Process Engineering Group

Process Engineering Group (R&D - GIL)

Organizational Processes' Needs

Objective :

PEG develop, maintain and institutionalize Organization's and projects' processes and metrics.

Scope :

This process is applicable to all activities under the purview of the R&D Division in Genus Innovation Ltd.

Vision :

- Development, maintenance and assimilation of processes to aid and support the organization's operations.
- Institutionalization of the aforesaid processes.
- Facilitation in adherence to the processes.
- To develop and maintain a quantitative insight into the organization's performance.

Roles and Responsibilities :

PEG was formed at Organizational level, Roles and Responsibilities also identified. *Project Team Section of PEG Plan in EinFrame.*

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Organization Processes' Needs

Goals of Current Year

- Strengthen the Project Management Processes
  Example : EinFrame as tool implemented for Project Management activities..
- Organization's Metrics review & revise :
  Business objectives revised according to Business priorities and Vison, MBRs made, reviewed the current measurement goals, Line Rejection Percentage goal revised.

Business objectives to Process objectives mapped on basis of these measurement:

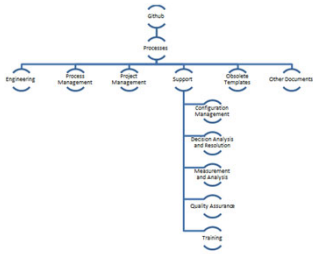
- Line Rejection Percentage (Quality)
- Schedule Variance (Delivery)

BOTOPO

Process

PEG Annual Plan was prepared for working of PEG, consists of

1. Budget Plan (IR and Benchmark Appraisal from KPMG, Stationery)
2. Resource Plan (SVN, EinFrame, MS Office etc.)
3. Roles & Responsibility Plan
4. Training Plan
5. Configuration Management Plan (This repository contains all artifacts of PEG working activities.)
6. Quality Plan (Consists of Audit, Senior Management Review)
7. Measurement & Analysis Plans
8. Monitor and Control
9. Action & Release Plan (Project Tasks).



Structure of QMS

PRCD_CONFIG (Page No. 10)

Quality Management System (QMS)

Policy : A policy is a deliberate system of principles to guide decisions and achieve rational outcomes. A policy is a statement of intent, and is implemented as a procedure or protocol.
For example:
Genus Development Policy (POLC_DEVPOL)

Procedure : A fixed, step by step sequence of activities or course of action (with definite start and end points) that should be followed in the same order to correctly perform a task.
For example:
Project Planning Procedure (PRCD_PRJPLN)

Templates / Tools : A template is a form or pattern used as a guide to making something.
For example:
Hardware Design Template (TMPL_HDWDSN)

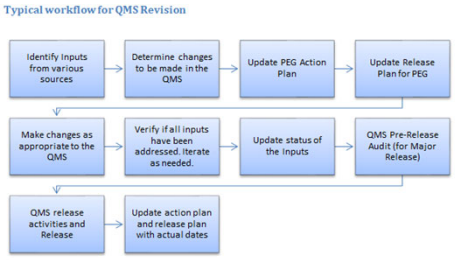
Checklist : A list of items to be noted, checked, or remembered.
For example:
Plan review checklist (CHKL_PLNREV)

Guidelines : A principle put forward to set standards or determine a course of action.
For example:
Firmware Coding Standards guidelines (GDLN_FRWSTD)

Logs : Project wise various review and testing defects available in Incident Management Report of EinFrame.
For example :
Incident Management

QMS Release and Deploy

QMS Release Audit : Pre-release audit is conducted with PQA Team member before Major release.
Incident Management Report for Audit NCs
QMS Release Note : It includes all necessary information related to QMS Release.
QMS 4.1_QMSREL
QMS Release Mail : New version of QMS is released for use and team is intimated via QMS Release Email which includes QMS release note.
QMS released mails
QMS Training : QMS release training is conducted by PEG. Venue and timings are intimated to team by Email.
QMS 4.0_Training



Process Improvements

Identify Process Improvement Opportunities through the following **inputs :**

- **Process Improvement Proposals :** Process Practitioners log their suggestions related to process improvement. For example : Incident Management Report for Process Improvement Proposal
- **Audit Report :** Auditor sends the "Audit Report" to PEG for analysis and identification of candidate process improvement opportunities. For example : Audit Reports
- **Training Report :** Training Report in EinFrame. For example : Training Reports and Feedbacks via Mail
- **Project Learning's :** During the Project and after the project closure, Project Practitioners forward the learnings in Incident learnings of EinFrame. For example : Incident Learning
- **Project Repository :** Project Risks, Plan etc.
  For example : Projects Repository in EinFrame
- **Project Metric :** Metrics Reports
- **Process Appraisal :** IR done by KPMG in August 2022. For example : Process Appraisal
- **Tailoring Proposals :** From practitioners. For example : Tailoring Proposals

Process Improvements Implementation

All improvement opportunities / inputs captured in single sheet called PEG_QMSREQ

Sr. No.	Input	Source of Input	Decision	Artefacts to be modified	Size	Remarks	Repository Rev
1	For new segment project effort estimation template need to more align .	Process Improvement Proposal via Einframe	Accepted	Efforts Estimation Template	Medium	size in terms of Complexity more clearly defined and to identify complexity guidelines added.	2e7743a70c945aebc315fb7c8b0b27061 3d02a22
2	Audit repitition in a phase : before and after Metrics report audit is time consuming for team, pls change to to once after metrics report preparation only.	Process Improvement Proposal via Einframe	Accepted	Project Plan Procedure	Small	Updated in planning procedure	547dbdc3cd09e7b9ecad634eef0fc5691115e6ea
3	Audit checklist to be sync with GILef : Category of NC is to be sync with term functional/non-functional	Process Improvement Proposal via Einframe	Accepted	Audit checklist	Small	Major and Minor words replaced by Functional & Non-Functional respectively	be4787ad0e20208cfa1468e98429759a70c40490
4	Designer itself do module testing by making module test cases, so to do this formally like log the defects and resolve by himself is extra burden, practically it is part of design & implementation and do in each projects. So see this and revise processes accordingly.	Process Improvement Proposal via Einframe	Rejected	Implementation Procedure, Module Test Cases	Large	Already mentioned that log the incidents if required	NA
5	Audit Chaecklist updation w.r.t. Einframe	External Review (IR)	Accepted	Audit checklist	Medium	Asset, knowledge, technology related points mentioned in checklist	13ef27ab8de43dec6d669d89d39a7c1414861a46
6	Measurement Goals should have some relastic figures, should not zero	External Review (IR)	Accepted	Organization performance goal page of Einframe	Small	Line rejection ration goal changed to 2.5	

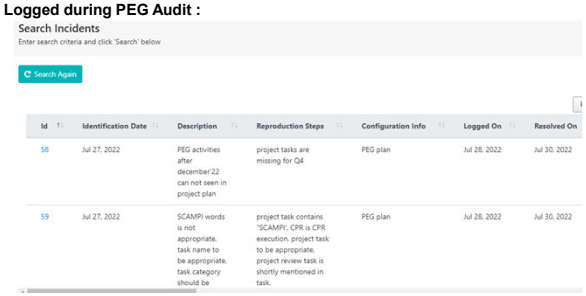
Monitoring and Control

PEG Periodic Team Meetings : Minutes of Meeting (If Required).

Senior Management Review Plan : It includes plan of PEG activities review with Senior Management . During MBR release and Annual Plan release. PEG Senior Management Review Checklist and PEG Senior Management Review and Discussion MOM

Audit Plan : It includes audit plan of PEG activities. During major release of QMS and PEG audit in every 3 months. **PEG Annual Plan**

Incident Logged during PEG Audit :



Managing Performance & Measurement

- **To measure, identify and address performance issue:**
  In project plan ensure measurement and goals, tracked in project metric report.
  Organization metric monitored for all projects. **PEG Annual Plan and Project GGE302 Plan**
- **Map org business objective to process objectives.**
  Keep updated, define ,measure, analyze performance. BOTOPO
- **Store measured data and analyze in project level and org level both.** MBR & Data
- **Follow set processes and keep updated. Project GGE302 Plan and PRCD_MEASUR**
- **Ensure data quality**
  For Example : 1. Einframe Project report used as source to collect and verify the schedule variance data. These data verified during each milestone audits by PQA.
  Einframe_Project_Report
  2. Google sheet maintained by production & quality for production quantities and line rejection quantities, used as tool to collect the data and the QA head verify the data. Production quantity can also be verified by SAP "MB51" transaction.
  Production_Rejection_Google_sheet
- **Use org measurement repository**
  - Project actual efforts used during next similar project's efforts estimation activity.
    Einframe_Project_Report
- **Analyze org performance and identify improvement needs.** MBR
- **Periodic sharing of performance measurement data to organization.** MBR

Tailoring

One standard process often cannot be fit all of an organization's projects, the solution to this problem is usually to allow for tailoring of the standard process to accommodate the attributes and characteristics of individual projects.

Example:

- Tailoring Proposals received from GGE295 DC-DC Converter Project
  - Matrix Report combined for RD & Planning Phase due to project time is one month and matrix report making in first phase is not possible due to unavailability of EVMS data in 3-4 day in EinFrame.
- Tailoring Proposals received from GGS151 3KVA MPPT PCU Project
  - Audit merge of RD phase and Planning Phase.
  - Implementation part of (Design and implementation phase) need to merge with Integration Phase

Tailoring requests approved keeping in mind of Project workflow and duration (size) of project.

