DESIGN REVIEW

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Abstract:
This document describes the work required to perform design review.

REVISION LOG

Issue	Date	Comment	Author
Orig			

DOCUMENT CHANGE RECORD

Issue	Item	Reason for Change

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1.0 PURPOSE

This document establishes design review instructions, documentation requirements, scheduling of design reviews, criteria for action item closeout and the items to be defined at each level of review.

2.0 THEORY

Design review is used to enhance the probability of product, software or service success by identifying potential or actual design problems. The solution of identified problems is not attempted at the review but is assigned as an action item. Reviewing a design does not imply a lack of confidence in the designer – it is a normal and necessary part of best engineering practice. Designers of critical items welcome rigorous design reviews for the peace of mind they provide. They help assure that something has not been overlooked because the designer was too close to the work. There is no reflection on a person's competence in having to respond to action items. To serve as a design reviewer indicates that your associates regard you as an expert.

3.0 DESIGN REVIEW

All deliverable hardware and software must undergo [redacted]

3.1 Number and Type of Design Reviews

The number and type of design reviews will depend on the complexity and criticality of the product, software or service. In principle, the design review must [redacted]

A simple, non-critical hardware, software or service may only require a single design review.

3.2 Scheduling Reviews

At the start of a program, responsible authorities must meet to determine [redacted] Sufficient time must be allowed for the design to [redacted]

3.3 Heritage Design Review

Designs that are qualified by another program do not require additional review unless [redacted]

3.4 Software and Service Reviews

Computer programs, contents of ROM, PROM and other programmable devices and [redacted]

3.5 Subcontractor Reviews

Products and services from subcontractors must be design reviewed according to [redacted] The responsible authority and appropriate support personnel must [redacted]

3.6 Interfaces

Reviewers should devote extra attention to both the intentional and unintentional interfaces under all modes and conditions. For example – [redacted]

3.7 Post Review Design Changes

Changes made to a design subsequent to a successful review should [redacted] Design changes, even minor ones made after the final design review (CDR) are [redacted] Fully configured programs begin formal change control immediately following CDR and [redacted]

3.8 Design Review Items

1. Requirements. [redacted]
2. Design. [redacted]
3. Reviewers. [redacted]

4. Design Package. [redacted]
5. Agenda. [redacted]
6. Review Minutes. [redacted]
7. Closeout of Action Items. [redacted]

3.9 Inappropriate Items for a Design Review

[redacted] - a design review is not a program status review.

3.10 System Review Attendees

System review attendees should include [redacted]

4.0 Types of Design Reviews

4.1 System Level Reviews

4.1.1 Baseline Design Review (BDR)

The BDR is held to assure that the project objective and requirements are understood and the proposed approach will meet them. The emphasis is on [redacted] The BDR must be held early enough so that concepts can be examined and modified without [redacted] The BDR should address the following:

1. [redacted]

2. [redacted]
3. [redacted]
4. [redacted]
5. [redacted]
6. [redacted]

The output of the BDR consists of an approved pre-release baseline design that is subject to [redacted]

4.1.2 Preliminary Design Review (PDR)

The PDR is the first review of the preliminary detailed design and is generally held [redacted] The PDR should address the following:

1. [redacted]
2. [redacted]
3. [redacted]
4. [redacted]
5. [redacted]
6. [redacted]
7. [redacted]
8. [redacted]

9. [redacted]
10. [redacted]
11. [redacted]
12. [redacted]
13. [redacted]
14. [redacted]

The output of the PDR consists of an approved functional baseline design that is [redacted]

The development (performance) configuration documents include:

1. [redacted]
2. [redacted]
3. [redacted]
4. [redacted]

Formal change control procedures are invoked concurrent with the release of the development (performance) configuration documents.

4.1.3 Critical Design Review (CDR)

The system CDR is held immediately prior to design freeze and before [redacted] The CDR presents a final detailed design using [redacted]

The CDR should address the following items:

1. [redacted]
2. [redacted]
3. [redacted]
4. [redacted]
5. [redacted]
6. [redacted]
7. [redacted]
8. [redacted]
9. [redacted]
10. [redacted]
11. [redacted]
12. [redacted]

Completion of the CDR and resolution of its action items establishes the design baseline. Following CDR, [redacted]

4.1.4 Environmental Review (ER)

The ER occurs prior to the start of environmental testing of the integrated system or end item. Its purpose is to:

1. [redacted]
2. [redacted]

4.1.5 Buyoff Review

The buyoff review (also known as [redacted]) is held at completion of all end item environmental and acceptance testing – it addresses:

1. [redacted]
2. [redacted]
3. [redacted]
4. Post-qualification plans.

