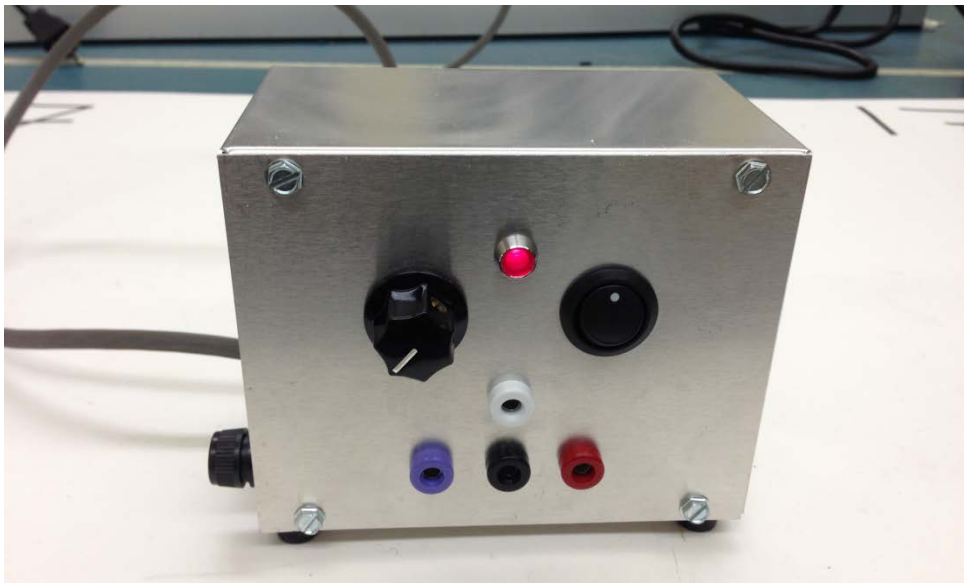
Documentation Standard

DC Power Supply



School of Energy
ELEX 1102
Electronic Fabrication Tools and Techniques

Contents

*** **Important** ***

1. All documents will be provided.
2. The string **<Rev>** is a placeholder for an upper case letter for the document revision.
3. Completed documents are released using the Portable Document Format (PDF).

0. INTRODUCTION

The development of a product requires the intellectual property to be documented in a manner suitable for use by all stakeholders. The types of documents and their contents depend on the product and the intended audience.

For an electronic product, such as the DC Power Supply, the documentation needs to capture those elements related to the product design and its manufacture. The design documents detail the electrical and mechanical attributes of the product and the manufacturing documents describe the key assembly processes for realizing the product. Documents may serve both design and manufacturing purposes depending upon the context in which they are used.

Prototyping or development related work usually involves low production quantities where the units are often hand assembled using minimal documentation. The repeatability and quality of these units may be variable. These units are produced for demonstration purposes or for 'proof of principle'.

With volume manufacture, it is important that a product can be produced repeatedly from one production run to the next with little or no deviation from its specifications. The documentation provides the means to communicate the essential design or manufacturing attributes to the various stakeholders. With adequate documentation a product could proceed to volume manufacture.

For the DC Power Supply the document package includes those documents that capture its design and describe its manufacture. These documents support the purchasing contracts for procuring the parts and services needed to implement a unit. The documents that are supplied are:

- Master Build List — Lists the documents for the latest power supply configuration
- Schematic diagram — Captures the electronic circuit attributes of the power supply
- Parts List — Details the electrical and mechanical parts for the power supply
- PCB Artwork — Shows the printed circuit board bottom layer traces and pads
- Component Locator — Shows the printed circuit board top layer component locations
- Alignment Test — Describes the printed circuit board assembly test
- Acceptance Test — Describes the DC power supply test
- Plan View — Details the chassis and cover holes for the cabinet
- Interconnect — Describes the interconnect wiring to the off-board components

These documents will be in \Share Out\ELEX\1102\Documentation.

As is standard in industry, each document version is identified by its revision with the latest version of a document released for use. Document revisions are identified alphabetically with the initial release of a document assigned a revision level **A**. Subsequent versions of a document are identified by sequentially incrementing the document revision. The conventional method for deploying any change to a document is through an Engineering Change Request / Order process.

The following sections describe the DC Power Supply documents and their contents. All of the required documents are located in the applicable shareout folder.

1. MASTER BUILD LIST

The Master Build List identifies the manufacturing documents and their revisions to produce a specific configuration (version) of the product. This document is supplied.

Requirements
The document is prepared using MS-Word.

A legible font of 10pt. minimum is to be used.

The electronic filename is: **01<REV>-Master Build List**

The document includes the following title, sections, header and footer information.

1	Document Title	Master Build List
2	Product Description	Short description of the unit and its purpose. Refer to the other documents.
3	Change Log	A table listing the product change history in descending order of the Master Build List revision. A row entry includes: Revision and Change Description. Only one entry needed for the “Initial product release” at Revision A.
4	Product Documents	A table listing the product documents in ascending order by electronic file name. Each row entry includes Document Title; e-File Name; Revision. Only the latest revision of a document is listed.
5	Header (Every Page)	Product, Document Title, Author, and Revision.
6	Footer (Every Page)	Revision Date and ‘Page Number of Total Pages’.

2. SCHEMATIC DIAGRAM

The Schematic Diagram details the electronic circuit for the product. This document is supplied.

Requirements
The document is prepared using Altium Designer or equivalent.

A legible font of 10pt. minimum is to be used.

The electronic filename is: **02<Rev>-Schematic Diagram**

The document includes the following title block information.