Tailoring guideline

Guidelines

Generic Work Environment

The generic work environment for the project must contain all of these:

1. A well-lit and litter free office space
2. At least 20SqFt of work area
3. Ergonomic standard issue chair and work platform
4. Temperature close to 27°C
5. A well-stocked canteen
6. Appropriate personal workstation
7. Quiet working conditions
8. Personalized Email address
9. Internet connectivity

Besides these, the software and Hardware environment needed is maintained by the IT function at the organization level and the list maintained and updated as needed.

Generic Work Environment

Generic work environment includes basic requirements for Projects' execution at Organization level.

Process Quality Assurance (PQA)

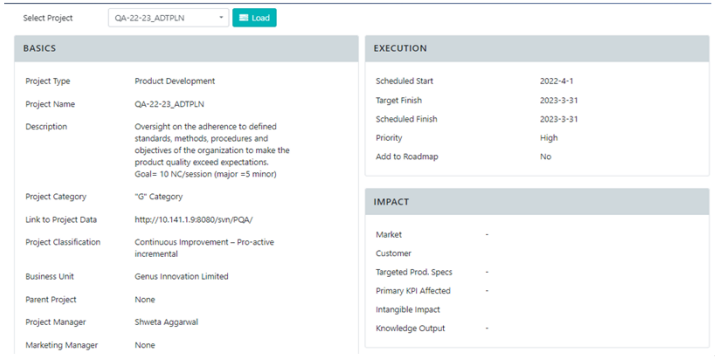
- Objective
- PQA Plan
- PQA schedule
- Audit Inputs
- Audit Incident log
- Audit NC analysis & reporting
- Process Improvement incidents

Why PQA?

To objectively evaluate the Process Areas and Work Products.

To provide stakeholders and management with objective insight into compliance.

To track and communicate issues to ensure that they are resolved.



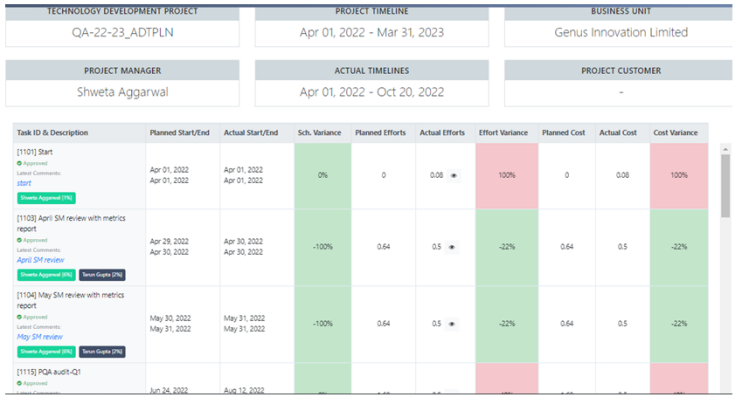
PQA resource

Personal Data Base PQA is additionally responsible for providing process facilitation and assistance to the project team members.

- PQA is independent of the project and not directly supervised by any stakeholder, and maintain a reporting channel to Senior Management.

PQA activities

PQA tasks/schedule is for conducting Organization Audits, audit report analysis & review with senior management, PQA audit.



Tasks assigned to me

At Einframe home screen, there are pending tasks assigned to me. This reflects combined schedule for me.

13255	Release & Closure audit,Audit defect resolve and close	Oct 29, 2022	Oct 31, 2022	Project Task	Sobhag Prajapat	
13353	Oct SM review with metrics report	Oct 29, 2022	Oct 31, 2022	Project Task	Me	
10917	Training on 3D Modeling & Rendering	Aug 18, 2022	Oct 31, 2022	Trainings	Girija Singh	
13179	Audit of Validation Phase	Nov 02, 2022	Nov 03, 2022	Project Task	Chandrashekhar Sharma	
13200	Team Meeting 2 in validation phase	Nov 02, 2022	Nov 03, 2022	Project Task	Chandrashekhar Sharma	
13250	SAP Documentation	Nov 02, 2022	Nov 03, 2022	Project Task	Sobhag Prajapat	
10075	Training on Buck & boost technology by TI	Aug 05, 2022	Nov 03, 2022	Trainings	Girija Singh	
10102	Training on LFPAK MOSFAT in Inverter Applicatoin by NXP	Aug 05, 2022	Nov 03, 2022	Trainings	Girija Singh	
13202	Final BOM updating in SAP	Nov 03, 2022	Nov 04, 2022	Project Task	Chandrashekhar Sharma	
13191	Release note and review	Nov 04, 2022	Nov 05, 2022	Project Task	Chandrashekhar Sharma	
10923	Training on CREO-Mechanism	Aug 18, 2022	Nov 10, 2022	Trainings	Girija Singh	
13355	Nov SM review with metrics report	Nov 29, 2022	Nov 30, 2022	Project Task	Me	
13350	PQA audit-Q3	Dec 23, 2022	Dec 24, 2022	Project Task	Me	

5

Audit task in Project's tasks

Project's audit task is planned in project tasks itself, and assigned to me as per mutual agreement in kick off meeting.

Select Project: GNE114 Load

TECHNOLOGY DEVELOPMENT PROJECT	PROJECT TIMELINE	BUSINESS UNIT
GNE114	Sep 13, 2022 - Nov 05, 2022	Genus Innovation Limited
PROJECT MANAGER	**ACTUAL TIMELINES**	**PROJECT CUSTOMER**
Chandrashekhar Sharma	Sep 19, 2022 - Oct 28, 2022	-

Task ID & Description	Planned Start/End	Actual Start/End	Sch. Variance	Planned Efforts	Actual Efforts	Effort Va
[1626] Audit of RD Phase Approved Latest Comments: *Audit done.* Chandrashekhar Sharma [12%] Shweta Aggarwal [8%]	Sep 23, 2022 Sep 24, 2022	Sep 24, 2022 Sep 24, 2022	-100%	1.6	1.34	
[1531] Toll Gate 0 Approved						

6

Audit Inputs

Audit Checklists

Projects' Work Products

Organizational and Project Standards, and Process Definitions

Name
- E -Mails and MOM
- Hardware Design
- Planning
- RD Phase
- Testing
- GNE114_AUDITT

Audit Checklist for Design and Implementation Phase End

Projec GNE114
Auditc Shweta Aggarwal
Auditc Chandra Shekhar Sharma
Date 22.10.2022

S. No	Checkpoint	Functional Non-Conformance/ Non-Functional Non-Conformance/ Observation	Log ID
1	Has the Design documents been prepared as per the defined and current Design template?	Conformance	
2	Have the Design documents been reviewed?	Conformance	
3	Has all interfaces idenfied?	Conformance	
4	Has all interfaces been reviewed?	Conformance	
5	Has the RTT been updated?	Conformance	
6	Has the RTT been reviewed?	Conformance	
7	Are all the external interfaces designed in the Design phase clearly traceable and marked as such in the functional	Conformance	
8	Has DAR been applied appropriately for critical design decisions? (If DAR applied)	Conformance	
9	Is the problem statement for DAR clear and concise?	Conformance	
10	Is the decision arrived at using DAR clearly stated and use sound judgment?	Conformance	
11	Have the findings of the reviews conducted logged in Incident Management?	Conformance	
12	Has the Design been approved by the project manager?	Major Non-Conformance	270
13	Have the respective modules been allocated to individual	Conformance	

Revision History | Initiation & RD-RM | Planning | Design-Implementation | Integration | Validation and closur

7

Genus

Audit Incident log

PQA classify findings as Non-Functional/Functional/Observations based on Audit guidelines & definitions provided in procedure.

INCIDENT MANAGEMENT
HOME / REPORTS / INCIDENT MANAGEMENT

Search Incidents
Enter search criteria and click 'Search' below

Search Again

256	Oct 18, 2022	HDWDSN-sequence/numbering of modules is mismatched, 3.10 is coming after 4.0	HDWDSN document, module numbering	HDWDSN	Oct 18, 2022	Oct 08, 2022	-	Closed	Project Related
257	Oct 18, 2022	No evidence is seen for RTT review.	RTT review log/timesheet not available.	RTT review	Oct 18, 2022	Oct 08, 2022	-	Closed	Project Related
258	Oct 18, 2022	no evidence of test case review is seen.	no evidence of test case review is seen.	test case review	Oct 18, 2022	Oct 08, 2022	-	Closed	Project Related
259	Oct 18, 2022	updated MOM is not available on SVN server.	latest MOM not on SVN	MINMET	Oct 18, 2022	Oct 08, 2022	-	Closed	Project Related

8

Audit incident closure

PQA discuss the timelines to close the NCs with the Auditee, After resolving the NC's by Stakeholder, I check resolution and re-open if not suitable action. I ensure that all audit findings are resolved.