For programs involving a qualification product, a buyoff review following qualification testing may be used to [redacted]

4.1.6 Operations Review

This review applies to programs that have operational [redacted] The review evaluates [redacted]

4.2 Subsystem Level Reviews

Subsystem level reviews are held when [redacted] These reviews are held for [redacted] This level of review must not [redacted]

4.2.1 Hardware Subsystem Reviews

Circuit design reviews are completed before significant packaging design is performed. Attendance is usually limited to [redacted] Completion of this review permits [redacted] Electrical and mechanical subsystem reviews and review packages should contain (as appropriate):

1. [redacted]
2. [redacted]

3. [redacted]
4. [redacted]
5. [redacted]
6. [redacted]
7. [redacted]
8. [redacted]

4.2.2 Software Subsystem Reviews

Software reviews should be held before final coding begins. When multiple reviews are deemed necessary, the first is [redacted] This may be followed by a Software PDR, based on [redacted] At PDR, all modules, data structures and interfaces should [redacted]

4.2.3 Fabrication Pre-release Review (FPR)

Prior to release of a drawing package to the shops for fabrication, an FPR (also known as Fabrication Feasibility Review – FFR) is held. This provides one last chance to catch manufacturability problems at the paper design stage. The FPR consists of [redacted] The FPR should assure that the drawing package:

1. [redacted]
2. [redacted]
3. [redacted]

The review should address the following items:

1. [redacted]
2. [redacted]
3. [redacted]

Upon successful completion of the FPR and closure of action items, the package is [redacted]

4.3 Other Reviews

Some programs require external reviews. These reviews may be able to supplant portions of certain in-house reviews. Interactions between external and internal providers should [redacted] A "lessons-learned" review is often beneficial when held after completion of the project.

5.0 Design Review Packages

All design reviews require a review package. For all but the FPR, the package must [redacted] Preparation of the review package is one of the major benefits of holding a design review – the designer will often discover design problems during the process. The package contents are [redacted]

5.1 System Level Design Review Data Package (BDR, PDR, CDR)

System level review packages typically contain:

#	Document	Preparer
1	[redacted]	[redacted]
2	[redacted]	[redacted]
3	[redacted]	[redacted]
4	[redacted]	[redacted]
5	[redacted]	[redacted]
6	[redacted]	[redacted]
7	[redacted]	[redacted]
8	[redacted]	[redacted]
9	[redacted]	[redacted]

#	Document	Preparer
10	[redacted]	[redacted]
11	[redacted]	[redacted]
12	[redacted]	[redacted]
13	[redacted]	[redacted]

5.2 Circuit Design Review Data Package

Circuit design review packages typically contain:

#	Document	Preparer
1	[redacted]	[redacted]
2	[redacted]	[redacted]
3	[redacted]	[redacted]
4	[redacted]	[redacted]
5	[redacted]	[redacted]
6	[redacted]	[redacted]
7	[redacted]	[redacted]
8	[redacted]	[redacted]
9	[redacted]	[redacted]
10	[redacted]	[redacted]
11	[redacted]	[redacted]
12	[redacted]	[redacted]
13	[redacted]	[redacted]
14	[redacted]	[redacted]

5.3 Software Review Data Package

Software review packages typically contain:

#	Document	Preparer
1	[redacted]	[redacted]
2	[redacted]	[redacted]
3	[redacted]	[redacted]
4	[redacted]	[redacted]
5	[redacted]	[redacted]
6	[redacted]	[redacted]
7	[redacted]	[redacted]
8	[redacted]	[redacted]
9	[redacted]	[redacted]

6.0 Responsibilities

6.1 Program Manager

The program manager is responsible for [redacted]

[redacted] The program manager is responsible for [redacted] The manager prepares [redacted] The manager will verify [redacted]

6.2 Chief Engineer

The chief engineer is responsible for [redacted] The chief engineer must ensure [redacted]

[redacted]

6.3 Chief Scientist

The chief scientist is responsible for [redacted]

Where appropriate, the scientist will [redacted]

6.4 Presenter

The presenter is responsible for [redacted] The presenter must [redacted] Comments from the reviewers should be accepted from an objective, non-defensive point of view.

6.5 Reviewers

Independent reviewers should be expert in the particular discipline being reviewed. They may or may not be working on the same program but should not be intimately involved in the design of the item being reviewed. All attendees at a review should consider themselves ad hoc reviewers. Reviewers have an obligation to [redacted]

6.6 Chairperson

The Chairperson directs the review, keeps it on schedule, curtails debates and attempts at real-time re-design by recording action items or scheduling splinter meetings if definitive agreement cannot be achieved. The Chairperson must [redacted]

The Chairperson should [redacted]

The Chairperson is the final authority in [redacted]

Generally, if there is doubt about the closure of a subject then it becomes an action item. At the end of the review, the Chairperson should [redacted]

The Chairperson is responsible for [redacted] The Chairperson may reconvene the review panel to discuss any questionable action items.

6.7 Section, Group and Department Supervisors

Line supervisors are responsible for [redacted] They should ensure [redacted] They must [redacted] Supervisors should [redacted]