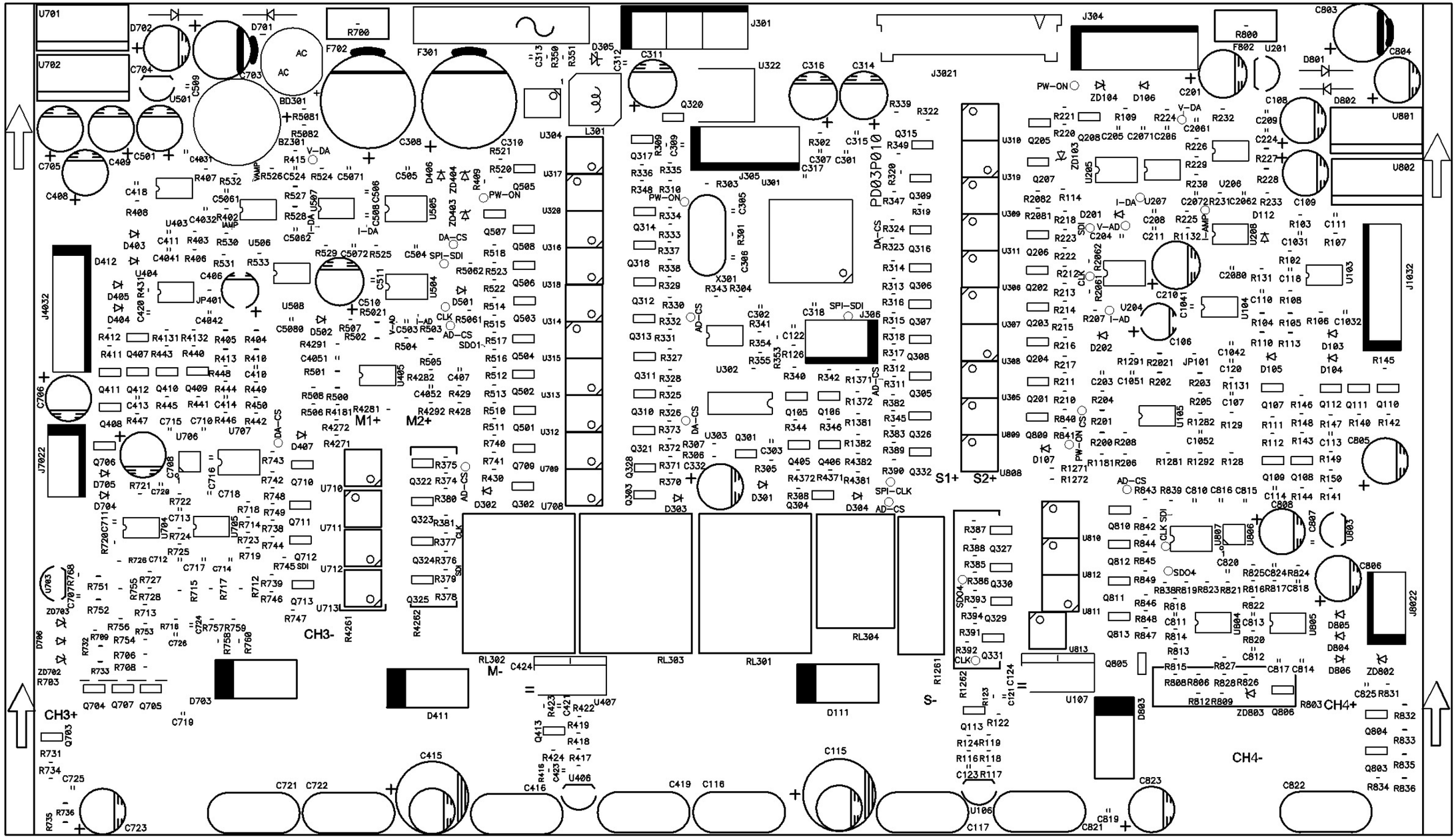
This chapter shows the PCB layout and circuit diagrams used in the GPD-x303S. For the list of parts including both the mechanical and PCB parts, see the *Parts List* chapter, page90.

# Overview

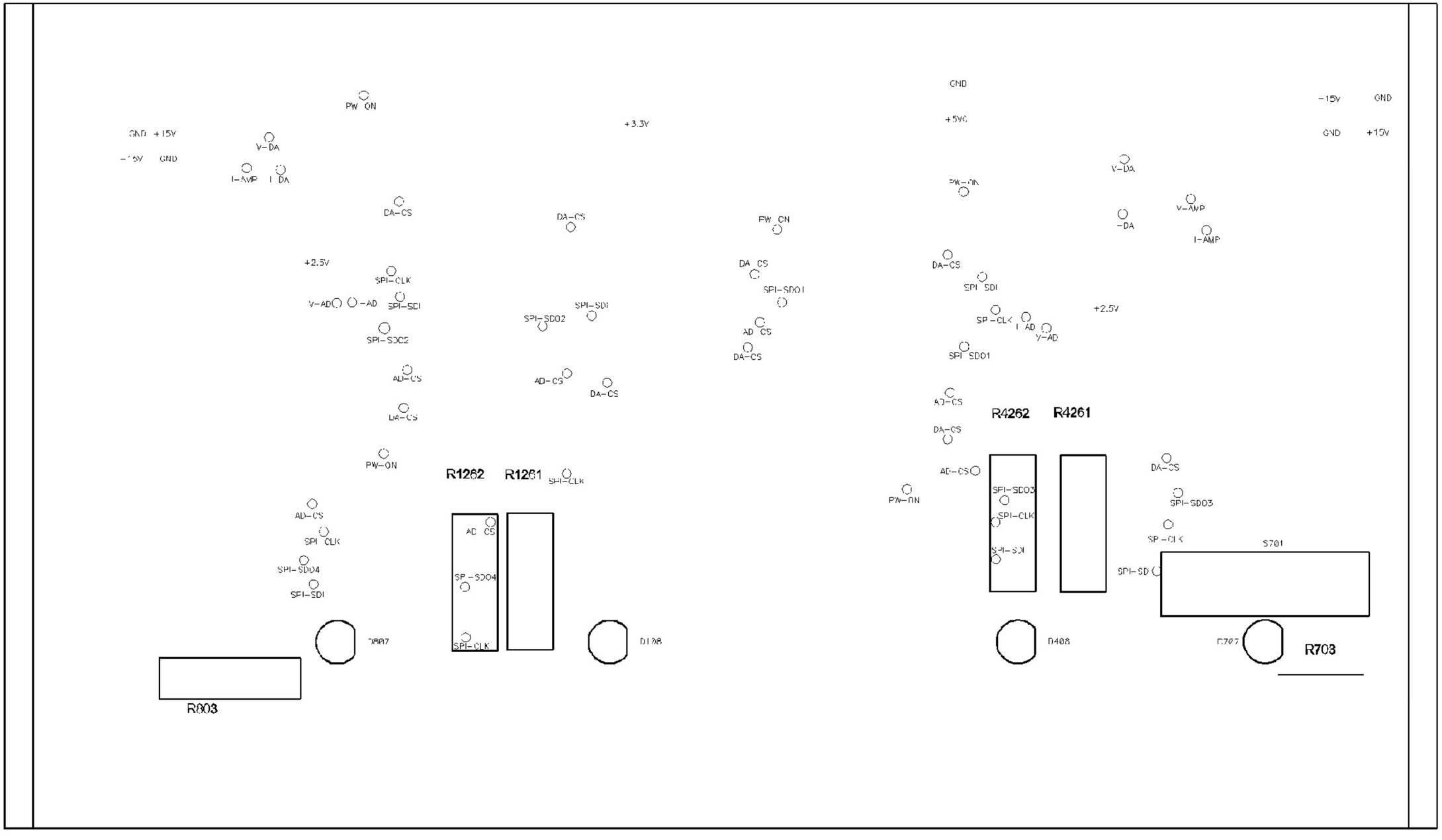

AC selector PCB
USB interface PCB
Power switch PCB
Power Supply PCB
CH4 Power PCB
Control PCB
Display PCB

# GPD-x303S Control PCB

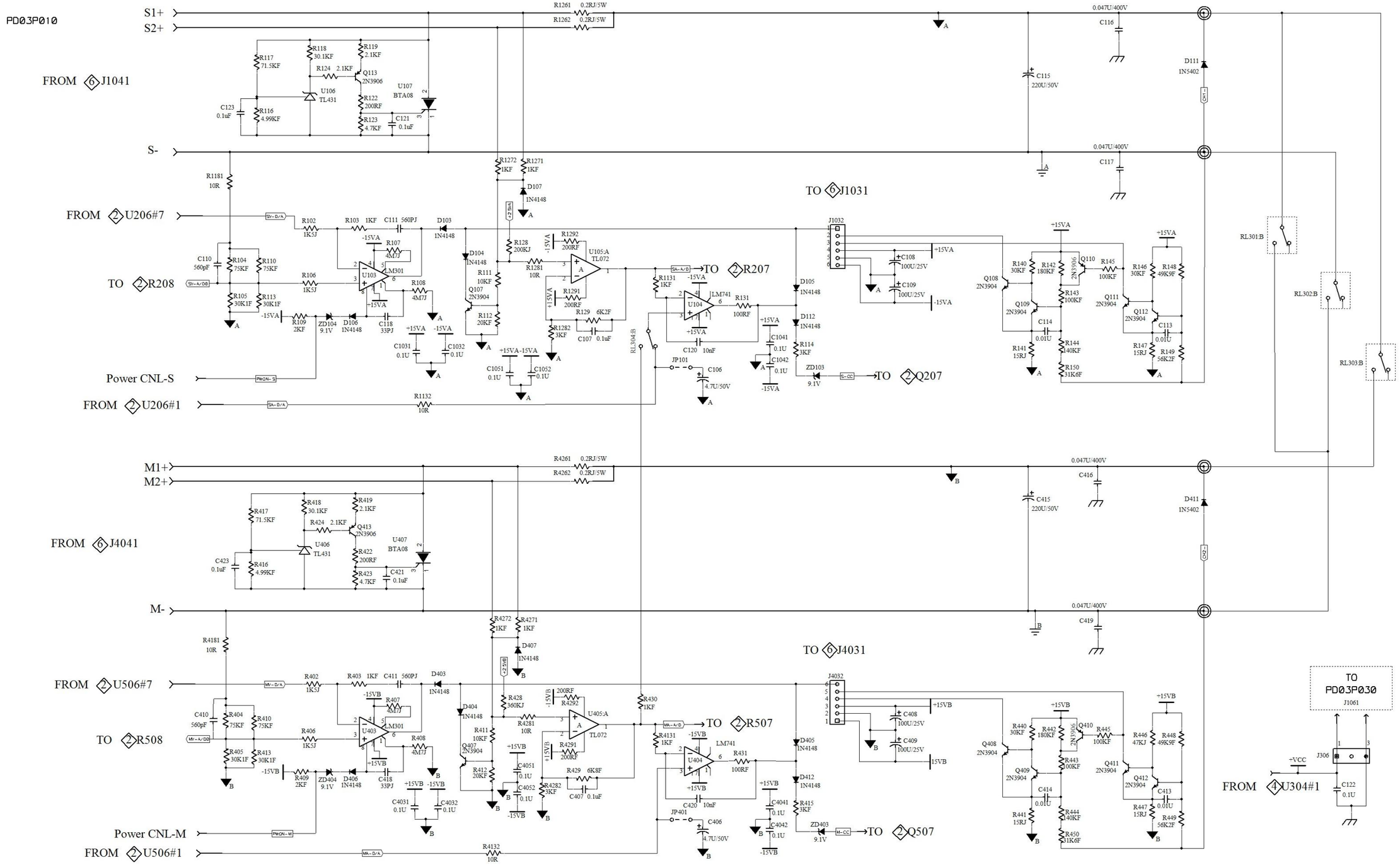
## GPD-x303S control PCB layout top side layout



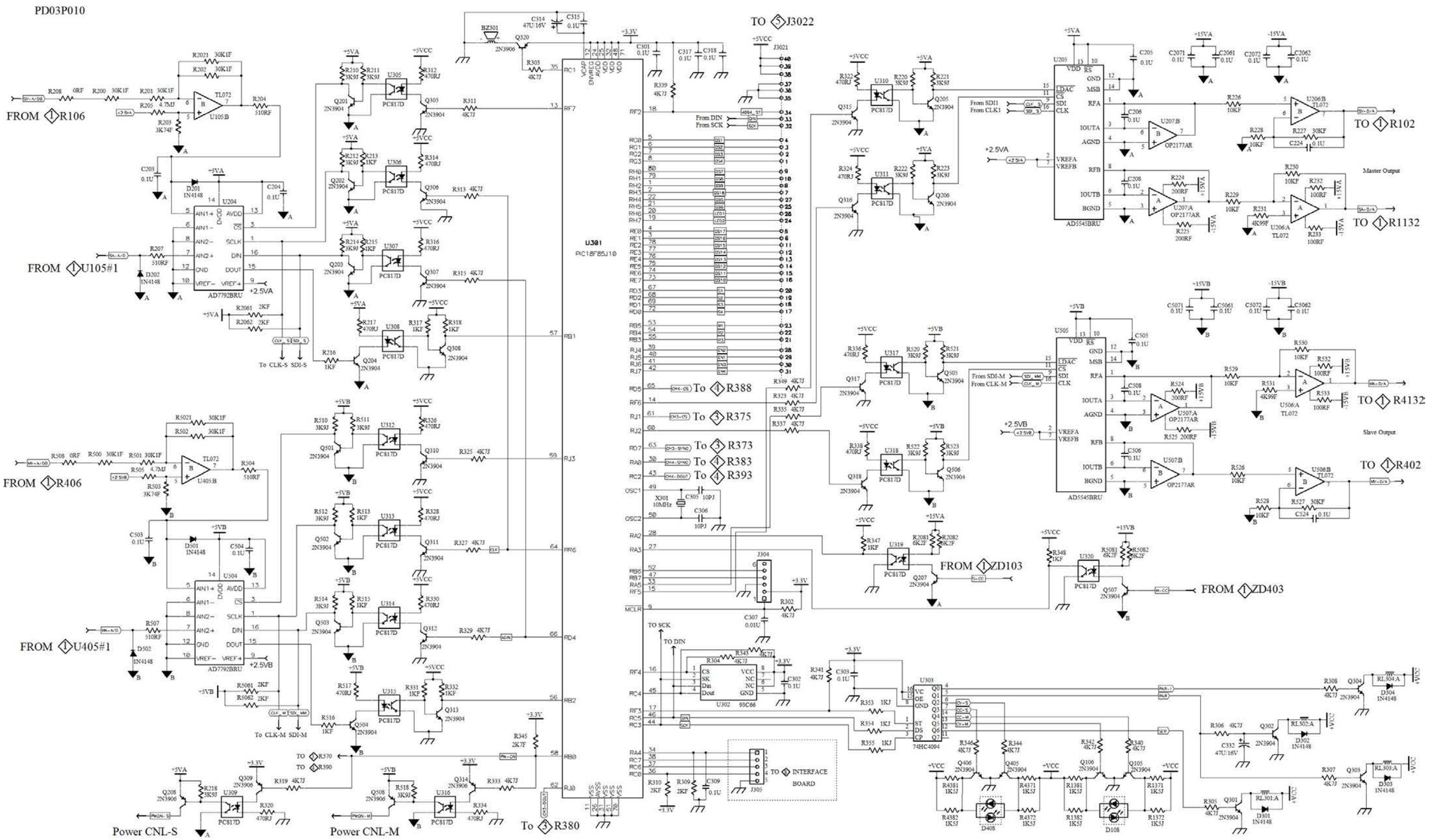
## GPD-x303S control PCB layout bottom side layout