INCIDENT DETAILS

Incident Type	Project Related	Date of Identification	Sep 06, 2022
Project	SP9-GGE295 DC-DC Converter 12V-10A & 5V-1A	Resolution Expected By	Sep 06, 2022
Stage	Audit	Assigned To	Sobhag Prajapat
Classification	Observation	Raised By	Shweta Aggarwal
Description	No review evidence could seen for RTT review after adding design, integration, system IDs.	Attachment(s)	No attachments found
Reproduction Steps	RTT review log, timesheet not seen		
Configuration Information	RTT review		

RESOLUTION DETAILS

Date of Resolution	Sep 06, 2022	CONFIGURATION & IMPACT	
Report Type	BUG	Found In	2022-09-06 - During audit at validation phase
Product KPI Affected	Reliability	Fixed In	2022-09-06 - During audit at validation phase
Task Category	Testing	Effort Spent	0 hrs.
Defect Source	Modified Implementation	Material Cost	0
Resolution Type	Fixed	Schedule Impact	0
Resolution Steps	2022-09-06 - RTT is now update with relevant Id and no observation found in all relevant documents	Learnings	2022-09-06 -

ACTIVITY LOG

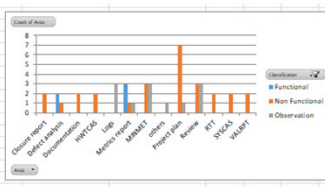
Description	User	Date & Time
Incident resolved	Sobhag Prajapat	Sep 06, 2022 17:21 (UTC)
Incident created	Shweta Aggarwal	Sep 06, 2022 09:44 (UTC)

9

Audit NC analysis & report

End of the month, I generate "Audit Report" using "Audit Reporting Tool" (TOOL_ADTRPT) and send this report to PEG Head for identifying Process Improvement Opportunities.
Discuss audit report and PQA activities monthly with senior management.

	3	3	6
		1	1
	7	1	8
	3	3	6
	2		2
	2		2
	2		2
5	27	12	44



Problem	Elaboration	Impacts	Suggestions
Metrics report	Corrective actions, process & product defect density are not mentioned in final metrics report while calculated separately in draft report at local computer.	locally data management may impact loss of data and other teammates can not take ref data for other projects also	Keep daily habit of SVN commit, a minor softw are can be installed in all computers to remind everyone at 5:25 to do this job.
	metrics report- corrective actions are not filled phase wise, inappropriate.	-	
Defect analysis	no formal defect analysis is seen	help in prevention of re-occurrence of the defects and by reaching at root cause of the defects may help in prevention of new type of potential defects	Defect analysis to be done for testing defects (every stage), review defects at least. (Incident ID - 237, Process improvement)

10

Project's process defect density

4. Project's Process Defect Density

The process defect density found 0.22, whereas measurement goal was 0.20±0.03. So it is equal to limit. The total efforts expended on this project is 157 persons hrs. This means that in every 4.48 person hrs one major non conformance came in this project. That is equal to expected.

4.1.Corrective Actions

As this defect density documented during closure so corrective actions not applicable for this particular project, but may help to future projects. But in this project I monitored the process defect density, and try to not leave any blunder in process point of view, as previous project leanings also use full. During updation of RTT ensure that each and every needs track by something in design, implementation, testing, no any system test case id missing to link with needs. Now as organization goal decided for process defect density as 0.20±0.02, so in next project will plan accordingly.

4.2.Root Cause Analysis

Most of NCs main cause observed is negligence during planning upgradation, time sheet missing, negligence during RTT upgradation, so some of silly mistakes done, which actually effects more.

11

Process Improvement incidents

- If any best practices and process improvement opportunities are identified, I submit them to the PEG using "Process Improvement Incidents".

55	Jul 25, 2022	Audit repitition in a phase	before and after Metrics report audit is time consuming for team. pls change to to once after metrics report preparation only.	PRCD_PRJPLN
56	Jul 25, 2022	Audit checklist to be sync with GIL.ef	Category of NC is to be sync with term functional/non-functional	CHKL_AUDITT

12

INTRODUCTION

Project Name:

SP10-GGE302 DC DC Synchronous Auto Grade

Objective- To Development Electronics part (DC Supply) for with auto grade components

Scope- DC DC Converter is converter which converter High DC voltage in to Low voltage with below Spec.

Input -35-90V ,Output Rating 12V-10A and 5V 1A DC ,Enclosure- IP 66.

Hardware side - Designing part of his Converter using Synchronous buck converter

Software side- No any scope of work.

Mechanical Side- To develop IP 67 Enclosure in Aluminum casing

Measurement Goals - SV: ±20% , PDD: 0.10±0.02 , PPDD : 0.20±0.02

Link to Project Data : http://192.168.100.9:8080/svn/DC_DC_Converter/SP10_GGE302

Team Size: 10 Nos. Effort Size: 201.04 hrs. Time Line : 07-09-2022 to 31-10-2022

Actual Scheduled Start to planed Finish Date: 19-7-2022 to 01-11-2022

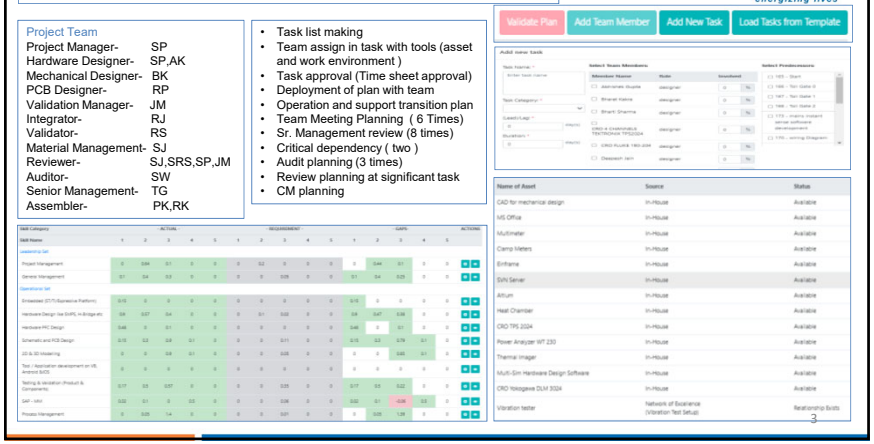
1

Project Planning in Einframe - Project Plan Link-https://gil.einframe.com/rptprojectoverview.aspx

Project Team

Project Manager-	SP
Hardware Designer-	SP,AK
Mechanical Designer-	BK
PCB Designer-	RP
Validation Manager-	JM
Integrator-	RJ
Validator-	RS
Material Management-	SJ
Reviewer-	SJ,SRS,SP,JM
Auditor-	SW
Senior Management-	TG
Assembler-	PK,RK

- Task list making
- Team assign in task with tools (asset and work environment)
- Task approval (Time sheet approval)
- Deployment of plan with team
- Operation and support transition plan
- Team Meeting Planning (6 Times)
- Sr. Management review (8 times)
- Critical dependency (two)
- Audit planning (3 times)
- Review planning at significant task
- CM planning



3

Estimating and Planning

High Level Estimation in start meeting with Sr. Management.

- Complexity -Medium Type
- Cost approx 400-450 Rs (assumption with 2 nos Mosfet -160Rs , 2 Inductor 50Rs , 6 nos capacitor -60 ,enclosure-30rs and harness 30rs ,PWM controller-80rs and converter-25Rs)
- Duration-35-40 day (design-7 days, design implementation - 15 days,Testing 10days,validation 5days , other activity-5 days)
- effort- high level reference of GGE295 approx 180-190persone hours

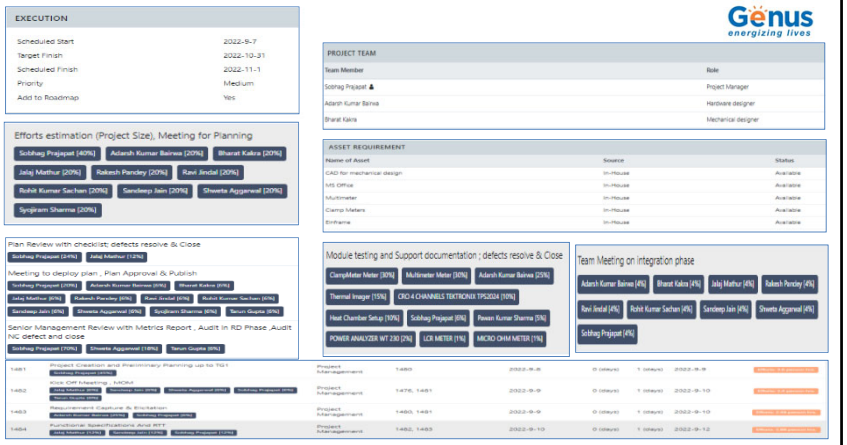
S. No.	Reference Project Name	Why Selected as Reference	Actual Efforts in RD Phase & Planning Phase	Actual Efforts in Design and Implementation	Actual Efforts in Testing and integration	Actual Efforts in Validation Phase , Closure	Actual Efforts in End
1	GGE295 DC-DC Converter 12V-10A & 5V-1A	Capacity Rating is approx equal and input na d output spec. also approx equal.	27	45	27	53	22
		Average Efforts in person hours	27	45	27	53	22

	Estimated Efforts in RD Phase & Planning Phase	Estimated Efforts in Design and Implementation	Estimated Efforts in Testing and integration	Estimated Efforts in Validation Phase , Closure	Estimated Efforts in End	
Past Projects	27	45	27	53	22	
Differences from reference projects	4	7	4	9	4	Total
Final estimates	31	52	31	62	26	202

