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

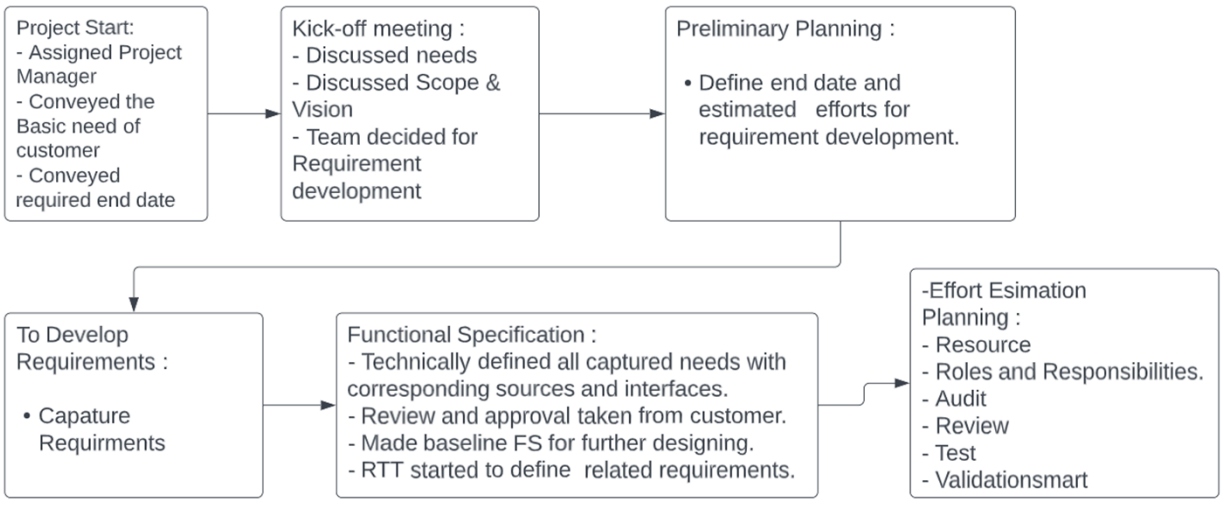
Team Size: 11 Nos.

Effort Size: 185 hrs.

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

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

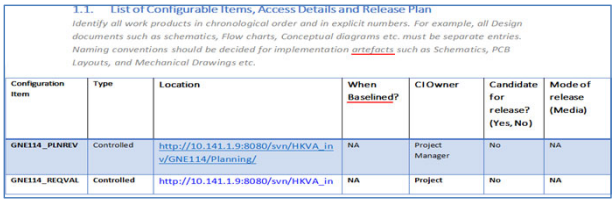
PROJECT FLOW



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.



1.1. List of Configurable Items, Access Details and Release Plan

Identify all work products in chronological order and in explicit numbers. For example, all Design documents such as schematics, Flow charts, Conceptual diagrams etc. must be separate entries. Naming conventions should be decided for implementation artefacts such as Schematics, PCB Layouts, and Mechanical Drawings etc.

Configuration Item	Type	Location	When Baselined?	CIOwner	Candidate for release? (Yes, No)	Mode of release (Media)
GNE114_PLNREV	Controlled	http://10.141.1.9:8080/svn/HKVA_inv/GNE114/Planning/	NA	Project Manager	No	NA
GNE114_REQVAL	Controlled	http://10.141.1.9:8080/svn/HKVA_in	NA	Project	No	NA

1.2. Project Repository

http://10.141.1.9:8080/svn/HKVA_inv/GNE114/

https://gil.einframe.com/rptprojecttasks.aspx

http://10.141.1.9:8080/svn/HW_10443/

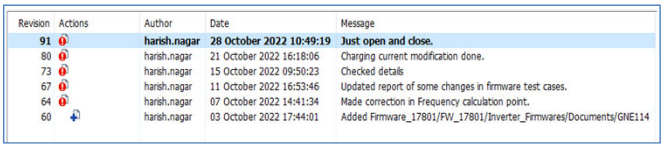
http://10.141.1.9:8080/svn/MCH_14404/

http://10.141.1.9:8080/svn/FW_17801/

http://10.141.1.9:8080/svn/FW_17865/Tunning Tool

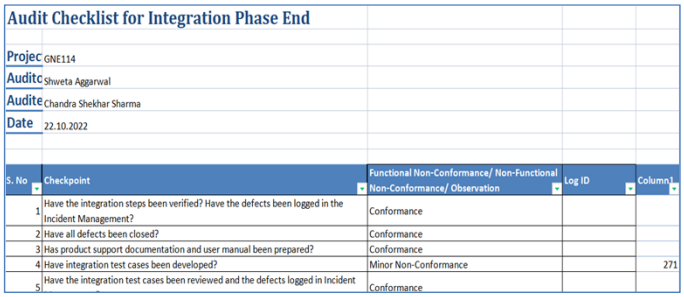
Configuration Management

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



Revision	Actions	Author	Date	Message
91		harish.nagar	28 October 2022 10:49:19	Just open and close.
80		harish.nagar	21 October 2022 16:18:06	Charging current modification done.
73		harish.nagar	15 October 2022 09:50:23	Checked details
67		harish.nagar	11 October 2022 16:53:46	Updated report of some changes in firmware test cases.
64		harish.nagar	07 October 2022 14:41:34	Made correction in Frequency calculation point.
60		harish.nagar	03 October 2022 17:44:01	Added Firmware_17801/FW_17801/Inverter_Firmwares/Documents/GNE114

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



Audit Checklist for Integration Phase End

Projec GNE114

Auditc Shweta Aggarwal

Audite Chandra Shekhar Sharma

Date 22.10.2022

S. No	Checkpoint	Functional Non-Conformance/ Non-Functional Non-Conformance/ Observation	Log ID	Column1
1	Have the integration steps been verified? Have the defects been logged in the Incident Management?	Conformance		
2	Have all defects been closed?	Conformance		
3	Has product support documentation and user manual been prepared?	Conformance		
4	Have integration test cases been developed?	Minor Non-Conformance		271
5	Have the integration test cases been reviewed and the defects logged in Incident	Conformance		

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

Analysis for selection of Driver IC.

1657	Deepesh Jain [15%] Sobhag Prajapat [15%] Chandrashekhar Sharma [4%]	Hardware	1631	Oct 07, 2022

<<Driver IC Selection>>

Project Code	GNE114
Problem Statem	Already used Driver IC IR2110 will be obsolete, so need to any other Driver IC.
Participants	Sobhag Deepesh

Sr. no	Criterion	weightage	IC UCC27712	IC TLP350
1	Component Availability	5	3	4
2	Technical(Compare specifications)	4	5	5
3	Cost	3	2	4
4	Reusability	4	1	4
5	Design Complexcity	3	3	3
	TOTAL		54	77
	Base of component availability			
	Base of cost scoring		INR 94	INR 45
	Base of technical comparision scoring			
	Base of Resuablity			
	Base of Design complexcity			

Result: Select IC TLP350 for this project because component availability and reusability score of TLP350 is high as our requirements.

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 aviliablity 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)

253	Project Related GNE114	Pre Validation	Functional	When 18A Charging Current mode selecting by switch charging current comes 18A. and again becomes 0A....	Oct 18, 2022	Mayur Sharma	Harish Nagar

1659	Team meeting for root cause analysis Chandrashekhar Sharma [6%] Deepesh Jain [6%] Harish Nagar [6%] Mayur Sharma [6%] Rohit Kumar Sachan [6%]	Project Management	1636	Oct 19, 2022	7 day(s)	1 day(s)	Oct 20, 2022

	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 changring 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 excced 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