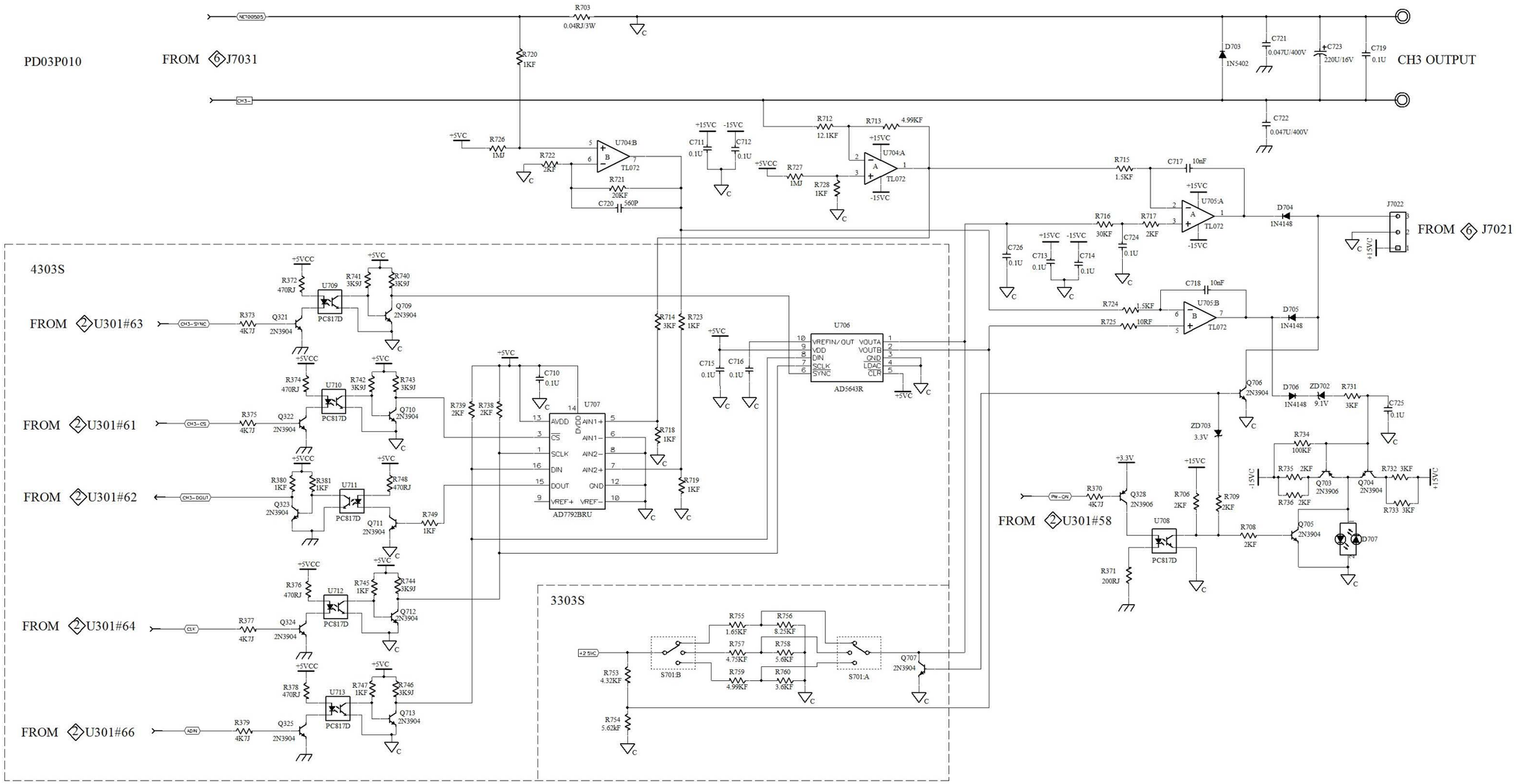
# GPD-x303S control PCB circuit diagram 1/4

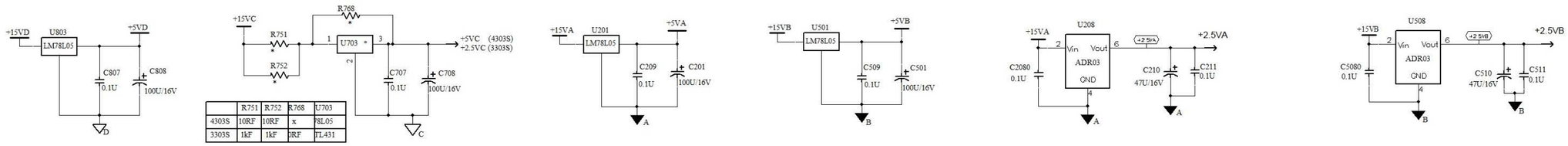


# GPD-x303S control PCB circuit diagram 2/4



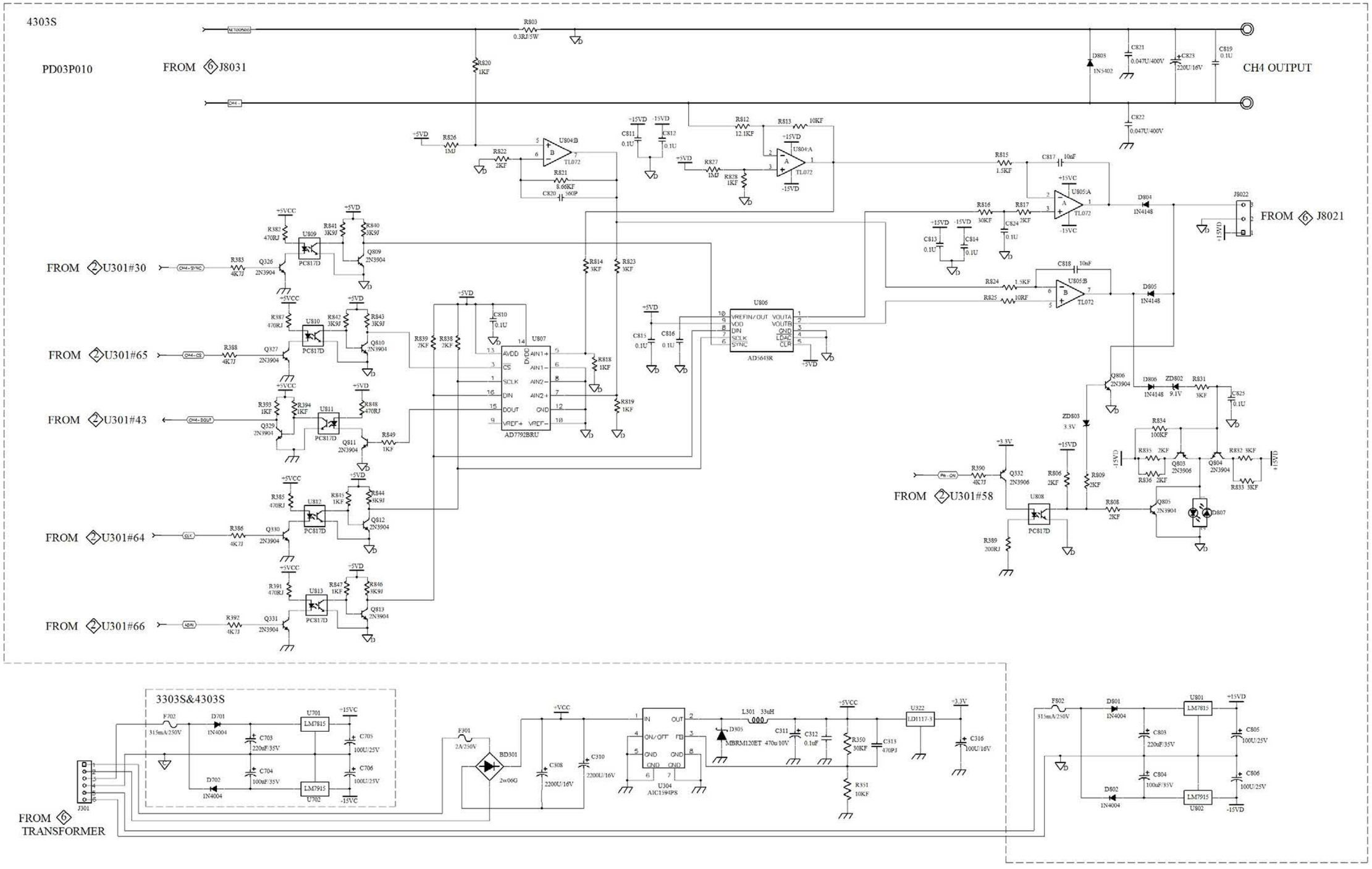
# GPD-x303S control PCB circuit diagram 3/4



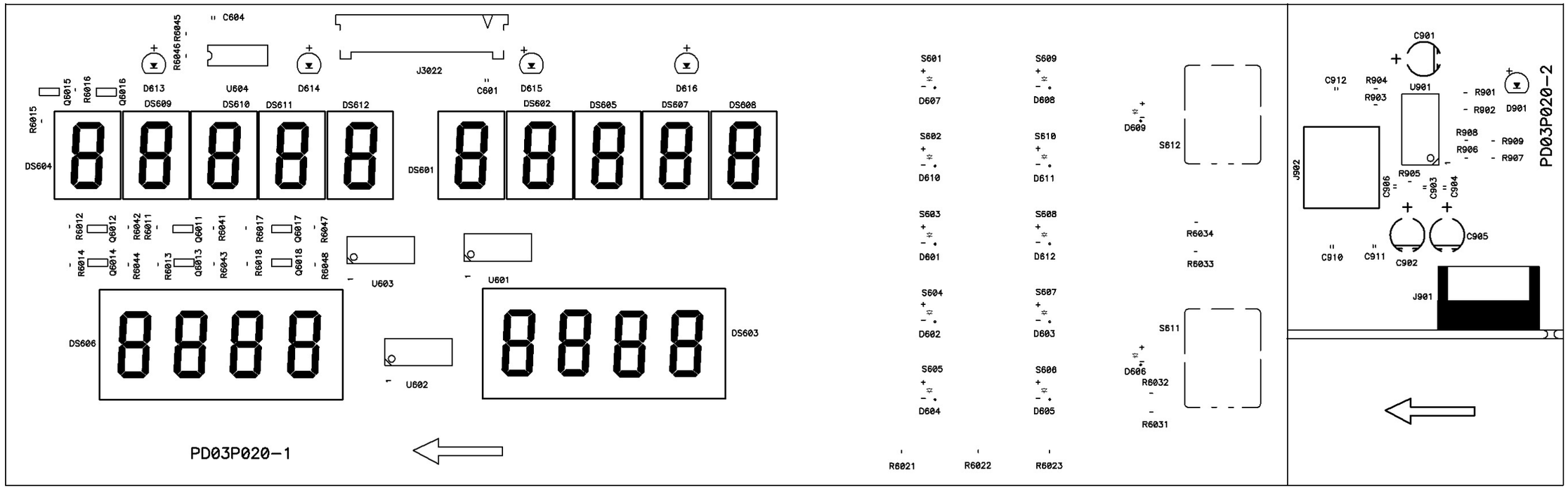

| | R751 | R752 | R768 | U703 |
|---|---|---|---|---|
| 4303S | 10RF | 10RF | x | 78L05 |
| 3303S | 1kF | 1kF | 0RF | TL431 |