	Difference from reference in detail	Impact in person hours due to the difference	Complexity	Remarks (Optional)
1	Enclosure Design	-8	H	First time development in Reference Project
2	Auto grade components selection and arrangement	8	H	First time development
3	Synchronous Buck converter Design	10	H	First time development
4	PCB layout and new component footprint making	8	H	First time development
5	SV design	4	M	First time development
6	SV PCB layout	4	M	First time development
7	Testing	10	H	First time testing
8	Readability of Power device and Inductor	-4	M	Reuse components
9	Testing Ids	-4	M	Reuse components
	Total Impact	28		

Size	5H+4M+0L

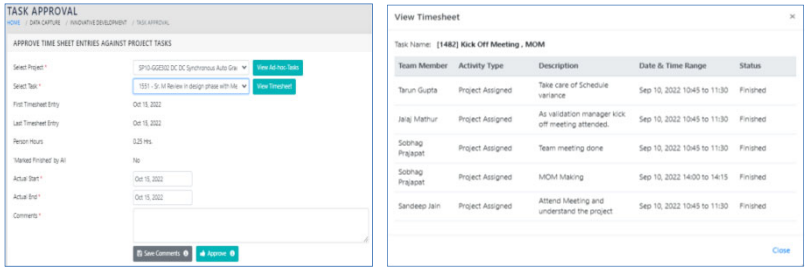
2



4

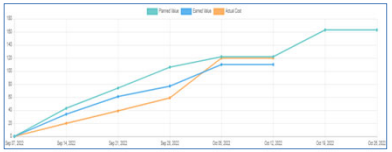
Record task completion

Task ID & Description	Planned Start/End	Actual Start/End	Sch. Variance	Planned Efforts	Actual Efforts	Effort Variance	Planned Cost	Actual Cost	Cost Variance
[1482] Kick Off Meeting , MOM	Sep 09, 2022 Sep 10, 2022	Sep 10, 2022 Sep 10, 2022	-100%	2.4	3.25	35%	2.4	3.25	35%



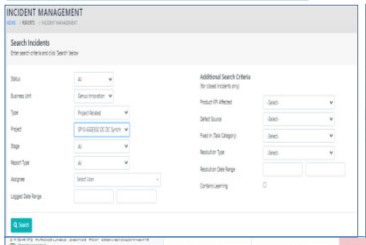
EVMS CHART
Causal Analysis,Corrective action,Preventive action

Dates	Sep 07, 2022	Sep 14, 2022	Sep 21, 2022	Sep 28, 2022	Oct 05, 2022	Oct 12, 2022	Oct 19, 2022	Oct 26, 2022
Planned Value	0	43	74	106	122	122	163	163
Earned Value	0	34	61	77	110	110	-	-
Actual Cost	0	20	39	59	120	120	-	-

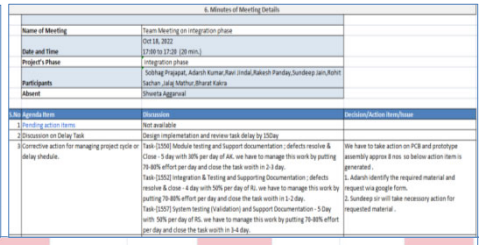


Weeks	No of Week	Name of Phase	Planned Value	Earned Value	Actual Cost	Schedule variance (EV-PV/PV)*100	Cost Variance (AC-EV/EV)*100
1st	07-09-22 to 14-09-22	RD Phase, Planning Phase	43	34	20	-20.93%	-41.17%
2nd	14-09-22 to 21-09-22	Design and Implementation	74	61	39	-17.56%	-36.06%
3rd	21-09-22 to 28-09-22	Design and Implementation	106	77	59	-27.35%	-23.37%
4th	28-09-22 to 05-10-22	Testing and integration	122	110	120	-9.83%	-9.09%
5th	05-10-22 to 12-10-22	Testing and integration	122	110	120	-9.83%	-9.09%
6th	13-10-22 to 19-10-22	Validation Phase , Closure	163				
7th	20-10-22 to 26-10-22	Validation Phase , Closure	163				
8th	27-10-22 to 01-11-22	Validation Phase , Closure	201.2				

- Identify issues and resolution
- Tacking review defect and status.

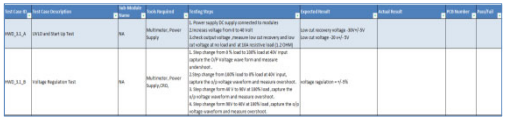


- Managing upcoming task due to delay in last task



Project is Running in Module testing

GGE302_HWTCAS



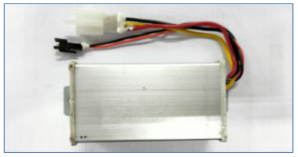
GGE302_MCTCAS

Test Case ID	Test Case Description	Part Name	Tools Required	Testing Steps	Expected Result	Actual Result	Drawing Number	Pass/Fail	Remarks
MCHT_1	Measure Outer size and all bendings of aluminium part	BODY	Varnier caliper, Tape,Scale	Measurement as per drawing.	85X50X33MM				
MCHT_2	Measure position and hole dia. for mosfet support clip	Body	Varnier caliper, scale	Match the dimensions c to c Check fitment	As per drawing				

GGE302_INTCAS

Test Case ID	Test Case Description	Inputs	Tools Required	Testing Steps	Expected Result	Actual Result	Pass/Fail	Remarks
INT_1	Integrated side cover and grove-met	Side Plate HW_2896 Rubber grove-met	By Hand	Rubber grove-met push into the side cover hole by fingers	Rubbergrovemet must properly fixed			
INT_2	Integrated cover, grove met , Harness HW_2857 and Harness HW_2858	Step 1 outcome Harness HW_2857 Harness HW_2858	By Hand	Insert the each wire into the rubber grove met up to sleeve	Wire insertion shoud properly .			

INTRODUCTION



Project Name:

SP9-GGE295 DC-DC Converter 12V-10A & 5V-1A

Objective- To Development Electronics part (DC Power Supply) for E Vehicle .

Scope- DC DC Converter is converter which converter High DC voltage to Low voltage with below Spec.

Input Rating - 35-90V DC, Output Rating 12V-10A and 5V 1A DC , Enclosure- IP 65.

Hardware side - Designing part of this Converter using one of the SMPS topology based.

Software side- No any scope of work.

Mechanical Side- To develop IP 65 Enclosure in aluminum casing

Measurement Goals - SV: ±20% , PDD: 0.10±0.02 , PPDD : 0.20±0.02

Link to Project Data : HTTP://192.168.100.9:8080/SVN/DC_DC_Converter/SP9_GGE295

Team Size: 10 Nos. Effort Size: 156 hrs. Time Line : 19-7-2022 to 20-8-2022

Actual Scheduled Start to Finish Date: 19-7-2022 to 31-8-2022

1

Requirement Development

- Initial Requirement received from Sr. management in form of VOC and one nos. sample product.
  VOC Format link as GGE295_Voice of Customer-Idea Vetting
- Requirement capture form sample product testing result and making functional specification & requirement traceability table .
  GGE295_Requirement Capture & Elicitation
  GGE295_FUNSPC
  GGE295_REQTRT

VOC
Product Power Ratings-120W
Input Parameters-Battery Voltage= 60 V
Output Parameters-12V 10A and 5V 1A for Mobile Charging

- Effort Estimation give us the estimated effort size 157.13 person hrs. . GGE295_ESTFNL

Project Planning in Einframe - Project Plan Link-
HTTP://gil.einframe.com/rptprojectoverview.aspx

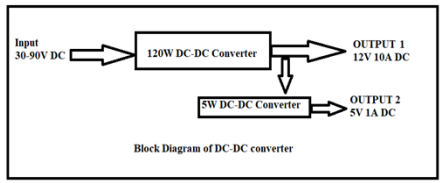
Sr. No	Need Statement	Elaboration
1	Input source (Li-ion battery)	48/60/72V
2	Converter type (conman ground)	Non isolated
3	Input voltage range (40 to 84V)	35V to 90V DC
4	Output Voltage 12 VDC	12 +/- 0.5V DC
5	Output Current 10A	10A +/- 0.5 A DC
6	Output Voltage 5 VDC	5 +/- 0.5V DC
7	Output Current 1 A	1A +/- 0.5 A DC
8	Efficiency (> 88%)	>88% at working range
9	Over current Protection (>10A) at 12 V output	Output voltage start to reduce
10	short circuit protection at 12 V output	output voltage reduces to zero
11	Over current Protection (>1A) at 5 V output	Output voltage start to reduce
12	short circuit protection at 5 V output	output voltage reduces to zero
13	Enclosure Type aluminium IP 65	IP 65
14	Output cable for 12V	150 mm with 3 pin Connector
15	Output cable for 5V	150 mm with 2 pin Connector

2

Design and Implementation

To build a technical solution for meet the requirement hardware design , mechanical design and interface & integration design is done and respectively document developed.
Design document as listed below.
GGE295_HDWDSN- Hardware design document is electrical requirement technical solution that is all hardware modules .
GGE295_MCHDSN- Mechanical design document is mechanical requirement technical solution ,that is enclosure and external part.
GGE295_INTDSN- This design document is interface and integration of all modules with to each other and build complete product as per requirement.