1	Title	Product title
2	Size	Sheet size
3	Revision	Document revision
4	Date	Document revision date
5	File	e-file name
6	Sheet	Sheet number of total sheets (Blank if only one sheet)

3. PARTS LIST

The Parts List identifies the components needed to produce the product. This document is supplied.

Requirements
The document is prepared using MS-Word.

A legible font of 10pt. minimum is to be used.

The electronic filename is: **03<Rev>-Parts List**

The document includes the following title, sections, header and footer information.

1	Document Title	Parts List
2	Electrical	A table listing all of the electronic components in ascending order by reference designator. A row entry includes: Reference Designators; Value / Part Number; Description; Package and Quantity. Similar parts are combined. Refer to the example.
3	Mechanical	A table listing all of the mechanical parts in ascending order by reference designator. Mechanical parts are designated by the letter 'M'. A row entry includes: Reference Designators; Description and Quantity. Similar parts are combined. Refer to the example.
4	Header (Every Page)	Product, Document Title, Author, and Revision.
5	Footer (Every Page)	Revision Date and 'Page Number of Total Pages'.

- List reference designators sequentially.
- Do not include consumables such as wire, solder, thermal paste, heat-shrink, etc.

EXAMPLES

The following are example tables for the Parts List. The contents are indicative of what information is to be included. Parts List information must be verified for accuracy.

Electrical

Ref Des	**Value / PN**	**Desc**	**Pkg**	**Qty**
C1, C9	330µF	25V, Al Electrolytic	Axial lead	2
D1, D2, D3	1N4007	1A, General purpose	DO-41	3

Mechanical

Ref Des	**Description**	**Qty**
M1	Cabinet, Al, 9in x 12in x 4in	1
M2, M3	Insulator, TO-220, Mica	2

4. PCB ARTWORK

The PCB Artwork is used to image the printed circuit boards for the product. This document is supplied.

Requirements
The document is prepared using MS-Word.

A legible font of 10pt. minimum is to be used.

The electronic filename is: **04<Rev>-PCB Artwork**

The document includes the following title, sections, header and footer information.

1	Document Title	PCB Artwork
2	Header (Every Page)	Product, Document Title, Author, and Revision.
3	Footer (Every Page)	Revision Date and 'Page Number of Total Pages'.

- The PCB Artwork includes only the copper traces, pads, and board outline. The component overlay detail is not shown as it is not included on the actual board.
- The PCB artwork is mirrored, scaled correctly with dimensions shown.

5. COMPONENT LOCATOR

The Component Locator shows the component positions on the PCB. This document is supplied.

Requirements
The document is prepared using MS-Word.

A legible font of 10pt. minimum is to be used.

The electronic filename is: **05<Rev>-Component Locator**

The document includes the following title, sections, header and footer information.

1	Document Title	Component Locator
2	Header (Every Page)	Product, Document Title, Author, and Revision.
3	Footer (Every Page)	Revision Date and 'Page Number of Total Pages'.

- Include the features below

'Top' or 'Bottom View' label	Voltage regulator pin numbers or location
Component outlines	Board outline
Reference designators	External connections (do not show wire)
Polarity marks	

6. TEST PROCEDURES

The test procedures list the PCB assembly and final product tests. These documents are supplied.

Requirements
The documents are prepared using MS-Word.

A legible font of 10pt. minimum is to be used.

The electronic filenames are: **06-1<Rev>-ALIGNMENT TEST**
06-2<Rev>-ACCEPTANCE TEST

The documents may include the following title, sections, header and footer information.

1	Document Title	Alignment Test Acceptance Test
2	Product Description	Short description of the unit and its purpose.
3	Test Equipment	A table listing all equipment needed to test the unit. Include Descriptions, Manufacturers, and Model Numbers.
4	Pre-setup Check	A visual check to confirm relevant attributes.
5	Test Setup	A description or drawing of the test equipment setup with enough detail for a non-technical person to proceed.
6	Equipment Tests	A tabular list of the test steps to perform on the unit. All relevant unit electrical / mechanical parameters are tested. Provisions for recording test results are included.
7	Header (Every Page)	Product, Document Title, Author, and Revision.
8	Footer (Every Page)	Revision Date and 'Page Number of Total Pages'.

Component Specifications (For Reference Only):

Specifications for some components used in the DC Power Supply are listed below.

Transformer:	Input AC voltage:	115 V_{ac}, 60 Hz	
	Output AC voltage:	33 V_{ac}, center-tapped	
	Max. Output AC Current:	1 A	
	Max. Output Power:	33 VA	
Diodes	Maximum forward bias current		1.0A
Regulators:	DC Output Voltages	**Max. Output Current**	**Operating Temp. Range**
	+5V	1.0 A	0 to 125ºC
	1.2 to + 15 V	1.5 A	0 to 125ºC
	-15V	1.0 A	0 to 125ºC
	Maximum output current achievable with adequate heat sinking. Refer to product datasheets for information. Regulators include current-overload and thermal-shutdown protection. Refer to product datasheets for information.		
Power Supply:	**Maximum Output Power:** Individual: As rated Combined: 33 Watts *Individual power supply outputs can be connected in series to provide additional output voltage capabilities.*		

7. MECHANICAL DRAWINGS

The mechanical drawings describe the fabricated parts; interconnect wiring; other manufacturing details and the final assembly of the product. These documents are supplied.

Requirements
A document is prepared using Autocad.

A legible font of 10pt. minimum is to be used.

The electronic filenames are: **07-1<Rev>-PLAN VIEW**
07-2<Rev>-INTERCONNECT

The documents include the following title block information.

1	Title	Product title
2	Sheet Size	Sheet size
3	Date	Document creation date
4	File name	e-file name
5	Drawn By / Set	Document author
6	Drawing Number	Document number
7	Revision History	Historical revision list with dates and approvals