# GPD-x303S control PCB circuit diagram 4/4

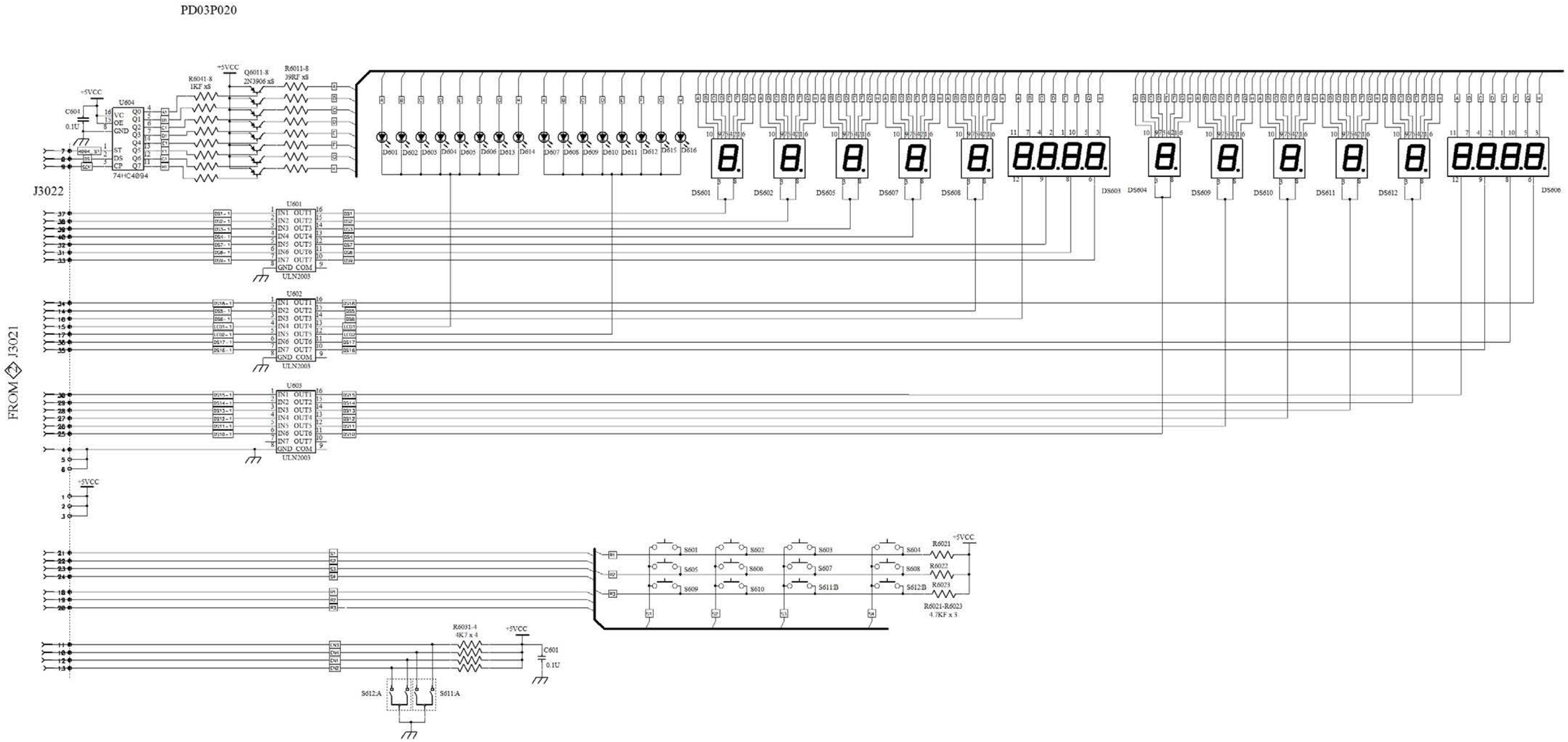


# GPD-x303S Display PCB

## GPD-x303S display PCB Top side layout

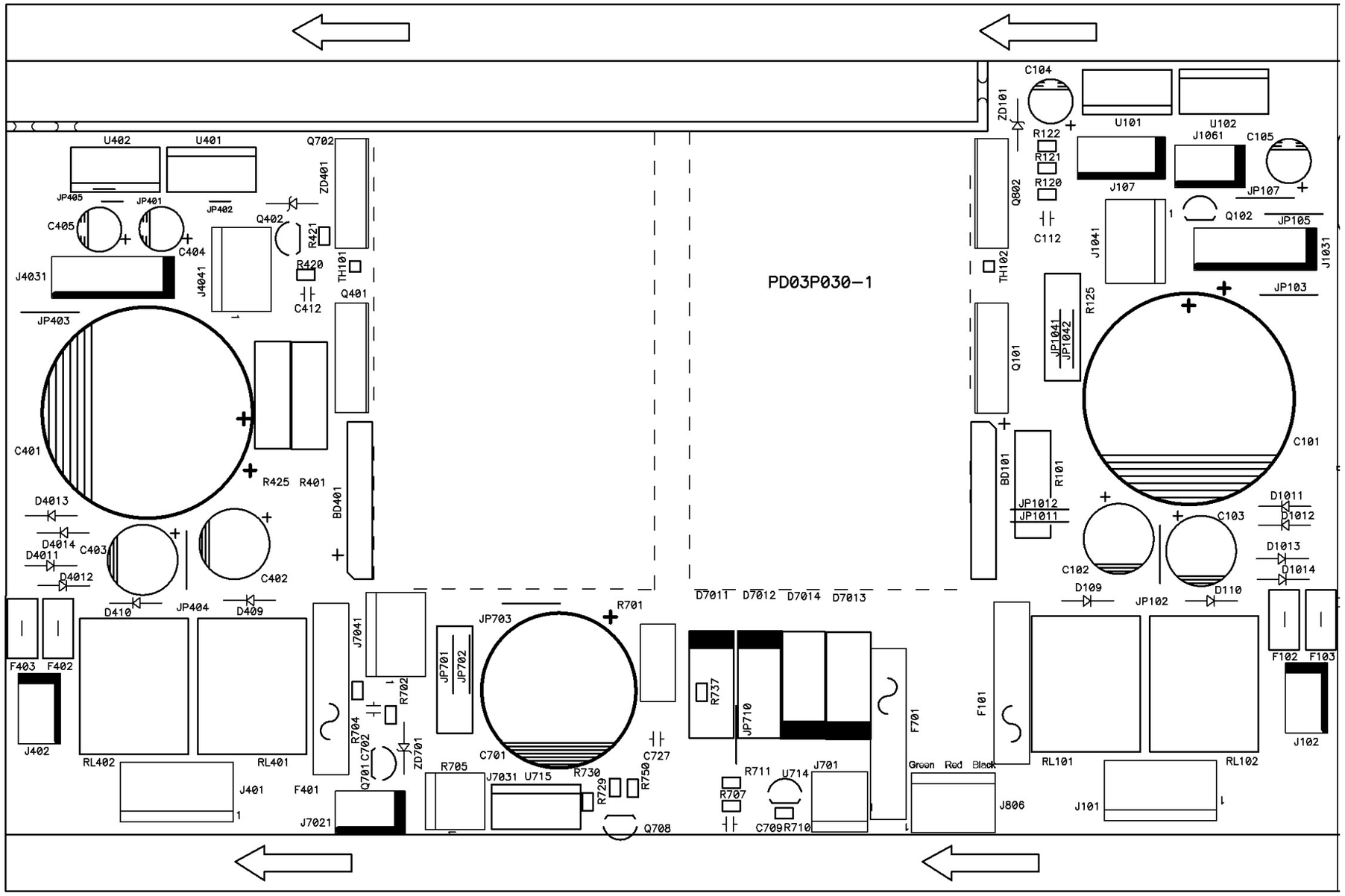


# GPD-x303S display PCB circuit diagram

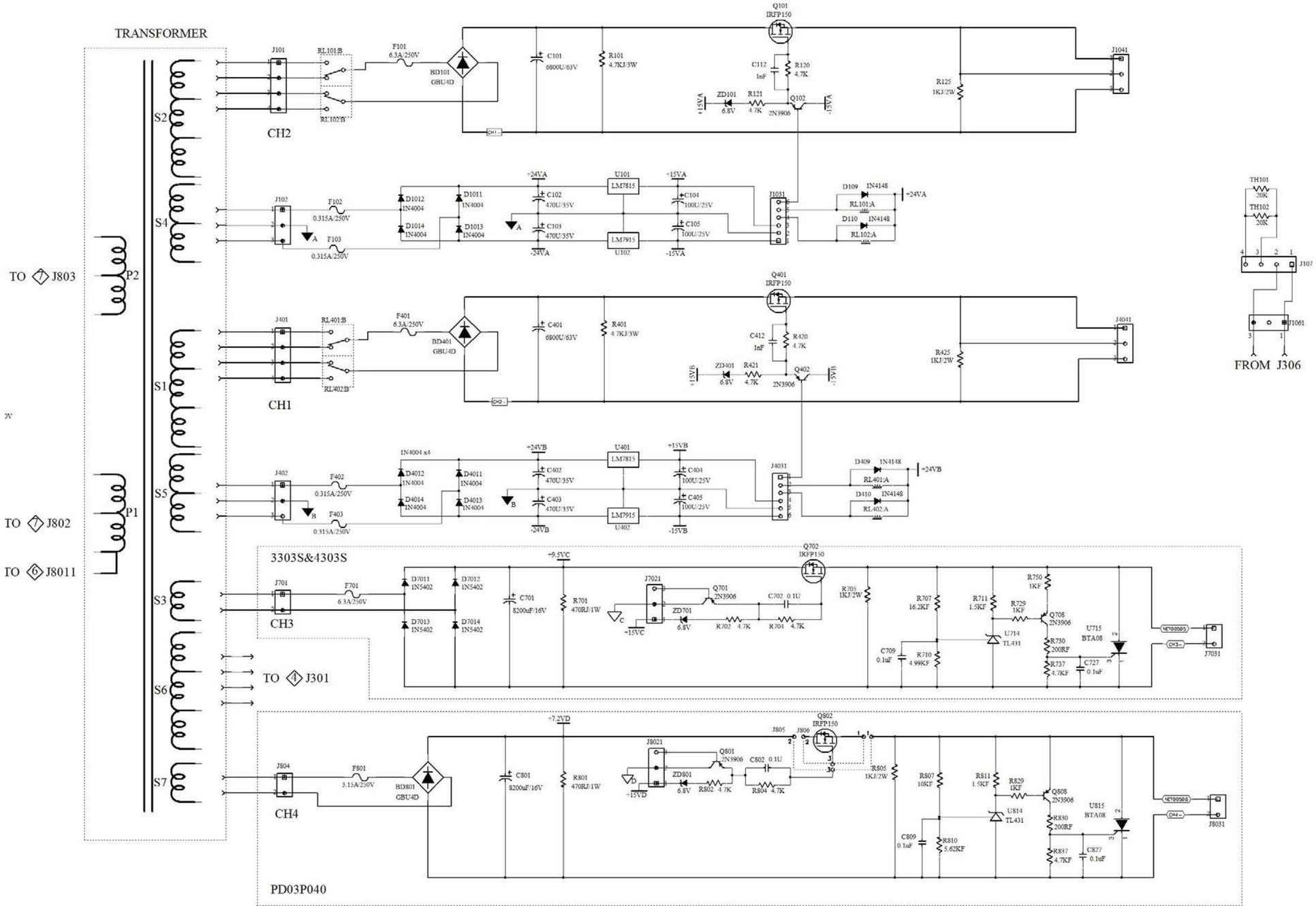


# GPD-x303S Power Supply PCB

## GPD-x303S power supply PCB layout (CH1/CH2/CH3)

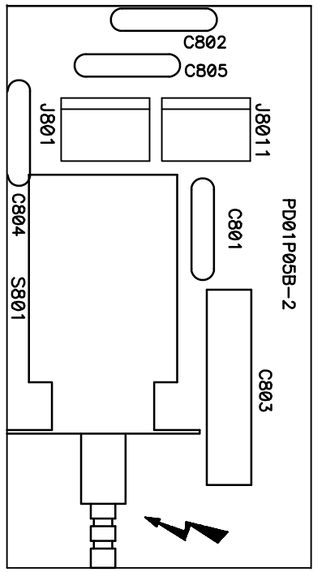


# GPD-x303S power supply PCB circuit diagram (CH1/CH2/CH3/CH4)

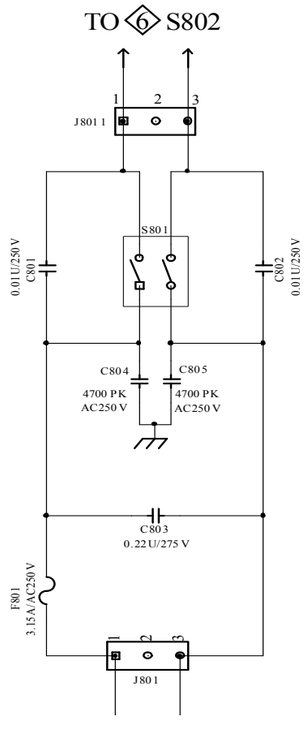


# GPD-x303S Power Switch PCB, CH4 Power PCB, AC Selector PCB, USB Interface PCB

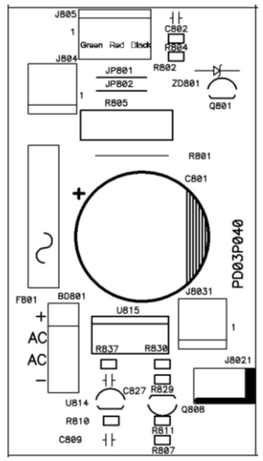
Power switch PCB layout



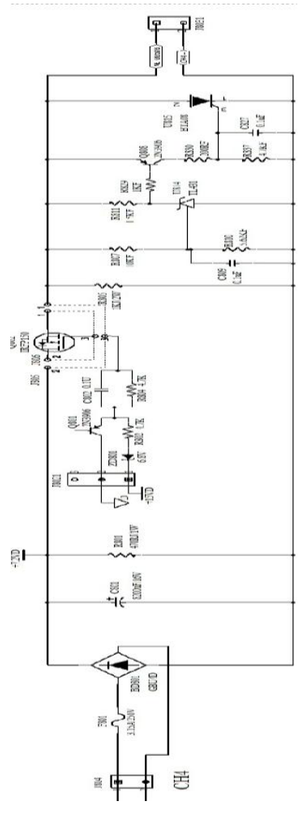

Power switch PCB circuit diagram



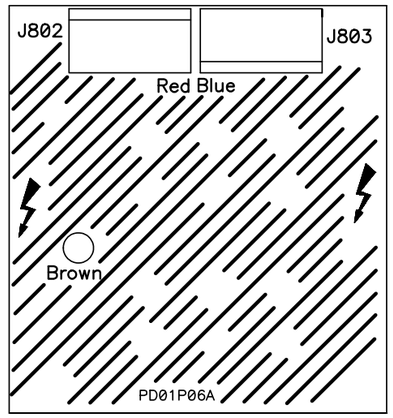

CH4 Power PCB layout



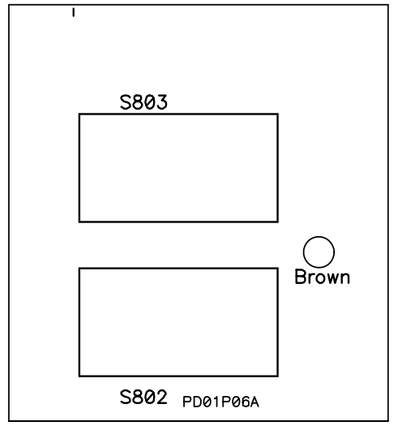

CH4 Power PCB circuit diagram



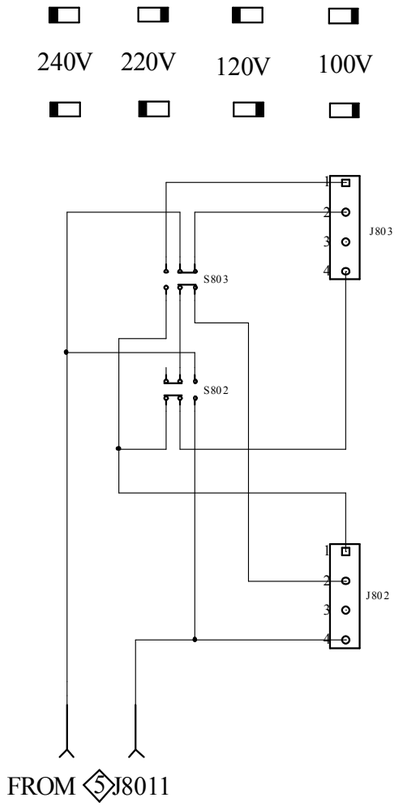
AC selector PCB top side layout



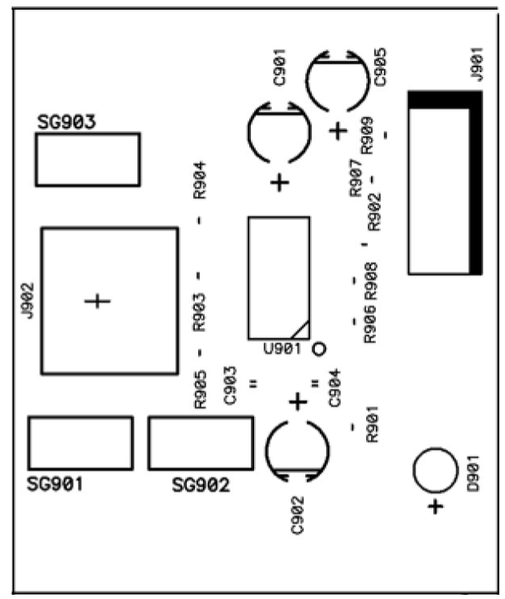

AC selector PCB bottom side layout



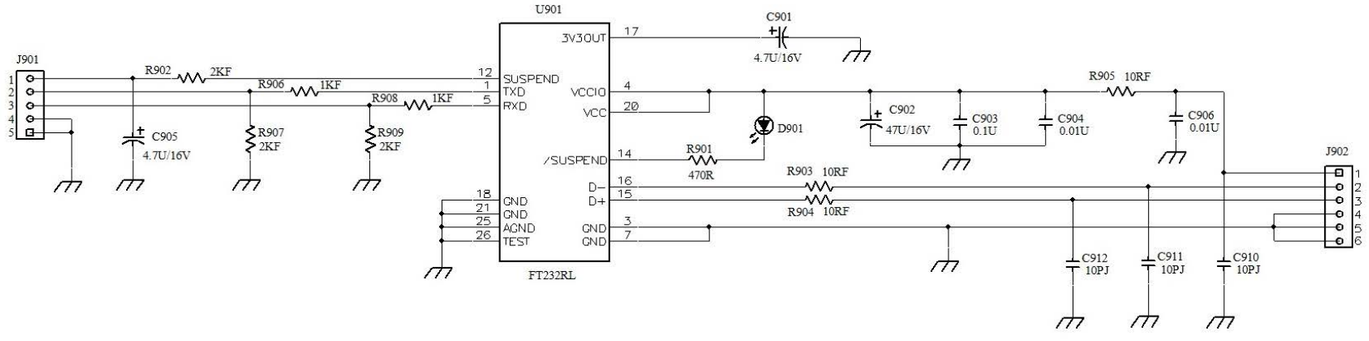

AC selector PCB circuit diagram




USB interface PCB layout



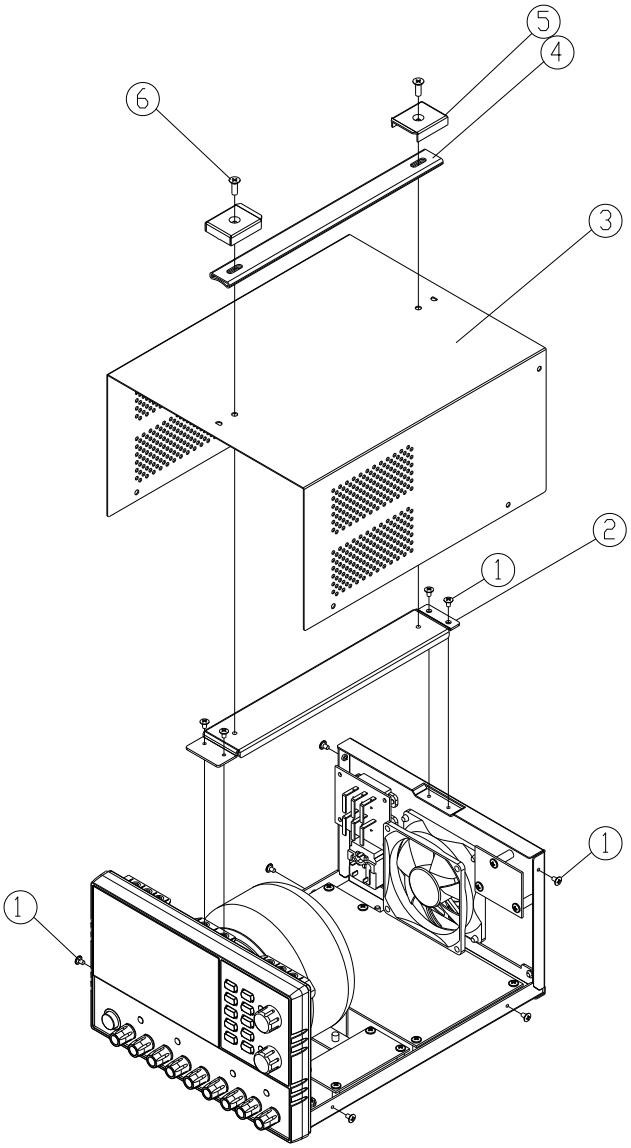

USB interface PCB circuit diagram



# PARTS LIST

The Mechanical Parts List chapter shows the diagrams for all replaceable mechanical components used in the power supply, together with their descriptions and part numbers. Use this chapter as a detailed reference for disassembling the power supplies, or for searching for the part number of components that require replacing.