GGE295_HDWDSN



Block Diagram of DC-DC converter

Hardware Modules-120W DC-DC Converter 12V-10A

- Description
- Topology selection
- Logical Flow
- External Interfaces (if any)
- Internal Dependencies
- Critical Design Consideration
- Design Alternative Consideration
- Development & Execution Environment
- Safety Consideration
- Component Selection and Details
- Prototyping and its results
- Schematic and Layout considerations
- Failure modes and Mitigation steps
- Reuse Components

3

Key Modules-
First- 120W DC-DC converter : Input 30-90V Dc and output 12V -10A DC.
Second- 5W DC-DC converter :Input 12V DC and output 5V -1A DC.

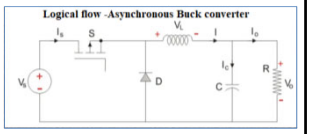
Criteria for design decisions-
Input Voltage =35-90VDC
Output Voltage = 12VDC
Output Current =10ADC
Efficiency=>85%
Isolation - NON- isolated
Input voltage > output voltage so applicable topology is buck and Fly back converter
Non isolated SMPS topology decided -Buck converter

Topology type Selection-
1. Synchronous Buck converter (comparatively high cost / high complex/ new part involvement)
2.Asynchronous Buck converter (low cost /low complex/ less new part involvement)

Design Alternative Consideration -Synchronous type buck converter ,but cost will be differ and higher side.

Reuse Components
PWM IC 3845 50% max Duty Cycle , Capacitor 100V 220uF , Capacitor 1000uH 25V, Mosfet IR4110 100V 120A , Diode FERD20H100ST 100V 20 A

Logical flow -Asynchronous Buck converter



Interface item consideration - 3 pin cable for input battery and output connection.

Design Document Review - Review using review check list

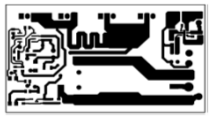
Outcomes
- Modules Schematics and its prototype result
- Layout consideration
- First Draft BOM (passive and active part)
- Basic design of enclosure

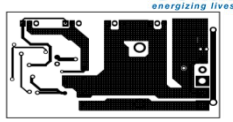
4

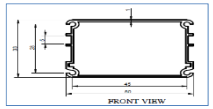
Genus energizing lives

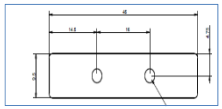
Interface document

- Interface for input and output 12V10A 3 pin cable on PCB Board
- Interface of 5V USB Supply cable on PCB Board
- PCB and enclosure interface .
- Thermal interface between Mosfet and enclosure using thermal pad
- Outer assembly(Grove met ,side plate ,gasket) interface for IP enclosure.
- Packaging related interface .



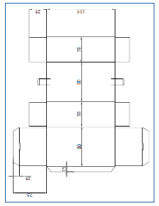


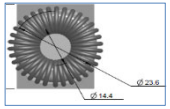


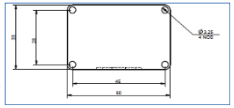


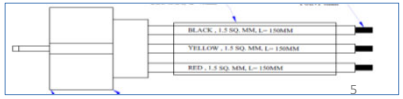
Implementation Outcomes

- Schematic No-G0449P1157 Rev. 1.0
- PCB Layout-G0449P1157 Rev. 1.0
- Enclosure Drawing-HW_2856
- Mounting Plate Drawing-HW_2859
- Packaging Box Drawing-HW_2875
- Inductor drawing -HW_2883
- Side plate Drawing-HW_2896
- 3 Pin Harness Drawing-HW_2857
- 2pin USB Drawing-HW_2858
- Thermal Pad Drawing-HW_2874







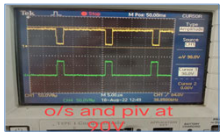


5

Hardware module test Report-REPORT_HWTCAS

Genus energizing lives

HWD_3.1_C	Voltage stress at Power device



System test Case and Ids

- UVLO and Start Up Test- VAL_1
- Voltage Regulation Test- VAL_2
- Efficiency Test - VAL_3
- Output Ripple Test- VAL_4
- Overload and short circuit test- VAL_5
- Heat Run Test- VAL_6

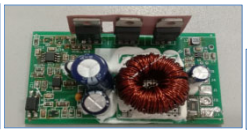
At 100% Load				
Input V	Input C	Output V	Output C	Efficiency
40	2.9	11.96	9.43	97.22655172
50	2.4	11.96	9.43	93.98566667
60	2	11.96	9.43	93.98566667
70	1.7	11.96	9.43	94.77546218
80	1.5	11.96	9.43	93.98566667
90	1.4	11.96	9.43	89.51015873

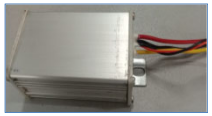
Test Case ID	Test Case Description	Inputs	Tools Required	Testing Steps	Expected Result	Actual Result	Pass/Fail
VAL_1	UVLO and Start Up Test	30V to 90V	Multimeter, Power Supply	1. Power supply Dc supply connected to modules 2.Increses voltage from 0 to 40 Volt 3.check output voltage ,measure low cut recovery and low cut voltage at no load and at 10A resistive load (1.2 OHM)	Low cut recovery voltage -30V+/-5V Low cut voltage -20 v+/- 5V	No load Low Cut Voltage=29V o/p=10.5 No Load Low Cut Recovery=29.5 o/p=10.7 10A load Low Cut Voltage=24.7 o/p=10.5	Pass

7

Hardware Module test Case and Ids

- UVLO and Start Up Test- HWD_3.1_A
- Voltage Regulation Test- HWD_3.1.B
- Voltage stress at Power device- HWD_3.1_C
- Efficiency Test - HWD_3.1_D
- Output Ripple Test- HWD_3.1_E
- Overload and short circuit test- HWD_3.1_F
- Heat Run Test- HWD_3.1_G





Integration document and Integration IDs

- Side Plate HW_2896 and Rubber grove-met Integration -INT_1
- harness HW_2857 and Harness HW_2858 integration INT_2
- PCB assembly integration INT_3
- Thermal Pad and Mosfet integration INT_4
- PCB assembly in enclosure integration INT_5
- Side cover on enclosure integration INT_6

Test Case ID	Test Case Description	Sub-Module Name	Tools Required	Testing Steps	Expected Result	Actual Result	PCB Number	Pass/Fail	Remarks
HWD_3.1_A	UVLO and Start Up Test	NA	Multimeter, Power Supply	1. Power supply Dc supply connected to modules 2.Increses voltage from 0 to 40 Volt 3.check output voltage ,measure low cut	Low cut recovery voltage -30V+/-5V Low cut voltage -20 v+/- 5V	No load Low Cut Voltage=29V o/p=10.5 No Load Low Cut Recovery=29.5 o/p=10.7 10A load Low Cut Voltage=24.7 o/p=10.5	G0449P1157 Rev1.0	Pass	

Test Case ID	Test Case Description	Inputs	Tools Required	Testing Steps	Expected Result	Actual Result	Pass/Fail	Remarks
INT_1	Integrated side cover and grove-met	Side Plate HW_2896 Rubber grove-met	By Hand	Rubber grove-met push into the side cover hole by fingers	Rubbergrovemet must properly fixed	Fitment Ok	Pass	
INT_2	Integrated cover, grove met , Harness HW_2857 and Harness HW_2858	Step 1 outcome Harness HW_2857 Harness HW_2858	By Hand	Insert the each wire into the rubber grove met up to sleeve	Wire insertion shoud properly .	Wire intert properly .	Pass	

6

Closure

GGE295_CLOSRE.DOCX

Project Closure Report

Date	7-9-2022
Project Code	GGE295 DC-DC Converter 12V-10A & 5V-1A
Project Manager	Sobhag Prajapat
Configuration Administrator	Jalaj Mathur
Audit Date	8-Sep-22
Participants	Sobhag Prajapat ,Jalaj Mathur

Sr. No	Checkpoint	Location/Link	Remarks (PM/CA)	Remarks (Project Close Audit)
1	Technical data package-			
	Requirement Documents (Customer requirements, Functional specifications, Requirement Traceability Table)	http://192.168.100.9:8080/svn/DC_DC_Converter/SP9_GGE295/Requirment/	OK	Looks Ok, direct link will be better. (Will be checked separately)
	Planning Data (Project Plan, Risk Plan, Estimates, Schedule)	http://192.168.100.9:8080/svn/DC_DC_Converter/SP9_GGE295/Plan/	OK	Looks Ok, direct link will be better. (Will be checked separately)
	Source Codes, Schematics, BOMs, Mechanical drawings, PCB layouts	http://192.168.100.9:8080/svn/DC_DC_Converter/SP9_GGE295/Hardware%20Doc/	OK	Looks Ok, direct link will be better. (Will be checked separately)
	Design Documents	http://192.168.100.9:8080/svn/DC_DC_Converter/SP9_GGE2	OK	Looks Ok, direct link will be better. (Will be checked

8

PROJECT INTRODUCTION

Project Name: GNE114 4200 Static UPS

Objective- Export Sales team required Static UPS 3300W with 48V battery bank and Some new different looks like New Bezel and Graphical LCD with Multi color.

Scope- Increase Load capacity of 3.5KVA System, Change LCD and Chassis.

Measurement Goals - Schedule Variance:±20%,Product Defect Density:0.10±0.02,Project's Process Defect Density:0.20±0.02,BOM COST: 14000±10% INR

Link to Project Data : http://10.141.1.9:8080/svn/HKVA_inv/GNE114

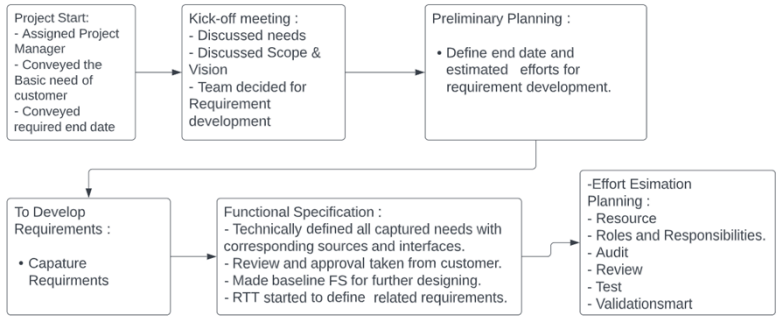
Team Size: 11 Nos.

Effort Size: 185 hrs.

Time Line : 13-9-2022 to 05-11-2022

Actual Scheduled Start to Finish Date: 13-9-2022 to

PROJECT FLOW



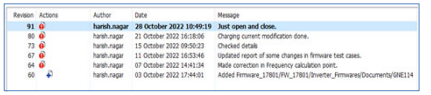
Configuration Management

- CI List in Project plan contains items list which placed under configuration management, where we mentioned location, owner, baseline or control and release or no release against each items. List of Configurable Items, Access Details and Release Plan

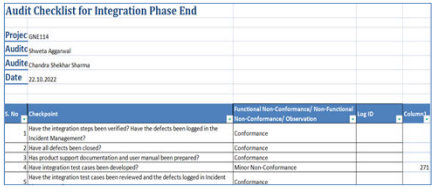
- Project repository at SVN Server used to perform version control of related artefacts.

Configuration Management

- **Channge in Firmware design during Integration Testing . Version History at SVN Server.**



- **Audit Checklist contains configuration audit related audit points that audited, section CM of each phase.**
- **Audit Log showing configuration audit done.**



PROJECT FLOW

Design:
- Collected and Study reference designs.
- Identified modules in each verticals.
- Identified alternate solutions in each modules.
- Select one solution out of corresponding alternate solutions

DAR :
- Due to further nonavailability of Driver IC IR2110 , take to alternate IC UC27712 and TLP350.
- Based on DAR applying criteria, selected IC TLP350.
- Applied PUGH matrix based weighted evaluation to select one solution.

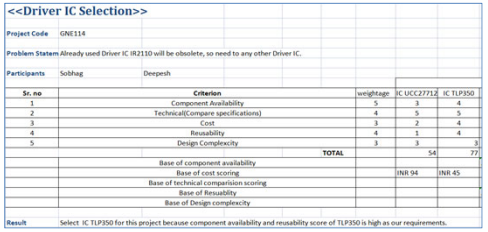
Design:
- In hardware schematic prepared.
- In firmware flow chart prepared.
- In mechanical block diagram prepared.
- Review and close all defects of design

Implementation :
- In hardware PCBs prepared.
- In firmware coding done.
- In mechanical 2D and 3D drawings prepared.
- Review and approved design and implementations, as Baseline.
- RTT update
- Send to vendor to get physical modules.

Module Testing :
- Prepared module test cases and reviewed.
- Did module testing accordingly.
- Prepared interfaces and integration steps.
- Prepared integration test cases and reviewed.
- Prepared user support documents.
- RTT update

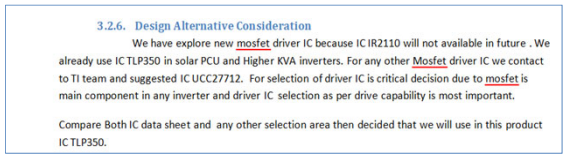
Decision Analysis and Resolution (DAR)

- Add task in Project Plan defined when we follow DAR and defined team .
- Defined evaluation method i.e. PUGH Matrix. GNE114_DARGEN
- DAR Sheet where criteria defined. GNE114_DARGEN
- DAR Sheet where defined alternate solutions, evaluation method.GNE114_DARGEN
- DAR Sheet where alternate solutions evaluate and select using criteria and methods. GNE114_DARGEN



Decision Analysis and Resolution (DAR)

- Hardware Design Document section Design Alternative Solution defined where we apply DAR. GNE114_HDWDSN

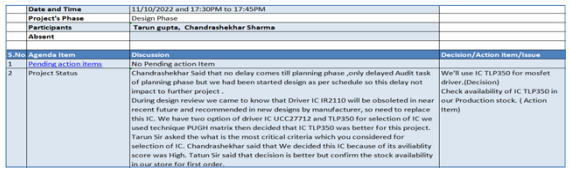


3.2.6. Design Alternative Consideration

We have explore new mosfet driver IC because IC IR2110 will not available in future . We already use IC TLP350 in solar PCU and Higher KVA inverters. For any other Mosfet driver IC we contact to TI team and suggested IC UCC27712. For selection of driver IC is critical decision due to mosfet is main component in any inverter and driver IC selection as per drive capability is most important.

Compare Both IC data sheet and any other selection area then decided that we will use in this product IC TLP350.

- Approval comments by decision maker authority. MOM



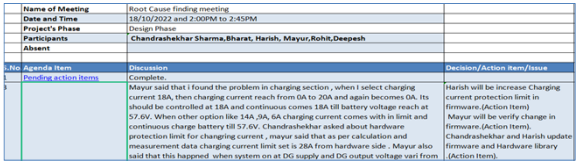
	Date and Time	11/10/2022 and 17:30PM to 17:45PM	
	Project's Phase	Design Phase	
	Participants	Tarun gupta, Chandrashekhar Sharma	
	Absent		
S.No	Agenda Item	Discussion	Decision/Action Item/Issue
1	Pending action items	No Pending action Item	
2	Project Status	Chandrashekhar Said that no delay comes till planning phase ,only delayed Audit task of planning phase but we had been started design as per schedule so this delay not impact to further project . During design review we came to know that Driver IC IR2110 will be obsoleted in near recent future and recommended in new designs by manufacturer, so need to replace this IC. We have two option of driver IC UCC27712 and TLP350 for selection of IC we used technique PUGH matrix then decided that IC TLP350 was better for this project. Tarun Sir asked the what is the most critical criteria which you considered for selection of IC. Chandrashekhar said that We decided this IC because of its avilability score was High. Tatun Sir said that decision is better but confirm the stock availability in our store for first order.	We'll use IC TLP350 for mosfet driver.(Decision) Check availability of IC TLP350 in our Production stock. (Action Item)

Root Cause Analysis : Integration Testing Defect

- The Problem identified during Integration testing.Incident Managment

- Make team and add task in plan for root cause analysis.Project Plan

- Discussion with team for findout the root cause .MOM(RootCause Analysis)



	Name of Meeting	Root Cause finding meeting	
	Date and Time	18/10/2022 and 2:00PM to 2:45PM	
	Project's Phase	Design Phase	
	Participants	Chandrashekhar Sharma,Bharat, Harish, Mayur,Rohit,Deepesh	
	Absent		
S.No	Agenda Item	Discussion	Decision/Action Item/Issue
1	Pending action items	Complete.	
3		Mayur said that i found the problem in charging section , when I select charging current 18A, then charging current reach from 0A to 20A and again becomes 0A. Its should be controlled at 18A and continuous comes 18A till battery voltage reach at 57.6V. When other option like 14A ,9A, 6A charging current comes with in limit and continuous charge battery till 57.6V. Chandrashekhar asked about hardware protection limit for changing current , mayur said that as per calculation and measurement data charging current limit set is 28A from hardware side . Mayur also said that this happned when system on at DG supply and DG output voltage vari from	Harish will be increase Charging current protection limit in firmware.(Action Item) Mayur will be verify change in firmware.(Action Item). Chandrashekhar and Harish update firmware and Hardware library .(Action Item).

Root Cause Analysis : Integration Testing Defect

- 8 D CAPA based template GNE114_ROCSAN was used for root cause analysis of this selected outcome with team.

Discipline – 4	Root Cause Analyses
Using why why technique, we found the actual root cause that Charging current protection limit set at 22A in firmware and as per calculation its OK but charging current peak goes to 23A practically. Further found when system on at Grid supply then peak current goes to 20A, but system on at DG supply then peak current goes to 23A. DG Supply continuoues vari from 200V to 250V. Find the actual reasons for this problem that fluctuation in mains voltage is very fast and our controller sampling rate for analog signal is not that much fast to taken care high cut and Low cut protection in UPS mode.	

- Corrective action for this problem change in Firmware design and code. Verify to impact of change during testing.Containment action identified that update in firmware library and incident proposed to approved learnings. GNE114_ROCSAN .