# Outer Casing




No.1

SCREW OMS, +, 3*6*0.5P, ISO, N

Part No.: 598B-03006NJ

Quantity: 10

No.2

*CA GPD-3303/S HOLDER,ROHS

Part No.: 62PD-333HP101

Quantity: 1

No.3

*CA GPD-3303/S TOP COVER, ROHS

Part No.: 62PD-333UP1A1

Quantity: 1

No.4

BELT SG120RB1-0(220*20*5), GRAY+SG120CH1-0(*2)

Part No.: 552G-2202050

Quantity: 1

No.5

*CA PC3030CH1-0, BELT FASTENER GRAY, ROHS

Part No.: 62PC-303CH301

Quantity: 2

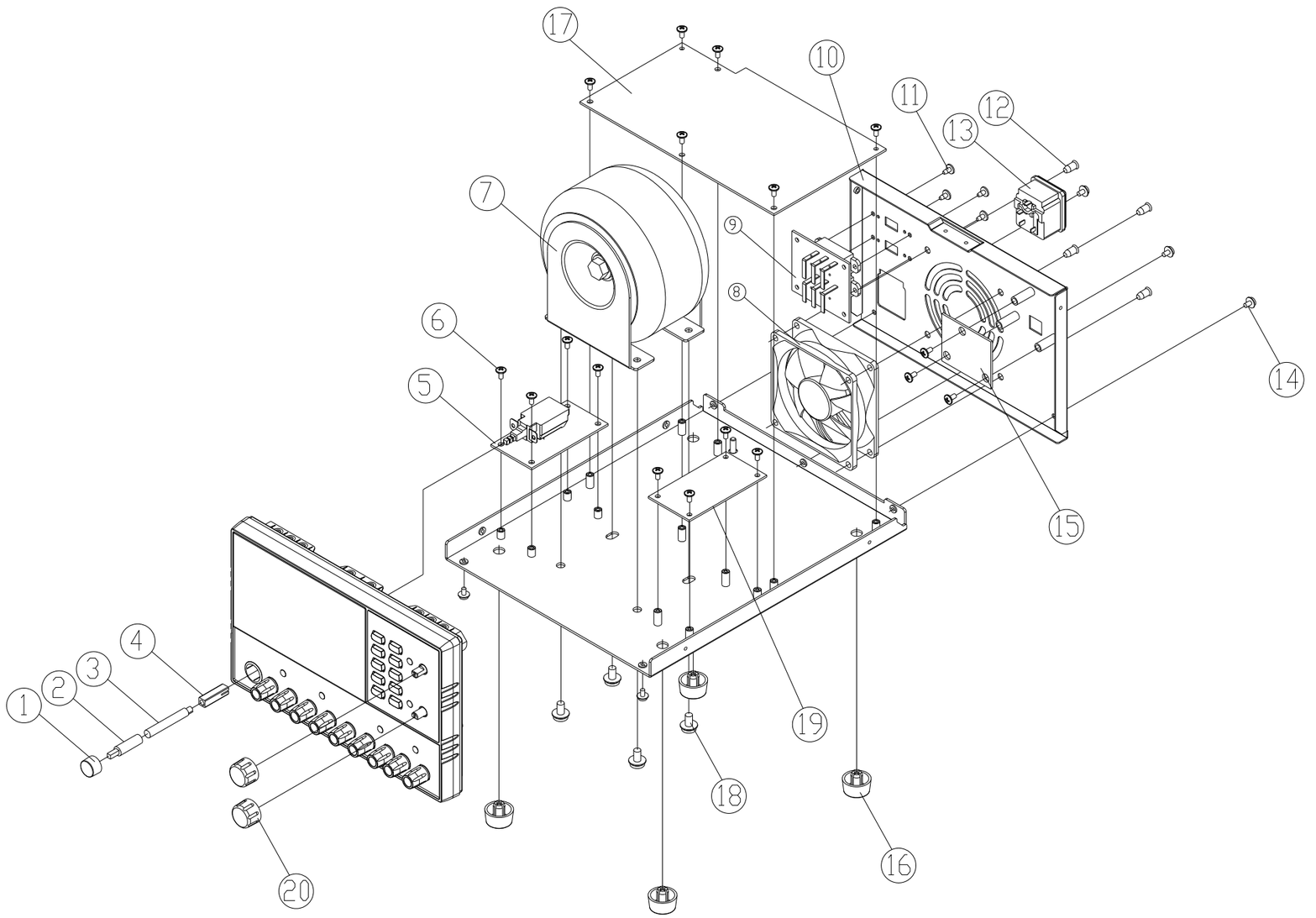
No.6

SCREW FMS, +, 4*10, ISO, N

Part No.: 593B-04010NJ

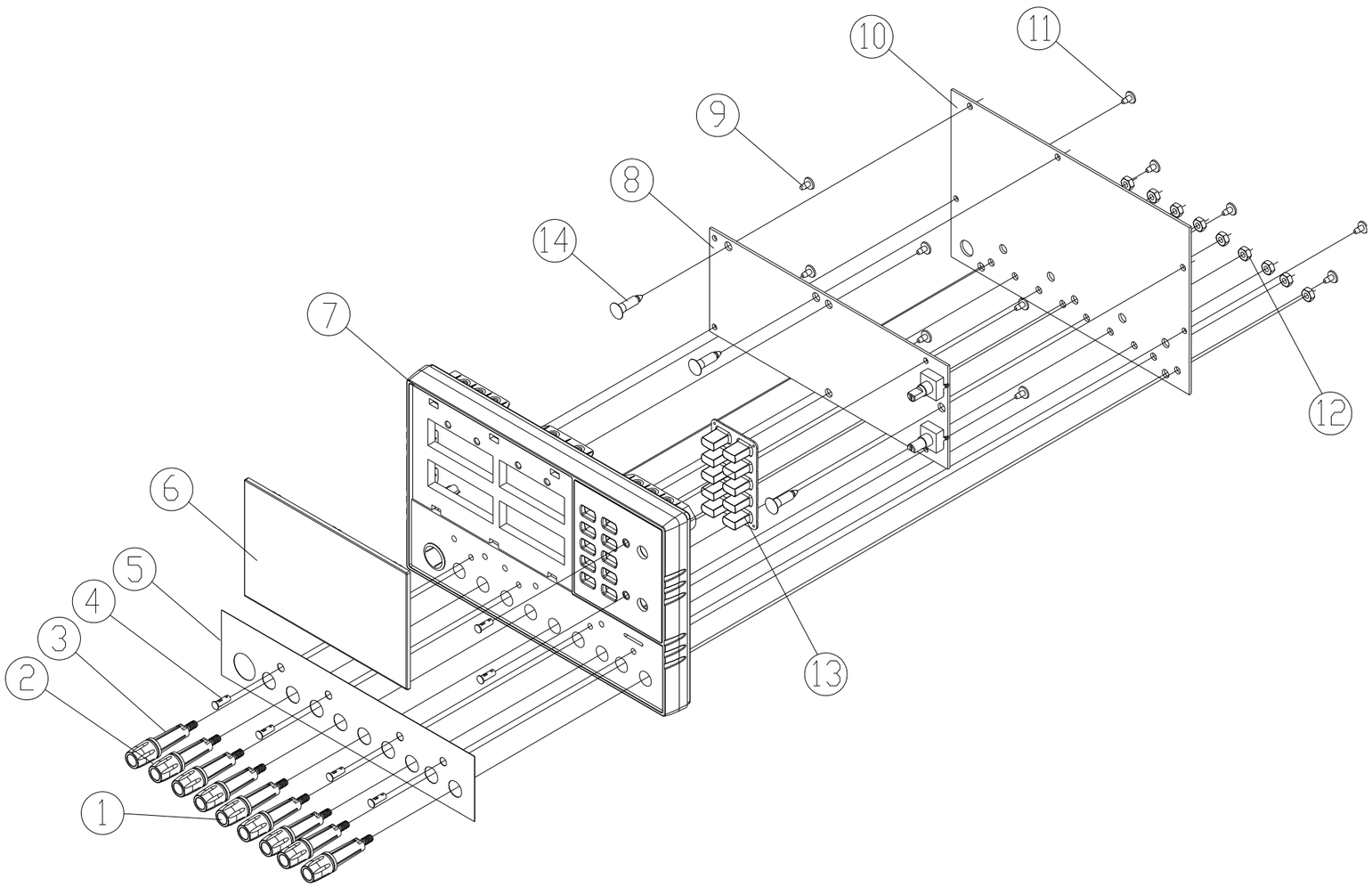
Quantity: 2

# Internal Structures




| No | Description | Qty | Part code |
|---|---|---|---|
| 1 | KNOB ST01M280, 13@, COOL GRAY 2u, POWER | 1 | 5004-130G010 |
| 2 | PC 815-CR-1B, JOINT STICK FOR KNOB | 1 | 63CR-AB1001B |
| 3 | PC OS611LK1-C, JOINT STICK (MIDDLE) | 1 | 63LK-AB1003C |
| 4 | PC OS610CR1-0, JOINT STICK FOR SW, BLACK | 1 | 63LK-AB10020 |
| 5 | PCB ASS'Y PD03P030 ,GPD-4303S (POWER) | 1 | 13PD-433S030 |
| 6 | SCREW TRUSS, +, 3*6*0.5P, B TYPE, N | 13 | 591B-03006NB |
| 7 | TS GPD-4303S-PT WITH WIRE C. CM-E-M-597Z ,RoHS | 1 | 3003-PD003001 |
| 8 | * FAN MGA8024MR-025, DL24V, 80*80*25, MS, P, CE | 1 | 3812-4620020 |
| 9 | PCB ASS'Y PD01P100 ,GPD-3303D (AC-SW) | 1 | 13PD-333D100 |
| 10 | * CA GPD-3303/S REAR PLATE, ROHS | 1 | 62PD-333RP5A1 |
| 11 | SCREW TMS, +, 3*6, TS-3, N | 4 | 591H-03006NS |
| 12 | SCREW FMS, +, 5*8, TS-3, N | 4 | 593H-05008NS |
| 13 | * PS R-3013, 6A, 250V, 3P, AC RECEPTACLE, ROHS | 1 | 3610-00600801 |
| 14 | SCREW BMS, +, 3*6*0.5P, ISO, N | 5 | 594B-W3006NJ |
| 15 | PCB ASS'Y PD03P020 ,GPD-4303S (DISPLAY) | 1 | 13PD-433S020 |
| 16 | * RUBBER FOOT, BLACK(GWS) | 4 | 57FC-30B0130 |
| 17 | PCB ASS'Y PD03P030 ,GPD-4303S (POWER) | 1 | 13PD-433S030 |
| 18 | SCREW BMS, +, 5*10, ISO, N | 4 | 594B-W5010NJ |
| 19 | PCB ASS'Y PD03P040 ,GPD-4303S (CH4) | 1 | 13PD-433S040 |
| 20 | KNOB DS01M19B, 18@, GRAY DIC650 | 2 | 5005-180G01B |

# Front Panel




| No | Description | Qty | Part code |
|---|---|---|---|
| 1 | * BINDING POST, 1P, 5(GREEN), ROHS | 1 | 44BJ-51100401 |
| 2 | * BINDING POST, 1P, 2(RED), ROHS | 3 | 44BJ-21101001 |
| 3 | * BINDING POST, 1P, 0(BLACK), ROHS | 3 | 44BJ-01101001 |
| 4 | * LED CAP EDN-3C-PCW, 3.45@10.1m/m, PINGWOOD, ROHS | 5 | 5323-01003501 |
| 5 | NP GPD-4303S (台規) MAIN NP ,RoHS | 1 | 51PD-4303S201 (4303S) |
| | NP GPD-3303S (台規) MAIN NP ,RoHS | 1 | 51PD-3303S201 (3303S) |
| | NP GPD-2303S (台規) MAIN NP ,RoHS | 1 | 51PD-2303S201 (2303S) |
| 6 | NP GPD-4303S MODEL NP ,RoHS | 1 | 51PD-4303S101 (4303S) |
| | NP GPD-3303S MODEL NP (新 LOGO) ,RoHS | 1 | 51PD-3303S1B1 (3303S) |
| | NP GPD-2303S MODEL NP ,RoHS | 1 | 51PD-2303S101 (2303S) |
| 7 | PC GPD-X303/S/D PLASTIC FRONT PLATE ,RoHS | 1 | 63FP-AG1062B1 |
| 8 | PCB ASS'Y PD03P020 ,GPD-4303S (DISPLAY) | 1 | 13PD-433S020 |
| 9 | SCREW TMS, +, 3*6, TS-3, N | 6 | 591H-03006NS |
| 10 | PCB ASS'Y PD03P010 ,GPD-X303S | 1 | 13PD-X33S010 |
| 11 | SCREW TMS, 3*8, TS-3, N | 5 | 591H-03008NS |
| 12 | NUT HEXAGON, +, M3*0.5P, ISO, N | 7 | 6001-CN0030J |
| 13 | SILICON RUBBER GPD-X303S ,RoHS | 1 | 57RB-40G08501 (4303S) |
| | SILICON RUBBER GPD-3303 ,10 KEYS ,RoHS | 1 | 57RB-40G051A1 (2303S/3303S) |
| 14 | * SPACER SUPPORT SCT-14, H=14mm, ROHS | 3 | 5321-00414001 |

# PCB Mount Parts: GPD-2303S

These parts, listed in alphabetical order, belong to the control PCB, display PCB, or power supply PCB. For the PCB layout and circuit diagrams, see page77.