Discipline - 5	Corrective Action Plan			
Root Cause	Action	Who	When	Status
Find the actual reasons for this problem that fluctuation in mains voltage is very fast and our controller sampling rate for analog signal is not that much fast to taken care high cut and Low cut protection in UPS mode.	During meeting decide that Change in firmware for increase charging current protection limit till 26A and Mayur test and verify that problem is solved.	Harish, Mayur	20-Oct-22	

Root Cause Analysis : Integration Testing Defect

- Approved Learnings

Oct 20, 2022	When 18A Charging Current mode selecting by switch charging current comes 18A and again becomes 0A. Again goes to 20A and Become 0A. Not continuous comes 18A.	2022-10-20 - 2022-10-20 -		discussed. As DG power fluctuates more when compared to actual grid. We should implement this test in other models also.	Gap in Talent: No Gap in Asset: No Gap in Knowledge: Yes Risk Identified: No

- Master firmware Library

12	Charging Current Protection	1	Battery Charging Profile	This module used for charging current protection also , so in previous in this we take 22A as high charging current but in this modification we can go upto 26A charging current . When ever the charging current exceed the 26A the charging will get stop as a protection.	GNE114_Rev_4.elf.S

PROJECT FLOW

Integration :
- Interfaces considering mentioned CTQs
- Implement define Integration steps
- Integration Testing
- Ensured risk mitigated by taking mitigation plan.
- Product Integrated and ready for validation
- BOM cost calculate.

Validation :
- System test cases prepared to make sure required environment.
- Review the system test cases
- System Testing (Validation) to validate requirement vs product.

Release :
- According to configuration management plan collect all to be release outputs from corresponding version control repository.
- List out these design outputs with their latest versions.
- Made release note and review.
- Project released with the release note.

Closure :
- Project learning's captured with team and log in corresponding project learning log of share point.
- Make TDP and mentioned in closure report.
- Review and audit the closure report.
- Intimate all team members that project officially closed, and you are relieve from this project.

PRODUCT PICTURE

- **Release Note contains records of all release configuration items.**
- **Closure Report contains records of all configuration items**

PROJECT INTRODUCTION

Project Name: GGE300_BMS 20S 40A NMC 72V

Objective-.Make a BMS with following specification.Cell no.=20cell,Cell type=NMC,Battery nominal voltage=72V,Continuous discharging current=40A

Scope-A Battery Management System (BMS), which manages the electronics of a rechargeable 20 cells , whole combines a battery pack thus becomes a crucial factor in ensuring safety. It safeguards both the user and the battery by ensuring that the cell operates within its safe operating limits .This particular BMS will be used for operating 72V battery pack having all controlling features for the safe limits of the working of the cell.

Measurement Goals - Schedule Variance:±20%,Product Defect Density:0.10±0.02,Project's Process Defect Density:0.20±0.02.

Link to Project Data :http://192.168.100.9:8080/svn/BMS/BMS_20S_40A/

Team Size: 10 Nos.

Effort Size: 132hrs.

Time Line : 19-07-2022 to 31-08-2022

Actual Scheduled Start to Finish Date: 19-07-2022 to 31-08-22

Target Customer :In-house use and domestic Market

Risk Identification, Analysis and Opportunity

Description	Risk identification date	Source	Sub-Category of source	Severity	Likelihood	Risk Priority Number	Performance parameter affected	Assigned to
Samples components (MOSFETs and BMS ic) availability :-In present scenario all electronics production industries are facing to semiconductor shortage.	23-07-2022	External	Components	2	0	0	Schedule, Design & Implementation	Project Manager
BMS Failure in Temprature controling of LI-ION battery :- If BMS oseTemprature controling ,BMS or cells of LIFEPO4 Battery will be more heat thats why cells of LIFEPO4 Battery temperature will be rise,may be LIFEPO4 cells blast or act misbehavior.	23-07-2022	External	Components	4	1	4	Reliability,Schedule, Design & Implementation	Project Manager
BMS Failure in Vibration test:-This BMS will be used in EV Battery ,during EV move on way ,any components fail,EV shall stop on the way.Thats why vibration test is important for BMS.	23-07-2022	External	vendors	4	1	4	Reliability,Schedule, Design & Implementation	Project Manager
Availibility of Aluminium encloser for Heat control of power components of BMS	23-07-2022	External	vendors	2	0	0	Schedule, Design & Implementation	Project Manager
Opportunity:- BMS currently as captive use . design in modular way then can be sale to other LI-ION battery manufacturers"thus shall open new business segment for company.	23-07-2022	Internal	specs	9	9	81	Company buss	Tarun Gupta Senior managment

http://192.168.100.9:8080/svn/BMS/BMS_20S_40A/GGE300_RSKMTX.xlsx

- To identify a potential problem before they occur so that risk handling activities can be planned and invoked as needed across the life of the product or project.
- To achieve project performance goals and objectives within defined cost, schedule, and performance constraints.
- Identify Risk source, subcategory. show in above table.
- For analysis determine the risk rating based on its severity/likelihood. parameters affected show in above table
- All activities are done with the team in the team meeting.

Risk Mitigation Action Plan

Risk ID	Risk Description	Action	Who	When	Status
1	**Samples components (MOSFETs and BMS ic) availability :-** In present scenario all electronics production industries are facing to semiconductor shortage.	Syoji :- shall provide list of sample components with details to sandeep jain. Sandeep jain: -shall Ensure to sample components Availability before module testing start.	Syoji & Sandeep jain	During D&I	Finished
2	**BMS Failure in Temprature controling of LI-ION battery :-** If BMS loseTemprature controling ,BMS or cells of LIFEPO4 Battery will be more heat thats why cells of LIFEPO4 Battery temperature will be rise,may be LIFEPO4 cells blast or act misbehavior.	Syoji:-shall be use all autograde components with high accuracy,better quality PCB and better quality soldering paste .	Syoji	During complete project cycle	Finished
3	**BMS Failure in Vibration test:-**This BMS will be used in EV Battery ,during EV move on way ,any components fail,EV shall stop on the way.Thats why vibration test is important for BMS.	Sandeep jain: shall Ensure to availability of external agency for BMS vibration test.	Sandeep jain	Just after product finalize	Finished
4	Avaibility of Aluminium encloser for Heat control of power components of BMS	Sandeep jain:shall Talk to vendors and Ensure to Avaibility of Aluminium encloser	Sandeep jain	Befor product integration	Finished
5	**Opportunity leverage** ;-BMS currently as captive use . design in modular way then can be sale to other LI-ION battery manufacturers"thus shall open new business segment for company.	Design module asper marketing and sales department inputs and market requirement. Informed to senior managment after product finallise during (MOM)Senior managment review with metrics report task	Syoji	During D&I	Ongoing

http://192.168.100.9:8080/svn/BMS/BMS_20S_40A/GGE300_RSKMTX.xlsx

- Outline a course of action for each major risk that is to be mitigated to minimize its likelihood. Periodically discuss with designer and confirm if he is planning for such kind of leaves, then ask him to hand over the design to functional head before he goes on leave.
- Assign responsibility. showed in above table
- Track and monitor the level of risks on a project throughout the Project Lifecycle by a team meeting.

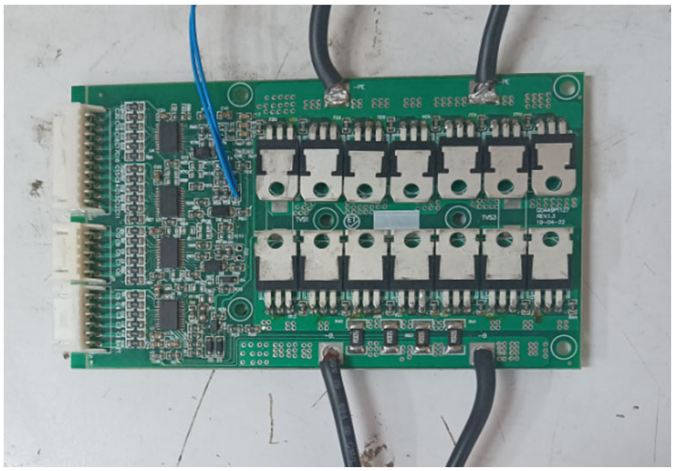
Risk Contingency Action Plan

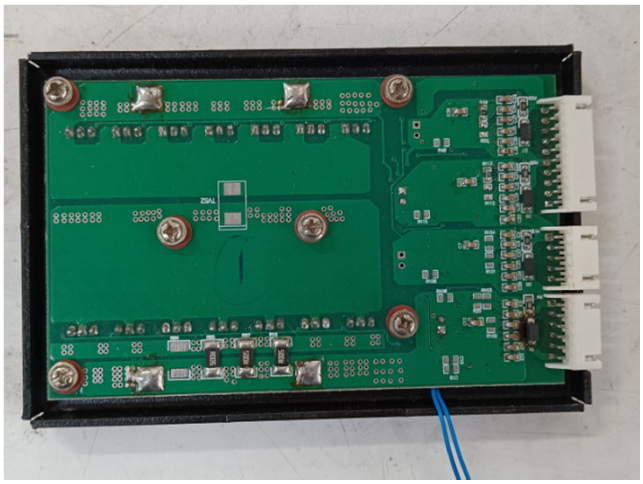
Risk ID	Risk Description	Action	Who	When	Status
1	**Samples components (MOSFETs and BMS ic) availability :-** In present scenario all electronics production industries are facing to semiconductor shortage.	Project manager shall be also work on components availability with components dealers with alternate option	Syoji	during design and implement ation	Not Required
2	**BMS Failure in Temprature controling of LI-ION battery :-** If BMS loseTemprature controling ,BMS or cells of LIFEPO4 Battery will be more heat thats why cells of LIFEPO4 Battery temperature will be rise,may be LIFEPO4 cells blast or act misbehavior.	Project manager shall also work on autograde components source with alternative options and use 2 protection in design on temprature controlling.	syoji	During complete project cycle	Finished
3	**BMS Failure in Vibration test:-**This BMS will be used in EV Battery ,during EV move on way ,any components fail,EV shall stop on the way.Thats why vibration test is important for BMS.	Sandeep jain shall be contact two or more Vibration test external agency. syoji:- BMS shall be check on drop test with 1ft hight.	Sandeep jain	End of validation phase	Finished
4	Avaibility of Aluminium encloser for Heat control of power components of BMS	Project manager also shall be talk to Aluminium enclosure vendors	Syoji	during design and implement ation	Not Required

http://192.168.100.9:8080/svn/BMS/BMS_20S_40A/GGE300_RSKMTX.xlsx

- Outline a course of action for each major risk that is to be mitigated to minimize its likelihood.
- Assign responsibility. Showed above table
- Track and monitor the level of risk on a project throughout the Project Lifecycle by a team meeting.