| | |
|---|---|
| BD | |
| BD101,BD401, | * BRIDGE GBU402 ,RoHS ,4A ,200V ,HY |
| BD301, | BRIDGE 2W06GL-5300E4 ,2A ,600Vmax ,VISHAT ,RoHS |
| BZ | |
| BZ502, | * BUZZER 6V ,DC ,12@*9(H) ,P ,OBO-1206A-A2 |
| C | |
| C112,C412, | CSC 50V ,1000pK ,VT ,BU4102KH ,RoHS |
| C104,C405,C404,C105,C409,C408,C108,C109, | CSE1 25V 100uM 6.3*7 F=5 SSP101M1EE07H RoHS |
| C102,C103,C402,C403, | CSE1 50V 470uM VT 10@*21 F=5 SKP471M1HG21H RoHS |
| C101,C401, | CSE1 63V 6800uM 30@*45 LPW682M1JP45H RoHS |
| C831,C832, | CSK AC250V ,4700pM ,Y5V ,AC13F472ML0 ,RoHS |
| C830, | CSK AC275V ,0.22uM,X2,R46KN322040M1M,ARCO |
| C834,C833, | CSC 250V ,0.01uFM ,Y2 ,JY103MY5VY2 ,RoHS |
| C902, | CSE1 16V 47uM 5@*11 F=5 SKP470M1CD11H RoHS |
| C901,C905,C106,C406, | CSE1 50V 4.7uM 4@*7 F=5 SSP4R7M1HC07H RoHS |
| C311, | CSE1 10V ,470uM ,6.3@*11 ,F=2.5 ,SKP471M1AE11ME2 |
| C316,C501,C201, | CSE1 16V,100uM,6.3@*7,F=2.5,SSP101M1CE07ME2 |
| C314,C210,C332,C510, | CSE1 16V 47uM 6.3@*7 F=2.5 SSP470M1CE07HE2 RoHS |
| C115,C415, | CSE1 50V 220uM VT 10@*13 F=5 SKP221M1HG13H RoHS |
| C910,C911,C912,C305,C306, | CSL 50V, 10pJ, NPO, U0603C100JCT, RoHS |
| C904,C906,C113,C114,C120,C307,C413,C414,C420, | CSL 50V ,0.01UK ,0603 ,X7R ,RoHS |
| C308,C310, | CSE1 16V ,2200UZ 13@*21m/m ,RoHS |
| C117,C416,C419,C116, | CSD 400V 0.047uJ ,MER473J2GC0 ,RoHS |
| C1032,C505,C506,C508,C503,C509,C318,C511,C524,C1031,C504,C1041,C1042,C1051,C1052,C2061,C2071,C2072,C2080,C4031,C4032,C4051,C317,C2062,C4042,C5061,C4041,C315,C4052,C5062,C5071,C5072,C5080,C407,C203,C204,C312,C206,C208,C209,C211,C224,C301,C302,C303,C309,C107,C205,C123,C121,C421,C423,C601,C604,C903, | CSL 50V ,0.1uZ ,Y5V ,0603 ,RoHS |
| C118,C418, | CSL 50V, 33pJ, NPO, U0603C330JCT, RoHS |
| C313, | CSL 50V, 470pJ, NPO, U0603C471JCT, RoHS |
| C111,C410,C411,C110, | CSL 50V, 560pJ, NPO, U0603C561JCT, RoHS |
| C801,C802, | CSC 250V 0.01UZ 16@ ECKATS103MF |
| C803, | CSK AC275V ,0.22uM,X2,R46KN32205001M,ARCO(PHILIPS) |
| D | |
| D4011,D4013,D4012,D4014,D1014,D1013,D1011,D1012, | DIODE 1N4004E-E3 ,G.I. HT ,T52 ,VISHAY ,RoHS |
| D109,D110,D409,D410, | DIODE 1N4148T-72 ,T52 ,ROHM ,RoHS |
| D609,D612,D601,D610,D608,D607,D606,D604,D603,D602,D611, | LED YELLOW LT8A33-53-UC91-T5 ,SMD 0603 ,RoHS |

| | |
|---|---|
| D605, | LED BLUE LT8AB3-54-UEC3-TE-Z ,SMD 0603 ,RoHS |
| D901, | LED GREEN ,204GD ,3@ |
| D405,D406,D104,D404,D403,D304,D302,D301,D112,D412,D105,D303,D106,D502,D501,D407,D202,D201,D107,D103, | DIODE RLS4148NTE-11 ,SMD (LL34) ,ROHM ,RoHS |
| D305, | SCHOTTKY BARRIER DIODE MBRM120ET1G ,SMD ,RoHS |
| D111,D411, | DIODE P300DL-5303E3 ,FORMING 22C-410 ,VISHAY ,RoHS |
| D108,D408, | * LED 2/4&5 ,LT1802-R2G6-UR9-FEW ,5@ ,RoHS |
| DS | |
| DS601,DS604,DS602,DS605,DS607,DS608,DS609,DS610,DS611,DS612, | DISPLAY 4&5 LC3921-11-SB96BWA035 ,0.39" ,RoHS |
| DS603,DS606, | DISPLAY SUPPER RED LM4074-11-M1BWR035 ,0.4" |
| F | |
| F301, | FUSE T 5*20 2A 250V 美/歐/日/大, 218XEP, RoHS |
| F101,F401, | FUSE T 5*20 6.3A 250V 美/歐/日/大, 218XEP, RoHS |
| F102,F103,F402,F403, | * FUSE 8.5mm ,0.315A ,250V U/C/V RoHS ,1702031544 |
| J | |
| J102,J402,J1061, | WAFER A2501WV2-3P ,180' ,RoHS |
| J107, | WAFER A2501WV2-4P ,180' ,RoHS |
| J1031,J4031,J304,J301, | WAFER A2501WV2-6P ,180' ,RoHS |
| J801,J1041,J4041,J8011, | WAFER B3P-VH (LF)(SN) ,RoHS |
| J101,J401,J802,J803, | WAFER B4P-VH (LF)(SN) ,RoHS |
| J3022, | FPC 0.5 40P ,SMD ,B0502F40TDM3 ,RoHS |
| J901, | WAFER S5B-XH-A(LF)(SN) ,RoHS |
| J902, | USB JACK B TYPE 8968-B04C00SWA ,4P ,180' ,RoHS |
| JP1011,JP1012,JP102,JP103,JP1041,JP1042,JP105,JP107,JP403,JP404,JP401,JP402, | JUMP WIRE 0.6@ ,HT ,160(OD)*22(ID)*115(H)/ROLL |
| J306, | XHCN-07#26-320mm-788-0 ,GW9703007-22 ,RoHS |
| J305, | XHCN-07#26-300mm-38888-0 ,7AJG0000514 ,RoHS |
| J1032,J4032, | XHCN-07#26-290mm-388888-0 ,RoHS |
| J3021, | FPC 0.5 40P ,SMD ,B0502F40TDM3 ,RoHS |
| JP | |
| JP1011,JP1012,JP102,JP103,JP1041,JP1042,JP105,JP106,JP406,JP407,JP405, JP703, | JUMP WIRE 0.6@ ,HT ,160(OD)*22(ID)*115(H)/ROLL |
| L | |
| L301 | INDUCTOR 33uH+/-30% ,SMD ,SCDS6D38NT330 ,RoHS |
| Q | |
| Q102,Q402, | TR 2N3906RLRMG ,VT ,ON ,RoHS |
| Q401,Q101, | FET IRFP150NPBF ,IR ,RoHS |
| Q502,Q310,Q303,Q304,Q305,Q306,Q307,Q308,Q302,Q311,Q312,Q313,Q316,Q301,Q501,Q202,Q503,Q504,Q506,Q507,Q318,Q111,Q105,Q106,Q107,Q204,Q109,Q207,Q112,Q405,Q206,Q407,Q408,Q409,Q411,Q412,Q201,Q203,Q406,Q108,Q315,Q317,Q205,Q505, | TR MMBT3904LT1G ,SMD ,ON ,RoHS |

| | |
|---|---|
| Q410,Q320,Q314,Q309,Q208,Q110,Q508,Q113,Q413,Q6013,Q6018,Q6017,Q6016,Q6014,Q6012,Q6011,Q6015, | TR MMBT3906LT1G ,SMD ,ON ,RoHS |
| R | |
| R125,R425, | RO 2W ,1kJ ,成型打點 P=20 ,RS-2W ,RoHS |
| R401,R101, | RO 3W ,4.7kJ ,RS-3W ,RoHS |
| R421,R420,R120,R121, | RC 1/4WS ,4.7kJ ,T52 ,CF1/4WS4.7kJT52 ,RoHS |
| R6043,R6041,R6042,R6044,R6045,R6046,R6047,R6048,R908,R906,R103,R1131,R1271,R1272,R213,R215,R216,R317,R318,R331,R332,R347,R348,R353,R354,R355,R403,R4131,R4271,R4272,R430,R513,R515,R516, | R CHIP 1/10W ,1kF ,RC0603 ,RoHS |
| R905,R904,R903,R1181,R4181,R1132,R1281,R4132,R4281, | R CHIP 1/10W ,10RF ,RC0603 ,RoHS |
| R907,R909,R902,R2062,R5061,R5062,R310,R109,R309,R409,R2061, | R CHIP 1/10W ,2kF ,RC0603 ,RoHS |
| R6014,R6018,R6017,R6015,R6013,R6012,R6011,R6016, | R CHIP 1/10W ,39RF ,RC0603 ,RoHS |
| R324,R338,R326,R320,R312,R330,R328,R316,R314,R217,R517,R334,R322,R336,R901, | R CHIP 1/10W ,470RJ ,RC0603 ,RoHS |
| R6022,R6034,R6033,R6032,R6023,R6021,R6031,R346,R329,R333,R337,R339,R340,R341,R342,R344,R303,R327,R343,R323,R319,R315,R313,R311,R308,R307,R306,R302,R304,R305,R325,R349,R335, | R CHIP 1/10W ,4.7kJ ,RC0603 ,RoHS |
| R208,R508, | R CHIP 1/10W ,0RJ ,RC0603 ,RoHS |
| R118,R418, | R CHIP 1/10W ,30.1kF ,RC0603 ,RoHS |
| R123,R423, | R CHIP 1/10W ,4.75kF ,RC0603 ,RoHS |
| R119,R419,R124,R424, | R CHIP 1/10W ,2.1kF ,RC0603 ,RoHS |
| R117,R417, | R CHIP 1/10W ,71.5kF ,RC0603 ,RoHS |
| R131,R232,R233,R431,R532,R533, | R CHIP 1/10W ,100RF ,RC0603 ,RoHS |
| R111,R530,R529,R526,R351,R230,R229,R411,R226, | R CHIP 1/10W ,10kF ,RC0603 ,RoHS |
| R143,R445,R145,R443, | R CHIP 1/10W ,100kF ,RC0603 ,RoHS |
| R444,R144, | R CHIP 1/10W ,140kF ,RC0603 ,RoHS |
| R447,R441,R141,R147, | R CHIP 1/10W ,15RJ ,RC0603 ,RoHS |
| R402,R406,R106,R102,R4372,R4371,R1382,R1371,R1381,R1372,R4381,R4382, | R CHIP 1/10W ,1.5kJ ,RC0603 ,RoHS |
| R442,R142, | R CHIP 1/10W ,180kF ,RC0603 ,RoHS |
| R1292,R525,R524,R225,R224,R4291,R1291,R4292,R122,R422, | R CHIP 1/10W ,200RF ,RC0603 ,RoHS |
| R412,R112, | R CHIP 1/10W ,20kF ,RC0603 ,RoHS |
| R128, | R CHIP 1/10W ,200kF,RC0603 ,RoHS |
| R345, | R CHIP 1/10W ,2.7kF ,RC0603 ,RoHS |
| R114,R415,R1282,R4282, | R CHIP 1/10W ,3kF ,RC0603 ,RoHS |
| R350,R146,R440,R140, | R CHIP 1/10W ,30kF ,RC0603 ,RoHS |
| R150,R450, | R CHIP 1/10W ,31.6kF ,RC0603 ,RoHS |
| R428, | R CHIP 1/10W ,360kF ,RC0603 ,RoHS |

| | |
|---|---|
| R511,R518,R523,R522,R514,R512,R223,R222,R218,R214,R212,R210,R211,R510,R220,R221,R520,R521, | R CHIP 1/10W ,3.9kJ ,RC0603 ,RoHS |
| R446, | R CHIP 1/10W ,47kJ ,RC0603 ,RoHS |
| R505,R205,R408,R407,R107,R108, | R CHIP 1/10W ,4.7MJ ,RC0603 ,RoHS |
| R231,R531,R116,R416, | R CHIP 1/10W ,4.99kF ,RC0603 ,RoHS |
| R148,R448, | R CHIP 1/10W ,49.9kF ,RC0603 ,RoHS |
| R507,R204,R504,R207, | R CHIP 1/10W ,510RF ,RC0603 ,RoHS |
| R149,R449, | R CHIP 1/10W ,56.2kF ,RC0603 ,RoHS |
| R129,R2081,R2082,R5081,R5082, | R CHIP 1/10W ,6.2kF ,RC0603 ,RoHS |
| R429, | R CHIP 1/10W ,6.8kF ,RC0603 ,RoHS |
| R228,R528, | R CHIP 1/8W ,10kF ,RC0805 ,RoHS |
| R227,R527, | R CHIP 1/8W ,30kF ,RC0805 ,RoHS |
| R413,R500,R5021,R2021,R502,R202,R405,R105,R501,R113,R200,R201, | R CHIP 1/8W ,30.1kF ,RC0805 ,RoHS |
| R203,R503, | R CHIP 1/8W ,3.74kF ,RC0805 ,RoHS |
| R104,R110,R404,R410, | R CHIP 1/8W ,75kF ,RC0805 ,RoHS |
| R1261,R1262,R4261,R4262, | RW 5W 0.2RJ ,+/-50ppm ,成型打點 P=25 ,KNP-5WS(500) |
| RL | |
| RL401,RL402,RL101,RL102, | RELAY JQC-3FF/024-1ZS,DC24V,10A,SPDT (W/O SORTING) |
| RL301,RL302,RL303, | RELAY SRUDH-SS-106DM1 ,6V (HF)JQC-3FF/006-1HS(551) |
| RL304, | RELAY HM4101F/06-H(555) ,6V ,1A ,SPDT ,RoHS |
| S | |
| S801, | KDC-A11-E210-S(750M)(SDDFA3117U-GW),DPDT,4P*1PP |
| S803,S802, | SW SLIDE SL14-22AM(5A)N ,RED ,2P2T ,RoHS |
| S611,S612, | SW ENCODER F-12ES5H24B+C ,L20FX7(D) ,24 STEP RoHS |
| TH | |
| TH102,TH101, | THR NTC TTC05203JSY ,20KJ ,5@ ,RoHS |
| U | |
| U101,U401, | IC AN7815 ,PANASONIC ,RoHS |
| U102,U402, | IC AN7915T ,PANASONIC ,RoHS |
| U601,U602,U603, | IC ULN2003ADR ,SMD ,TEXAS ,RoHS |
| U303,U604, | IC 74HC4094DT ,SMD ,PHILIPS ,RoHS |
| U901, | IC FT232RL ,SMD ,FTDI ,RoHS |
| U404,U104, | IC UA741CDR ,SMD ,TEXAS ,RoHS |
| U508,U208, | IC ADR03ARZ ,SMD ,ANDE ,RoHS |
| U507,U207, | IC OP2177ARZ ,SMD ,ANDE ,RoHS |
| U505,U205, | IC AD5545BRUZ ,SMD ,ANDE ,RoHS |
| U504,U204, | IC AD7792BRUZ ,SMD ,ANDE ,RoHS |
| U405,U105,U506,U206, | IC TL072CDT, SMD,ST ,RoHS |
| U309,U312,U319,U318,U316,U315,U314,U320,U313,U311,U307,U308,U305,U306,U310,U317, | IC LTV-817S ,SMD ,LITEON ,RoHS |
| U302, | * IC AT93C66A-10SU-2.7 ,SMD ,ATMEL ,RoHS |
| U304, | IC AIC1594PS ,SMD ,AIC ,RoHS |
| U403,U103, | IC LM301ADG ,SMD ,ON ,RoHS |
| U322, | IC LD1117A-3.3V-A ,SMD ,UTC |
| U201,U501, | IC 78L05L-T92-B ,UTC ,RoHS |

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| U107,U407, | TRIAC BTA08-600C ,ST ,RoHS |
| U301, | IC PIC18F85J10 ,SMD ,GPD-X303S V1.00 (2C59) RoHS |
| U106,U406, | IC TL431ACLPRE3 ,TEXAS ,RoHS |
| X | |
| X301 | CRYSTAL 10MHz , HUSG-10.000-30 HC-49/US ,RoHS |
| ZD | |
| ZD401,ZD101, | ZENER 1/2W ,6.6-6.9V ,HZ7A3 ,HITACHI ,HT ,T52 |
| ZD103,ZD104,ZD403,ZD404, | ZENER 1/2W ,8.5-9.6V ,SMD ,TZMC9V1 ,VISHAY,RoHS |

# PCB Mount Parts: GPD-3303S

These parts, listed in alphabetical order, belong to the control PCB, display PCB, or power supply PCB. For the PCB layout and circuit diagrams, see page77.

| | |
|---|---|
| BD | |
| BD301, | BRIDGE 2W06GL-5300E4 ,2A ,600Vmax ,VISHAT ,RoHS |
| BD101,BD401, | * BRIDGE GBU402 ,RoHS ,4A ,200V ,HY |
| BZ | |
| BZ301, | BUZZER DC6V ,12@*9 ,P ,OBO-1206A-A2 ,RoHS |
| C | |
| C305,C306, C910,C911,C912, | CSL 50V, 10pJ, NPO, U0603C100JCT, RoHS |
| C1032,C505,C506,C508,C503, C509,C318,C511,C524,C1031, C504,C1041,C1042,C1051,C1052,C2061,C2071,C2072,C2080, C4031,C4032,C4051,C317,C2062,C4042,C5061,C4041,C315, C4052,C5062,C5071,C5072,C5080,C407,C203,C204,C312,C206,C208,C209,C211,C224,C301,C302,C303,C309,C107,C205, C123,C121,C421,C423, C601,C604,C903, C711,C714,C725,C724,C719,C712,C707,C726,C713, | CSL 50V ,0.1uZ ,Y5V ,0603 ,RoHS |
| C118,C418, | CSL 50V, 33pJ, NPO, U0603C330JCT, RoHS |
| C313, | CSL 50V, 470pJ, NPO, U0603C471JCT, RoHS |
| C111,C410,C411,C110, C720, | CSL 50V, 560pJ, NPO, U0603C561JCT, RoHS |
| C113,C114,C120,C307,C413,C414,C420, C717,C718, C904,C906, | CSL 50V ,0.01UK ,0603 ,X7R ,RoHS |
| C311, | CSE1 10V ,470uM ,6.3@*11 ,F=2.5 ,SKP471M1AE11ME2 |
| C316,C501,C201, C708, | CSE1 16V,100uM,6.3@*7,F=2.5,SSP101M1CE07ME2 |
| C314,C210,C332,C510, | CSE1 16V 47uM 6.3@*7 F=2.5 SSP470M1CE07HE2 RoHS |
| C409,C408,C108,C109, C705,C706, C104,C405,C404,C105, | CSE1 25V 100uM 6.3*7 F=5 SSP101M1EE07H RoHS |
| C106,C406, C901,C905, | CSE1 50V 4.7uM 4@*7 F=5 SSP4R7M1HC07H RoHS |
| C115,C415, | CSE1 50V 220uM VT 10@*13 F=5 SKP221M1HG13H RoHS |
| C704, | CSE1 35V 100uM VT 6.3@*11 F=5 SKP101M1VE11H RoHS |
| C703, | CSE2 35V ,220uM ,105'C,VT,8@*11,F=5,TKP221M1VF11M |
| C308,C310, | CSE1 16V ,2200UZ 13@*21m/m ,RoHS |
| C117,C416,C419,C116, C721,C722, | CSD 400V 0.047uJ ,MER473J2GC0 ,RoHS |

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|---|---|
| C723, | CSE2 16V 220uM 105'C 6.3@*11 F=5 TKR221M1CE11H |
| C902, | CSE1 16V 47uM 5@*11 F=5 SKP470M1CD11H RoHS |
| C112,C412, | CSC 50V ,1000pK ,VT ,BU4102KH ,RoHS |
| C102,C103,C402,C403, | CSE1 50V 470uM VT 10@*21 F=5 SKP471M1HG21H RoHS |
| C702,C709,C727, | CSC 50V ,0.1uZ ,8@ ,VT ,FYU6104ZH ,RoHS |
| C101,C401, | CSE1 63V 6800uM 30@*45 LPW682M1JP45H RoHS |
| C831,C832, | CSK AC250V ,4700pM ,Y5V ,AC13F472ML0 ,RoHS |
| C830, | CSK AC275V ,0.22uM,X2,R46KN322040M1M,ARCO |
| C834,C833, | CSC 250V ,0.01uFM ,Y2 ,JY103MY5VY2 ,RoHS |
| D | |
| D7012,D7014,D7011,D7013, | DIODE 1N5402-5301E3 ,VISHAY ,RoHS |
| D405,D406,D104,D404,D403,D304,D302,D301,D112,D412,D105,D303,D106,D502,D501,D407,D202,D201,D107,D103, D704,D705,D706, | DIODE RLS4148NTE-11 ,SMD (LL34) ,ROHM ,RoHS |
| D305, | SCHOTTKY BARRIER DIODE MBRM120ET1G ,SMD ,RoHS |
| D111,D411, D703, | DIODE P300DL-5303E3 ,FORMING 22C-410 ,VISHAY ,RoHS |
| D108,D408, D707, | * LED 2/4&5 ,LT1802-R2G6-UR9-FEW ,5@ ,RoHS |
| D701,D702, | DIODE 1N4004E-E3 ,G.I. HT ,T52 ,VISHAY ,RoHS |
| D609,D612,D601,D610,D608,D607,D606,D604,D603,D602,D611, | LED YELLOW LT8A33-53-UC91-T5 ,SMD 0603 ,RoHS |
| D605, | LED BLUE LT8AB3-54-UEC3-TE-Z ,SMD 0603 ,RoHS |
| D901, | LED GREEN ,204GD ,3@ |
| D4011,D4013,D4012,D4014,D1014,D1013,D1011,D1012, | DIODE 1N4004E-E3 ,G.I. HT ,T52 ,VISHAY ,RoHS |
| D109,D110,D409,D410, | DIODE 1N4148T-72 ,T52 ,ROHM ,RoHS |
| DS | |
| DS601,DS604,DS602,DS605,DS607,DS608,DS609,DS610,DS611,DS612, | DISPLAY 4&5 LC3921-11-SB96BWA035 ,0.39" ,RoHS |
| DS603,DS606, | DISPLAY SUPPER RED LM4074-11-M1BWR035 ,0.4" |
| F | |
| F301, | FUSE T 5*20 2A 250V 美/歐/日/大, 218XEP, RoHS |
| F101,F401, F701, | FUSE T 5*20 6.3A 250V 美/歐/日/大, 218XEP, RoHS |
| F102,F103,F402,F403, F702, | * FUSE 8.5mm ,0.315A ,250V U/C/V RoHS ,1702031544 |
| J | |
| J7031,J701, | WAFER B2P-VH (LF)(SN) ,RoHS |
| J3021, | FPC 0.5 40P ,SMD ,B0502F40TDM3 ,RoHS |
| J102,J402,J1061, J7021, | WAFER A2501WV2-3P ,180' ,RoHS |
| J107, | WAFER A2501WV2-4P ,180' ,RoHS |
| J1031,J4031, J304,J301, | WAFER A2501WV2-6P ,180' ,RoHS |
| J801,J1041,J4041,J8011, | WAFER B3P-VH (LF)(SN) ,RoHS |
| J101,J401,J702 ， J802,J803, | WAFER B4P-VH (LF)(SN) ,RoHS |
| J306, | XHCN-07#26-320mm-788-0 ,GW9703007-22 ,RoHS |

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|---|---|
| J305, | XHCN-07#26-300mm-38888-0 ,7AJG0000514 ,RoHS |
| J1032,J4032, | XHCN-07#26-290mm-388888-0 ,RoHS |
| J901, | WAFER S5B-XH-A(LF)(SN) ,RoHS |
| J902, | USB JACK B TYPE 8968-B04C00SWA ,4P ,180' ,RoHS |
| J7022, | XHCN-07#26-280mm-388-0 ,GW9703007-22 ,RoHS |
| J3022, | FPC 0.5 40P ,SMD ,B0502F40TDM3 ,RoHS |
| JP | |
| JP1011,JP1012,JP102,JP103,JP1041,JP1042,JP105,JP107,JP403,JP404, JP401,JP402, JP701,JP702,JP703,JP710, | JUMP WIRE 0.6@ ,HT ,160(OD)*22(ID)*115(H)/ROLL |
| L | |
| L301, | INDUCTOR 33uH+/-30% ,SMD ,SCDS6D38NT330 ,RoHS |
| Q | |
| Q502,Q310,Q303,Q304,Q305,Q306,Q307,Q308,Q302,Q311,Q312,Q313,Q316,Q301,Q501,Q202,Q503,Q504,Q506,Q507,Q318,Q111,Q105,Q106,Q107,Q204, Q109,Q207,Q112,Q405,Q206,Q407,Q408,Q409,Q411,Q412,Q201,Q203,Q406,Q108,Q315,Q317,Q205,Q505, Q706,Q705,Q707,Q704, | TR MMBT3904LT1G ,SMD ,ON ,RoHS |
| Q410,Q320,Q314,Q309,Q208,Q110,Q508,Q113,Q413, Q328,Q703, Q6013,Q6018,Q6017,Q6016,Q6014,Q6012,Q6011,Q6015, | TR MMBT3906LT1G ,SMD ,ON ,RoHS |
| Q102,Q402,Q701, Q708, | TR 2N3906RLRMG ,VT ,ON ,RoHS |
| Q101,Q401,Q702, | FET IRFP150NPBF ,IR ,RoHS |
| R | |
| R208,R508, R768, | R CHIP 1/10W ,0RJ ,RC0603 ,RoHS |
| R118,R418, | R CHIP 1/10W ,30.1kF ,RC0603 ,RoHS |
| R123,R423, R757, | R CHIP 1/10W ,4.75kF ,RC0603 ,RoHS |
| R119,R419, R124,R424, | R CHIP 1/10W ,2.1kF ,RC0603 ,RoHS |
| R117,R417, | R CHIP 1/10W ,71.5kF ,RC0603 ,RoHS |
| R131,R232,R233,R431,R532,R533, | R CHIP 1/10W ,100RF ,RC0603 ,RoHS |

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| R103,R1131,R1271,R1272,R213,R215,R216,R317,R318,R331,R332,R347,R348,R353,R354,R355,R403,R4131,R4271,R4272,R430,R513,R515,R516,R720,R728,R6043,R6041,R6042,R6044,R6045,R6046,R6047,R6048,R908,R906, | R CHIP 1/10W ,1kF ,RC0603 ,RoHS |
| R111,R530,R529,R526,R351,R230,R229,R411,R226, | R CHIP 1/10W ,10kF ,RC0603 ,RoHS |
| R143,R445,R145,R443, R734, | R CHIP 1/10W ,100kF ,RC0603 ,RoHS |
| R1181,R4181,R1132,R1281,R4132,R4281, R905,R904,R903, | R CHIP 1/10W ,10RF ,RC0603 ,RoHS |
| R444,R144, | R CHIP 1/10W ,140kF ,RC0603 ,RoHS |
| R447,R441,R141,R147, | R CHIP 1/10W ,15RJ ,RC0603 ,RoHS |
| R402,R406,R106,R102,R4372,R4371,R1382,R1371,R1381,R1372,R4381,R4382, | R CHIP 1/10W ,1.5kJ ,RC0603 ,RoHS |
| R442,R142, | R CHIP 1/10W ,180kF ,RC0603 ,RoHS |
| R1292,R525,R524,R225,R224,R4291,R1291,R4292,R122,R422, | R CHIP 1/10W ,200RF ,RC0603 ,RoHS |
| R2062,R5061,R5062,R310,R109,R309,R409,R2061, | R CHIP 1/10W ,2kF ,RC0603 ,RoHS |
| R412,R112, | R CHIP 1/10W ,20kF ,RC0603 ,RoHS |
| R128, | R CHIP 1/10W ,200kF,RC0603 ,RoHS |
| R345, | R CHIP 1/10W ,2.7kF ,RC0603 ,RoHS |
| R114,R415,R1282,R4282, | R CHIP 1/10W ,3kF ,RC0603 ,RoHS |
| R350,R146,R440,R140, | R CHIP 1/10W ,30kF ,RC0603 ,RoHS |
| R150,R450, | R CHIP 1/10W ,31.6kF ,RC0603 ,RoHS |
| R428, | R CHIP 1/10W ,360kF ,RC0603 ,RoHS |
| R511,R518,R523,R522,R514,R512,R223,R222,R218,R214,R212,R210,R211,R510,R220,R221,R520,R521, | R CHIP 1/10W ,3.9kJ ,RC0603 ,RoHS |
| R324,R338,R326,R320,R312,R330,R328,R316,R314,R217,R517,R334,R322,R336, | R CHIP 1/10W ,470RJ ,RC0603 ,RoHS |
| R346,R329,R333,R337,R339,R340,R341,R342,R344,R303,R327,R343,R323,R319,R315,R313,R311,R308,R307,R306,R302,R304,R305,R325,R349,R335, | R CHIP 1/10W ,4.7kJ ,RC0603 ,RoHS |
| R446, | R CHIP 1/10W ,47kJ ,RC0603 ,RoHS |
| R505,R205,R408,R407,R107,R108, | R CHIP 1/10W ,4.7MJ ,RC0603 ,RoHS |
| R231,R531,R116,R416, | R CHIP 1/10W ,4.99kF ,RC0603 ,RoHS |