PRODUCT PICTURE





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1

Orgnisational Training

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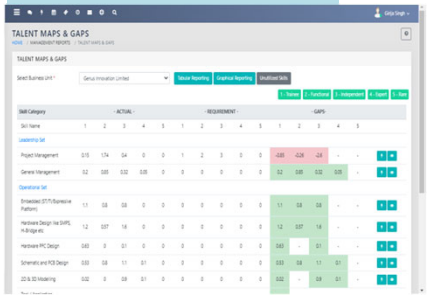
OT :- The Purpose of Organizational Training is to support the Organization's Business Objectives and to meet the tactical training needs that are common across projects and support groups in the organization.

Scope

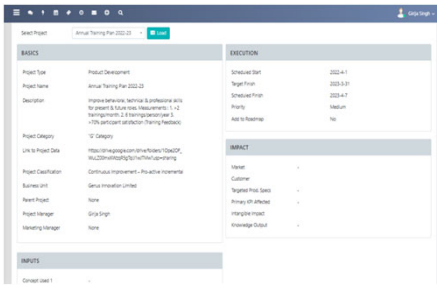
- Identification of Training needs
- Preparation of Strategic and Tactical Training Plan
- Identification of Internal and External Trainers
- Scheduling the Training
- Conduction of Training
- Maintenance of Training Records
- Analysis of Training feedbacks
- Maintaining the Talent map for skill inventory

2

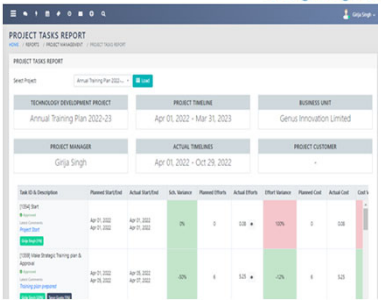
✓ Identified Training Needs



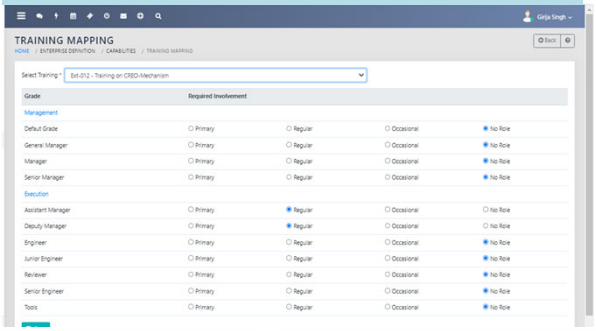
✓ Project Overview



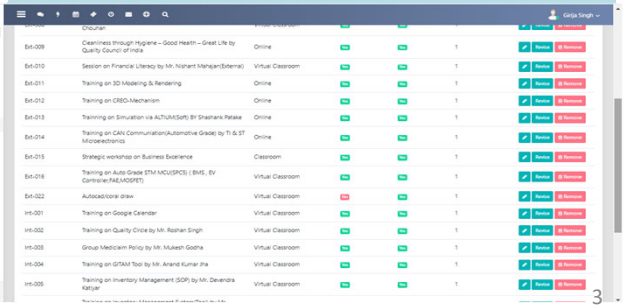
✓ Project Task



✓ Training mapping

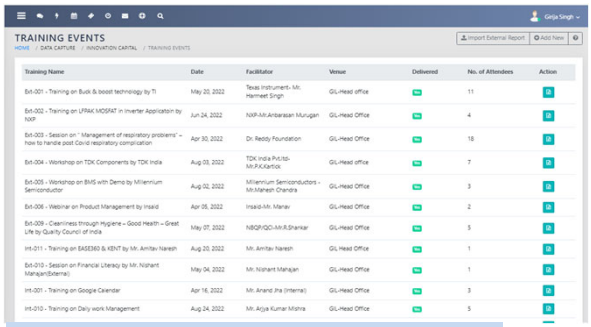


✓ Preparation of Strategic and Tactical Training yearly Plan



3

✓ Organise training Event



✓ Attendance Sheet

	A	B	C	D	E
1	EinFrame				
2					
3	Training Event Report				
4					
5	Training Name	Ext-001 - Training on Buck & boost technology by TI			
6	Date	May 20, 2022			
7	Facilitator	Texas Instrument- Mr. Harmeet Singh			
8	Venue	GIL-Head office			
9	Delivered	Yes			
10					
11	Employee	Business Unit	Grade		
12	Chandrashekhar Sharma	Genus Innovation Limited	Deputy Manager		
13	Syojram Sharma	Genus Innovation Limited	Assistant Manager		
14	Abhishek Kumar	Genus Innovation Limited	Engineer		
15	Ravi Jindal	Genus Innovation Limited	Senior Engineer		
16	Rohit Kumar Sachan	Genus Innovation Limited	Engineer		
17	Dhirendra Rai	Genus Innovation Limited	Senior Engineer		
18	Adarsh Kumar Bairwa	Genus Innovation Limited	Engineer		
19	Vikash Sharma	Genus Innovation Limited	Engineer		
20	Deepesh Jain	Genus Innovation Limited	Assistant Manager		
21	Umesh Likhitkar	Genus Innovation Limited	Senior Engineer		
22	Mahesh Joshi	Genus Innovation Limited	Engineer		
23					

G-form:-Feedback Response Sheet

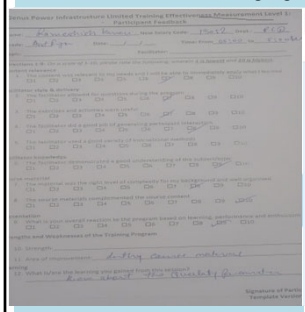
Timestamp	Email Address	Training Name	Employee Name	Employee Code	Designation	Training Manhours	Contents	Could the facilitator generate interaction	Facilitators Knowledge on the subject	Quality of course material	The Content relevance	Quality of presentation	Average (Individual)	Strength of the program	Areas of improvement of the program	Learning	Trainer/Fasilitator Name	Name/Employee Code	TRG ID
5/20/2022 18:02:37	syoji.sharma@genusinnovation.com	Ext-001 Training on Buck & boost technology by TI	syoji	15008	assistant Manager	2	2	4	8	8	7	8	6	KNOWLEGE UPGRADE	COMPONENT SELECTION OF BUCK AND BOOST	DESINING CONCEPT OF BUCK AND BOOST UPDATED	Ti team		INT
5/20/2022 9:23:25	deepesh.jain@genusinnovation.com	Ext-001 Training on Buck & boost technology by TI	deepesh jain	14191	Dy. Manager	2	4	4	9	9	9	9	7	NEW upcoming part knowledge	It was Ok	new part	TI employee		EXT, INT

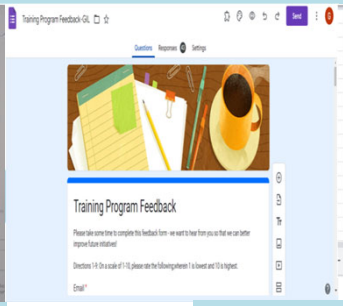
4

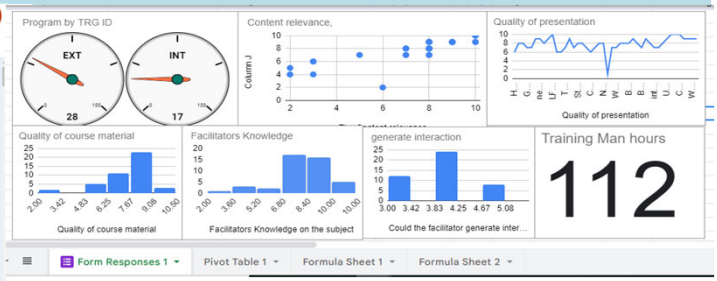
Earlier collected the feedback in hardcopy but after PQA evaluation we have design google form

Maintain Training Records and Analyse Feedbacks

Google Drive:- Video recording, ppt etc.







Monthly meeting

Training Detail Report

Analysis of Training Data