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| R148,R448, | R CHIP 1/10W ,49.9kF ,RC0603 ,RoHS |
| R507,R204,R504,R207, | R CHIP 1/10W ,510RF ,RC0603 ,RoHS |
| R149,R449, | R CHIP 1/10W ,56.2kF ,RC0603 ,RoHS |
| R129,R2081,R2082,R5081,R5082, | R CHIP 1/10W ,6.2kF ,RC0603 ,RoHS |
| R429, | R CHIP 1/10W ,6.8kF ,RC0603 ,RoHS |
| R228,R528, | R CHIP 1/8W ,10kF ,RC0805 ,RoHS |
| R227,R527, | R CHIP 1/8W ,30kF ,RC0805 ,RoHS |
| R413,R500,R5021,R2021,R502,R202,R405,R105,R501,R113,R200,R201, | R CHIP 1/8W ,30.1kF ,RC0805 ,RoHS |
| R203,R503, | R CHIP 1/8W ,3.74kF ,RC0805 ,RoHS |
| R104,R110,R404,R410, | R CHIP 1/8W ,75kF ,RC0805 ,RoHS |
| R726,R727, | R CHIP 1/10W ,1MJ ,RC0603 ,RoHS |
| R712, | R CHIP 1/10W ,12.1kF ,RC0603 ,RoHS |
| R715,R724, | R CHIP 1/10W ,1.5kF ,RC0603 ,RoHS |
| R755, | R CHIP 1/10W ,1.65kF ,RC0603 ,RoHS |
| R706,R708,R709,R722,R717, | R CHIP 1/10W ,2kF ,RC0603 ,RoHS |
| R721, | R CHIP 1/10W ,20kF ,RC0603 ,RoHS |
| R731, | R CHIP 1/10W ,3kF ,RC0603 ,RoHS |
| R716, | R CHIP 1/10W ,30kF ,RC0603 ,RoHS |
| R760, | R CHIP 1/10W ,3.6kF ,RC0603 ,RoHS |
| R753, | R CHIP 1/10W ,4.32kF ,RC0603 ,RoHS |
| R371, | R CHIP 1/10W ,470RJ ,RC0603 ,RoHS |
| R370, | R CHIP 1/10W ,4.7kJ ,RC0603 ,RoHS |
| R713,R759, | R CHIP 1/10W ,4.99kF ,RC0603 ,RoHS |
| R758, | R CHIP 1/10W ,5.6kF ,RC0603 ,RoHS |
| R754, | R CHIP 1/10W ,5.62kF ,RC0603 ,RoHS |
| R756, | R CHIP 1/10W ,8.25kF ,RC0603 ,RoHS |
| R751,R752, | R CHIP 1/8W ,1kJ ,RC0805 ,RoHS |
| R736,R735, | R CHIP 1/8W ,2kF ,RC0805 ,RoHS |
| R732,R733, | R CHIP 1/8W ,3kF ,RC0805 ,RoHS |
| R907,R909,R902, | R CHIP 1/10W ,2kF ,RC0603 ,RoHS |
| R6014,R6018,R6017,R6015,R6013,R6012,R6011,R6016, | R CHIP 1/10W ,39RF ,RC0603 ,RoHS |
| R901, | R CHIP 1/10W ,470RJ ,RC0603 ,RoHS |
| R6022,R6034,R6033,R6032,R6023,R6021,R6031, | R CHIP 1/10W ,4.7kJ ,RC0603 ,RoHS |
| R703, | NICHROME WIRE ,1@ ,3W ,0.04RJ ,OAR3-0.04R-5% ,RoHS |
| R421,R420,R120,R121, | RC 1/4WS ,4.7kJ ,T52 ,CF1/4WS4.7kJT52 ,RoHS |
| R704,R702, | RC 1/4WS ,4.7kJ ,T52 ,CF1/4WS4.7kJT52 ,RoHS |
| R710, | RM 1/4WS ,4.99kF ,T52 ,MF1/4WS1% ,RoHS |
| R711, | RM 1/4WS ,1.5kF ,T52 ,MF1/4WS1% ,RoHS |
| R729,R750, | RM 1/4WS ,1kF ,T52 ,MF1/4WS1% ,RoHS |
| R730, | RM 1/4WS ,200RF ,T52 ,MF1/4WS1% ,RoHS |
| R737, | RM 1/4WS ,4.7kF ,T52 ,MF1/4WS1% ,RoHS |

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| R707, | RM 1/4WS ,18.7KF ,T52 ,MF1/4WS1% ,RoHS |
| R125,R425, | RO 2W ,1kJ ,成型打點 P=20 ,RS-2W ,RoHS |
| R401,R101, | RO 3W ,4.7kJ ,RS-3W ,RoHS |
| R701, | RC 1W ,470RJ ,T52 ,CF1W470RJT52 ,RoHS |
| R705, | RO 2W ,1kJ ,成型打點 P=20 ,RS-2W ,RoHS |
| RL | |
| R1261,R1262,R4261,R4262, | RW 5W 0.2RJ ,+/-50ppm ,成型打點 P=25 ,KNP-5WS(500) |
| RL301,RL302,RL303, | RELAY SRUDH-SS-106DM1 ,6V (HF)JQC-3FF/006-1HS(551) |
| RL304, | RELAY HM4101F/06-H(555) ,6V ,1A ,SPDT ,RoHS |
| RL401,RL402,RL101,RL102, | RELAY JQC-3FF/024-1ZS,DC24V,10A,SPDT (W/O SORTING) |
| S | |
| S701, | * SW SLIDE SS001-P223BDbS-SB20 ,2P3T ,RoHS |
| S611,S612, | SW ENCODER F-12ES5H24B+C ,L20FX7(D) ,24 STEP RoHS |
| S801, | KDC-A11-E210-S(750M)(SDDFA3117U-GW),DPDT,4P*1PP |
| S803,S802, | SW SLIDE SL14-22AM(5A)N ,RED ,2P2T ,RoHS |
| TH | |
| TH101,TH102, | THR NTC TTC05203JSY ,20KJ ,5@ ,RoHS |
| U | |
| U404,U104, | IC UA741CDR ,SMD ,TEXAS ,RoHS |
| U508,U208, | IC ADR03ARZ ,SMD ,ANDE ,RoHS |
| U507,U207, | IC OP2177ARZ ,SMD ,ANDE ,RoHS |
| U505,U205, | IC AD5545BRUZ ,SMD ,ANDE ,RoHS |
| U504,U204, | IC AD7792BRUZ ,SMD ,ANDE ,RoHS |
| U405,U105,U506,U206, | IC TL072CDT, SMD,ST ,RoHS |
| U303, | IC 74HC4094DT ,SMD ,PHILIPS ,RoHS |
| U309,U312,U319,U318,U316,U315,U314,U320,U313,U311,U307,U308,U305,U306,U310,U317, | IC LTV-817S ,SMD ,LITEON ,RoHS |
| U302, | * IC AT93C66A-10SU-2.7 ,SMD ,ATMEL ,RoHS |
| U304, | IC AIC1594PS ,SMD ,AIC ,RoHS |
| U403,U103, | IC LM301ADG ,SMD ,ON ,RoHS |
| U322, | IC LD1117A-3.3V-A ,SMD ,UTC |
| U301, | IC PIC18F85J10 ,SMD ,GPD-X303S V1.00 (2C59) RoHS |
| U704,U705, | IC TL072CDT, SMD,ST ,RoHS |
| U708, | IC LTV-817S ,SMD ,LITEON ,RoHS |
| U106,U406, | IC TL431ACLPRE3 ,TEXAS ,RoHS |
| U201,U501, | IC 78L05L-T92-B ,UTC ,RoHS |
| U107,U407, | TRIAC BTA08-600C ,ST ,RoHS |
| U701, | IC AN7815 ,PANASONIC ,RoHS |
| U702, | IC AN7915T ,PANASONIC ,RoHS |
| U703, | IC TL431ACLPRE3 ,TEXAS ,RoHS |
| U601,U602,U603, | IC ULN2003ADR ,SMD ,TEXAS ,RoHS |
| U604, | IC 74HC4094DT ,SMD ,PHILIPS ,RoHS |

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|---|---|
| U901, | IC FT232RL ,SMD ,FTDI ,RoHS |
| U714, | IC TL431ACLPRE3 ,TEXAS ,RoHS |
| U101,U401, | IC AN7815 ,PANASONIC ,RoHS |
| U102,U402, | IC AN7915T ,PANASONIC ,RoHS |
| U715, | TRIAC BTA08-600C ,ST ,RoHS |
| X | |
| X301, | CRYSTAL 10MHz , HUSG-10.000-30 HC-49/US ,RoHS |
| ZD | |
| ZD103,ZD104,ZD403,ZD404, ZD702, | ZENER 1/2W ,8.5-9.6V ,SMD ,TZMC9V1 ,VISHAY,RoHS |
| ZD703, | * ZENER 1/2W ,3.3V ,SMD ,TZMC3V3-GS08 ,RoHS |
| ZD401,ZD101, ZD701, | ZENER 1/2W ,6.6-6.9V ,HZ7A3 ,HITACHI ,HT ,T52 |

# PCB Mount Parts: GPD-4303S

These parts, listed in alphabetical order, belong to the control PCB, display PCB, or power supply PCB. For the PCB layout and circuit diagrams, see page77.

| | |
|---|---|
| BD | |
| BD101,BD401, | * BRIDGE GBU402 ,RoHS ,4A ,200V ,HY |
| BD301, | BRIDGE 2W06GL-5300E4 ,2A ,600Vmax ,VISHAT ,RoHS |
| BD801, | BRIDGE KBP205G ,2A ,600V |
| BZ | |
| BZ301, | * BUZZER 6V ,DC ,12@*9(H) ,P ,OBO-1206A-A2 |
| C | |
| C101,C401, | CSE1 63V 6800uM 30@*45 LPW682M1JP45H RoHS |
| C831,C832, | CSK AC250V ,4700pM ,Y5V ,AC13F472ML0 ,RoHS |
| C830, | CSK AC275V ,0.22uM,X2,R46KN322040M1M,ARCO |
| C701,C801, | CSE1 16V ,8200uM ,22@*30 ,LPW822M1CN30H ,RoHS |
| C809,C827,C802,C702,C709,C727, | CSC 50V ,0.1uZ ,8@ ,VT ,FYU6104ZH ,RoHS |
| C834,C833, | CSC 250V ,0.01uFM ,Y2 ,JY103MY5VY2 ,RoHS |
| C305,C306,C910,C911,C912, | CSL 50V, 10pJ, NPO, U0603C100JCT, RoHS |
| C1032,C505,C506,C508,C503,C509,C318,C511,C524,C1031,C504,C1041,C1042,C1051,C1052,C2061,C2071,C2072,C2080,C4031,C4032,C4051,C317,C2062,C4042,C5061,C4041,C315,C4052,C5062,C5071,C5072,C5080,C407,C203,C204,C312,C206,C208,C209,C211,C224,C301,C302,C303,C309,C107,C205,C123,C121,C421,C423,C813,C814,C815,C816,C819,C710,C715,C716,C824,C810,C825,C811,C812,C725,C724,C719,C714,C713,C712,C711,C807,C707,C601,C604,C903, | CSL 50V ,0.1uZ ,Y5V ,0603 ,RoHS |
| C118,C418, | CSL 50V, 33pJ, NPO, U0603C330JCT, RoHS |
| C313, | CSL 50V, 470pJ, NPO, U0603C471JCT, RoHS |
| C111,C410,C411,C110,C820,C720, | CSL 50V, 560pJ, NPO, U0603C561JCT, RoHS |
| C113,C114,C120,C307,C413,C414,C420,C817,C818,C717,C718,C904,C906, | CSL 50V ,0.01UK ,0603 ,X7R ,RoHS |
| C311, | CSE1 10V ,470uM ,6.3@*11 ,F=2.5 ,SKP471M1AE11ME2 |
| C316,C501,C201,C808,C708, | CSE1 16V,100uM,6.3@*7,F=2.5,SSP101M1CE07ME2 |
| C314,C210,C332,C510, | CSE1 16V 47uM 6.3@*7 F=2.5 SSP470M1CE07HE2 RoHS |

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|---|---|
| C409,C408,C108,C109,C806,C705,C805,C706,C104,C405,C404,C105, | CSE1 25V 100uM 6.3*7 F=5 SSP101M1EE07H RoHS |
| C106,C406,C901,C905, | CSE1 50V 4.7uM 4@*7 F=5 SSP4R7M1HC07H RoHS |
| C115,C415, | CSE1 50V 220uM VT 10@*13 F=5 SKP221M1HG13H RoHS |
| C804,C704, | CSE1 35V 100uM VT 6.3@*11 F=5 SKP101M1VE11H RoHS |
| C803,C703, | CSE2<br>35V ,220uM ,105'C,VT,8@*11,F=5,TKP221M1VF11M |
| C308,C310, | CSE1 16V ,2200UZ 13@*21m/m ,RoHS |
| C117,C416,C419,C116,C821,C822,C721,C722, | CSD 400V 0.047uJ ,MER473J2GC0 ,RoHS |
| C823,C723, | CSE2 16V 220uM 105'C 6.3@*11 F=5 TKR221M1CE11H |
| C902, | CSE1 16V 47uM 5@*11 F=5 SKP470M1CD11H RoHS |
| C112,C412, | CSC 50V ,1000pK ,VT ,BU4102KH ,RoHS |
| C102,C103,C402,C403, | CSE1 50V 470uM VT 10@*21 F=5 SKP471M1HG21H RoHS |
| D | |
| D614,D615,D616,D613,D901, | LED GREEN ,204GD ,3@ |
| D4011,D4013,D4012,D4014,D1014,D1013,D1011,D1012,D802,D701,D702,D801, | DIODE 1N4004E-E3 ,G.I. HT ,T52 ,VISHAY ,RoHS |
| D109,D110,D409,D410, | DIODE 1N4148T-72 ,T52 ,ROHM ,RoHS |
| D108,D408,D707,D807, | * LED 2/4&5 ,LT1802-R2G6-UR9-FEW ,5@ ,RoHS |
| D803,D703,D111,D411, | DIODE P300DL-5303E3 ,FORMING<br>22C-410 ,VISHAY ,RoHS |
| D805,D706,D705,D806,D804,D704,D405,D406,D104,D404,D403,D304,D302,D301,D112,D412,D105,D303,D106,D502,D501,D407,D202,D201,D107,D103, | DIODE RLS4148NTE-11 ,SMD (LL34) ,ROHM ,RoHS |
| D305, | SCHOTTKY BARRIER DIODE MBRM120ET1G ,SMD ,RoHS |
| D609,D612,D601,D610,D608,D607,D606,D604,D603,D602,D611, | LED YELLOW LT8A33-53-UC91-T5 ,SMD 0603 ,RoHS |
| D605, | LED BLUE LT8AB3-54-UEC3-TE-Z ,SMD 0603 ,RoHS |
| D7013,D7014,D7012,D7011, | DIODE 1N5402-5301E3 ,VISHAY ,RoHS |
| DS | |
| DS601,DS604,DS602,DS605,DS607,DS608,DS609,DS610,DS611,DS612, | DISPLAY 4&5 LC3921-11-SB96BWA035 ,0.39" ,RoHS |
| DS603,DS606, | DISPLAY SUPPER RED LM4074-11-M1BWR035 ,0.4" |
| F | |
| F301,F801, | FUSE T 5*20 2A 250V 美/歐/日/大, 218XEP, RoHS |
| F101,F401,F701, | FUSE T 5*20 6.3A 250V 美/歐/日/大, 218XEP, RoHS |
| F102,F103,F402,F403,F802,F702, | * FUSE 8.5mm ,0.315A ,250V U/C/V RoHS ,1702031544 |
| J | |
| J8022,J7022, | XHCN-07#26-280mm-388-0 ,GW9703007-22 ,RoHS |

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|---|---|
| J304,J301,J1031,J4031, | WAFER A2501WV2-6P ,180' ,RoHS |
| J306, | XHCN-07#26-320mm-788-0 ,GW9703007-22 ,RoHS |
| J305, | XHCN-07#26-300mm-38888-0 ,7AJG0000514 ,RoHS |
| J1032,J4032, | XHCN-07#26-290mm-388888-0 ,RoHS |
| J3021,J3022, | FPC 0.5 40P ,SMD ,B0502F40TDM3 ,RoHS |
| J802,J803,J101,J401,J806 | WAFER B4P-VH (LF)(SN) ,RoHS |
| J102,J402,J1061,J7021,J8021, | WAFER A2501WV2-3P ,180' ,RoHS |
| J107, | WAFER A2501WV2-4P ,180' ,RoHS |
| J801,J1041,J4041,J8011, | WAFER B3P-VH (LF)(SN) ,RoHS |
| J7031,J701,J8031,J804, | WAFER B2P-VH (LF)(SN) ,RoHS |
| J805, | VH00-17#22-70mm-120-0 ,RoHS |
| J901, | WAFER S5B-XH-A(LF)(SN) ,RoHS |
| J902, | USB JACK B TYPE 8968-B04C00SWA ,4P ,180' ,RoHS |
| JP | |
| JP1011,JP1012,JP102,JP103,JP1041,JP1042,JP105,JP107,JP403,JP404,JP701,JP702,JP703,JP710,JP802,JP801,JP401,JP402, | JUMP WIRE 0.6@ ,HT ,160(OD)*22(ID)*115(H)/ROLL |
| L | |
| L301, | INDUCTOR 33uH+/-30% ,SMD ,SCDS6D38NT330 ,RoHS |
| Q | |
| Q502,Q310,Q303,Q304,Q305,Q306,Q307,Q308,Q302,Q311,Q312,Q313,Q316,Q301,Q501,Q202,Q503,Q504,Q506,Q507,Q318,Q111,Q105,Q106,Q107,Q204,Q109,Q207,Q112,Q405,Q206,Q407,Q408,Q409,Q411,Q412,Q201,Q203,Q406,Q108,Q315,Q317,Q205,Q505,Q711,Q323,Q325,Q327,Q329,Q330,Q331,Q710,Q712,Q713,Q324,Q322,Q709,Q813,Q326,Q812,Q321,Q811,Q810,Q809,Q706,Q705,Q704,Q806,Q805,Q804, | TR MMBT3904LT1G ,SMD ,ON ,RoHS |
| Q410,Q320,Q314,Q309,Q208,Q110,Q508,Q113,Q413,Q703,Q328,Q803,Q332,Q6013,Q6018,Q6017,Q6016,Q6014,Q6012,Q6011,Q6015, | TR MMBT3906LT1G ,SMD ,ON ,RoHS |
| Q102,Q402,Q701,Q708,Q801,Q808, | TR 2N3906RLRMG ,VT ,ON ,RoHS |
| Q101,Q401,Q702,Q802, | FET IRFP150NPBF ,IR ,RoHS |
| R | |
| R131,R232,R233,R431,R532,R533, | R CHIP 1/10W ,100RF ,RC0603 ,RoHS |

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|---|---|
| R103,R1131,R1271,R1272,R213,R215,R216,R317,R318,R331,R332,R347,R348,R353,R354,R355,R403,R4131,R4271,R4272,R430,R513,R515,R516,R394,R393,R828,R819,R818,R719,R718,R723,R749,R747,R728,R745,R720,R845,R847,R849,R380,R381,R820,R6043,R6041,R6042,R6044,R6045,R6046,R6047,R6048,R908,R906, | R CHIP 1/10W ,1kF ,RC0603 ,RoHS |
| R111,R530,R529,R526,R351,R230,R229,R411,R226,R813, | R CHIP 1/10W ,10kF ,RC0603 ,RoHS |
| R143,R445,R145,R443,R834,R734, | R CHIP 1/10W ,100kF ,RC0603 ,RoHS |
| R1181,R4181,R1132,R1281,R4132,R4281,R725,R825,R905,R904,R903, R725, | R CHIP 1/10W ,10RF ,RC0603 ,RoHS |
| R444,R144, | R CHIP 1/10W ,140kF ,RC0603 ,RoHS |
| R447,R441,R141,R147, | R CHIP 1/10W ,15RJ ,RC0603 ,RoHS |
| R402,R406,R106,R102,R4372,R4371,R1382,R1371,R1381,R1372,R4381,R4382, | R CHIP 1/10W ,1.5kJ ,RC0603 ,RoHS |
| R442,R142, | R CHIP 1/10W ,180kF ,RC0603 ,RoHS |
| R1292,R525,R524,R225,R224,R4291,R1291,R4292,R122,R422, | R CHIP 1/10W ,200RF ,RC0603 ,RoHS |
| R2062,R5061,R5062,R310,R109,R309,R409,R2061,R739,R809,R817,R738,R839,R838,R822,R717,R722,R709,R708,R706,R806,R808,R907,R909,R902, | R CHIP 1/10W ,2kF ,RC0603 ,RoHS |
| R412,R112,R721, | R CHIP 1/10W ,20kF ,RC0603 ,RoHS |
| R128, | R CHIP 1/10W ,200kF,RC0603 ,RoHS |
| R345, | R CHIP 1/10W ,2.7kF ,RC0603 ,RoHS |
| R114,R415,R1282,R4282,R831,R823,R814,R731,R714, | R CHIP 1/10W ,3kF ,RC0603 ,RoHS |
| R350,R146,R440,R140,R716,R816, | R CHIP 1/10W ,30kF ,RC0603 ,RoHS |
| R150,R450, | R CHIP 1/10W ,31.6kF ,RC0603 ,RoHS |
| R428, | R CHIP 1/10W ,360kF ,RC0603 ,RoHS |
| R511,R518,R523,R522,R514,R512,R223,R222,R218,R214,R212,R210,R211,R510,R220,R221,R520,R521,R740,R746,R744,R743,R742,R741,R846,R844,R843,R842,R840,R841, | R CHIP 1/10W ,3.9kJ ,RC0603 ,RoHS |

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|---|---|
| R324,R338,R326,R320,R312,R330,R328,R316,R314,R217,R517,R334,R322,R336,R376,R387,R389,R385,R382,R378,R372,R371,R748,R848,R374,R391,R901, | R CHIP 1/10W ,470RJ ,RC0603 ,RoHS |
| R346,R329,R333,R337,R339,R340,R341,R342,R344,R303,R327,R343,R323,R319,R315,R313,R311,R308,R307,R306,R302,R304,R305,R325,R349,R335,R377,R392,R390,R388,R386,R379,R375,R370,R373,R383,R6022,R6034,R6033,R6032,R6023,R6021,R6031, | R CHIP 1/10W ,4.7kJ ,RC0603 ,RoHS |
| R446, | R CHIP 1/10W ,47kJ ,RC0603 ,RoHS |
| R505,R205,R408,R407,R107,R108, | R CHIP 1/10W ,4.7MJ ,RC0603 ,RoHS |
| R231,R531,R116,R416,R713, | R CHIP 1/10W ,4.99kF ,RC0603 ,RoHS |
| R148,R448, | R CHIP 1/10W ,49.9kF ,RC0603 ,RoHS |
| R507,R204,R504,R207, | R CHIP 1/10W ,510RF ,RC0603 ,RoHS |
| R149,R449, | R CHIP 1/10W ,56.2kF ,RC0603 ,RoHS |
| R129,R2081,R2082,R5081,R5082, | R CHIP 1/10W ,6.2kF ,RC0603 ,RoHS |
| R429, | R CHIP 1/10W ,6.8kF ,RC0603 ,RoHS |
| R228,R528, | R CHIP 1/8W ,10kF ,RC0805 ,RoHS |
| R227,R527, | R CHIP 1/8W ,30kF ,RC0805 ,RoHS |
| R413,R500,R5021,R2021,R502,R202,R405,R105,R501,R113,R200,R201, | R CHIP 1/8W ,30.1kF ,RC0805 ,RoHS |
| R203,R503, | R CHIP 1/8W ,3.74kF ,RC0805 ,RoHS |
| R104,R110,R404,R410, | R CHIP 1/8W ,75kF ,RC0805 ,RoHS |
| R208,R508, | R CHIP 1/10W ,0RJ ,RC0603 ,RoHS |
| R118,R418, | R CHIP 1/10W ,30.1kF ,RC0603 ,RoHS |
| R123,R423, | R CHIP 1/10W ,4.75kF ,RC0603 ,RoHS |
| R119,R419,R124,R424, | R CHIP 1/10W ,2.1kF ,RC0603 ,RoHS |
| R117,R417, | R CHIP 1/10W ,71.5kF ,RC0603 ,RoHS |
| R727,R726,R826,R827, | R CHIP 1/10W ,1MJ ,RC0603 ,RoHS |
| R812,R712, | R CHIP 1/10W ,12.1kF ,RC0603 ,RoHS |
| R815,R715,R724,R824, | R CHIP 1/10W ,1.5kF ,RC0603 ,RoHS |
| R821, | R CHIP 1/10W ,8.66kF ,RC0603 ,RoHS |
| R752,R751, | R CHIP 1/8W ,10RJ ,RC0805 ,RoHS |
| R836,R835,R735,R736, | R CHIP 1/8W ,2kF ,RC0805 ,RoHS |
| R832,R833,R732,R733, | R CHIP 1/8W ,3kF ,RC0805 ,RoHS |
| R1261,R1262,R4261,R4262, | RW 5W 0.2RJ ,+/-50ppm ,成型打點 P=25 ,KNP-5WS(500) |
| R6014,R6018,R6017,R6015,R6013,R6012,R6011,R6016, | R CHIP 1/10W ,39RF ,RC0603 ,RoHS |

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| R703, | NICHROME WIRE ,1@ ,3W ,0.04RJ ,OAR3-0.04R-5% ,RoHS |
| R803, | RW 5W 0.3RJ ,+/-50ppm ,成型打點 P=25 ,KNP-5WS(500) |
| R802,R804,R421,R420,R120,R121,R704,R702, | RC 1/4WS ,4.7kJ ,T52 ,CF1/4WS4.7kJT52 ,RoHS |
| R829,R729,R750, | RM 1/4WS ,1kF ,T52 ,MF1/4WS1% ,RoHS |
| R811,R711, | RM 1/4WS ,1.5kF ,T52 ,MF1/4WS1% ,RoHS |
| R830,R730, | RM 1/4WS ,200RF ,T52 ,MF1/4WS1% ,RoHS |
| R837,R737, | RM 1/4WS ,4.7kF ,T52 ,MF1/4WS1% ,RoHS |
| R810, | RM 1/4WS ,5.62kF ,T52 ,MF1/4WS1% ,RoHS |
| R807, | RM 1/4WS ,10kF ,T52 ,MF1/4WS1% ,RoHS |
| R801,R701, | RC 1W ,470RJ ,T52 ,CF1W470RJT52 ,RoHS |
| R805,R705,R125,R425, | RO 2W ,1kJ ,成型打點 P=20 ,RS-2W ,RoHS |
| R710, | RM 1/4WS ,4.99kF ,T52 ,MF1/4WS1% ,RoHS |
| R707, | RM 1/4WS ,18.7KF ,T52 ,MF1/4WS1% ,RoHS |
| R401,R101, | RO 3W ,4.7kJ ,RS-3W ,RoHS |
| RL | |
| RL304, | RELAY HM4101F/06-H(555) ,6V ,1A ,SPDT ,RoHS |
| RL301,RL302,RL303, | RELAY SRUDH-SS-106DM1 ,6V (HF)JQC-3FF/006-1HS(551) |
| RL401,RL402,RL101,RL102, | RELAY JQC-3FF/024-1ZS,DC24V,10A,SPDT (W/O SORTING) |
| S | |
| S803,S802, | SW SLIDE SL14-22AM(5A)N ,RED ,2P2T ,RoHS |
| S611,S612, | SW ENCODER F-12ES5H24B+C ,L20FX7(D) ,24 STEP RoHS |
| S801, | KDC-A11-E210-S(750M)(SDDFA3117U-GW),DPDT,4P*1PP |
| TH | |
| TH101,TH102, | * THR NTC JJTR203J5SBD50K ,20KJ ,6@ ,RoHS |
| U | |
| U404,U104, | IC UA741CDR ,SMD ,TEXAS ,RoHS |
| U508,U208, | IC ADR03ARZ ,SMD ,ANDE ,RoHS |
| U507,U207, | IC OP2177ARZ ,SMD ,ANDE ,RoHS |
| U505,U205, | IC AD5545BRUZ ,SMD ,ANDE ,RoHS |
| U504,U204,U807,U707, | IC AD7792BRUZ ,SMD ,ANDE ,RoHS |
| U405,U105,U506,U206,U804,U705,U805,U704, | IC TL072CDT, SMD,ST ,RoHS |
| U303,U604, | IC 74HC4094DT ,SMD ,PHILIPS ,RoHS |
| U309,U312,U319,U318,U316,U315,U314,U320,U313,U311,U307,U308,U305,U306,U310,U317,U810,U708,U712,U711,U710,U709,U713,U811,U809,U808,U812,U813, | IC LTV-817S ,SMD ,LITEON ,RoHS |
| U302, | * IC AT93C66A-10SU-2.7 ,SMD ,ATMEL ,RoHS |
| U304, | IC AIC1594PS ,SMD ,AIC ,RoHS |
| U403,U103, | IC LM301ADG ,SMD ,ON ,RoHS |
| U322, | IC LD1117A-3.3V-A ,SMD ,UTC |

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|---|---|
| U301, | IC PIC18F85J10 ,SMD ,GPD-X303S V1.00 (2C59) RoHS |
| U806,U706, | IC AD5643RBRMZ-5 ,SMD ,ANDE ,RoHS |
| U106,U406,U714,U814, | IC TL431ACLPRE3 ,TEXAS ,RoHS |
| U201,U501,U803,U703, | IC 78L05L-T92-B ,UTC ,RoHS |
| U107,U407,U715,U815, | TRIAC BTA08-600C ,ST ,RoHS |
| U101,U401,U801,U701, | IC AN7815 ,PANASONIC ,RoHS |
| U102,U402,U702,U802, | IC AN7915T ,PANASONIC ,RoHS |
| U601,U602,U603, | IC ULN2003ADR ,SMD ,TEXAS ,RoHS |
| U901, | IC FT232RL ,SMD ,FTDI ,RoHS |
| X | |
| X301, | CRYSTAL 10MHz , HUSG-10.000-30 HC-49/US ,RoHS |
| ZD | |
| ZD103,ZD104,ZD403,ZD404,ZD702,ZD802, | ZENER 1/2W ,8.5-9.6V ,SMD ,TZMC9V1 ,VISHAY,RoHS |
| ZD401,ZD101,ZD701,ZD801, | ZENER 1/2W ,6.6-6.9V ,HZ7A3 ,HITACHI ,HT ,T52 |
| ZD803,ZD703, | * ZENER 1/2W ,3.3V ,SMD ,TZMC3V3-GS08 ,RoHS |

# APPENDIX

## Declaration of Conformity

We

**GOOD WILL INSTRUMENT CO., LTD.**

(1) No.7-1, Jhongsing Road, Tucheng Dist., New Taipei City 236, Taiwan

(2) No. 69, Lu San Road, Newarea, Suzhou, Jiangsu , China

declare, that the below mentioned product

**Type of Product: Power Supply**

**Model Number: GPD-2303S/GPD-3303S/GPD-4303S**

are herewith confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Law of Member States relating to Electromagnetic Compatibility (2004/108/EC) and Low Voltage Directive (2006/95/EC).
For the evaluation regarding the Electromagnetic Compatibility and Low Voltage Directive, the following standards were applied:

◎ **EMC**

| EN 61326-1: 2006 Electrical equipment for measurement, control and laboratory use –– EMC requirements | |
|---|---|
| Conducted Emission<br>Radiated Emission ClassB | Electrostatic Discharge<br>EN 61000-4-2: 2008 |
| EN 55011: 2009 + A1: 2010 | |
| Current Harmonics<br>EN 61000-3-2: 2006+A2:2009 | |
| Voltage Fluctuations<br>EN 61000-3-3: 2008 | |
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◎ **Safety**

| Low Voltage Equipment Directive 2006/95/EC |
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| Safety Requirements<br>IEC/EN 61010-1: 2001(Second Edition) |

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