# 1 Stack Depth Analysis

Stack Depth Analysis is performed on HDU Communication Application Software and HDU Display Application Software. Following sections describe Software Depth Analysis for application software.

## **1.1 Communication Board Source Code**

Stack Depth Analysis for Howell Display Unit of communication Module for the baseline HDU\_SOI3\_RELEASE\_04:

([https://bitbucket.org/machglobaltech-sw/ du/Software/Verification/HSIT/Stack\_Analysis/Inputs/Source\_Code](https://bitbucket.org/machglobaltech-sw/%20du/Software/Verification/HSIT/Stack_Analysis/Inputs/Source_Code))

## **1.2 HDU Communication Application Software**

Stack Analysis is performed on following Tasks of HDU Application Software identified in Requirement: HDU-SRS-CB-DRQ-271

1. A429 Task
2. Application Task
3. CBIT Task
4. Idle Task
5. Init Task
6. Log Task

**Stack Depth Analysis Calculations**

Steps followed to perform Stack Depth Analysis for each of the tasks of HDU Communication Application Software is described in following sections:

**A429 Task:**

A429 Task stack index is logged in the byte 1 and 2 of payload in CAN Message ID 156435272

**Calculation:**

**Stack Used** in % = (50 / 1024) \* 100

= 4.88%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 4.88

= 95.11%

Stack Used for A429 Task is **4.88%** and Stack Free A429 Task is **95.11%**

**Application Task:**

Application Task stack index is logged in the byte 3 and 4 of payload in CAN Message ID 156435272

**Calculation:**

**Stack Used** in % = (70 / 1024) \* 100

= 6.83%

**Stack Free in** % = 100 – (Stack Used in %)

= 100 – 6.83

= 93.16%

Stack Used for Application Task is **6.83%** and Stack Free Application Task is **93.16%**

**CBIT Task:**

CBIT Task stack index is logged in the byte 5 and 6 of payload in CAN Message ID 156435272

Calculation:

**Stack Used** in % = (47 / 1024) \* 100

= 4.589%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 4.589

= 95.41%

Stack Used for CBIT Task is **4.589%** and Stack Free CBIT Task is **95.41%**

**Idle Task:**

Idle Task stack index is logged in the byte 7 and 8 of payload in CAN Message ID 156435272

Calculation:

**Stack Used** in % = (35 / 512) \* 100

= 0.06%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 0.06

= 93.16%

Stack Used for Idle Task is **0.06%** and Stack Free Idle Task is **93.16%**

**Init Task:**

Init Task stack index is logged in the byte 1 and 2 of payload in CAN Message ID 156435276

Calculation:

**Stack Used** in % = (78 / 1024) \* 100

= 7.61%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 8.789

= 92.38%

Stack Used for Init Task is **7.61%** and Stack Free Init Task is **92.38%**

**Log Task:**

Log Task stack index is logged in the byte 3 and 4 of payload in CAN Message ID 156435189 and 156435276

Calculation:

**Stack Used** in % = (47 / 1024) \* 100

= 4.589%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 4.589

= 95.41%

Stack Used for Log Task is **4.589%** and Stack Free Log Task is **95.41%**

## **1.3 Display Board Source Code**

Stack Depth Analysis for Howell Display Unit of Display Module for the baseline HDU\_SOI3\_RELEASE\_04:

([https://bitbucket.org/machglobaltech-sw/ du/Software/Verification/HSIT/Stack\_Analysis/Inputs/Source\_Code](https://bitbucket.org/machglobaltech-sw/%20du/Software/Verification/HSIT/Stack_Analysis/Inputs/Source_Code))

## **1.4 HDU Display Application Software**

Stack Analysis is performed on following Tasks of HDU Display Application Software identified in Requirement: HDU-SRS-DB-DRQ-314

1. Application Task
2. Poller Task
3. CBIT Task
4. Idle Task
5. Init Task
6. A825 Communication#1 Task
7. A825 Communication#2 Task
8. Demo Task

Steps followed to perform Stack Depth Analysis for each of the tasks of HDU Display Application Software is described in following sections

**Application Task:**

Application Task stack index is logged in the byte 1 and 2 of payload in CAN Message ID 156435232

Calculation:

**Stack Used** in % = (593/ 1024) \* 100

= 57.91%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 57.91%

= 42.09%

Stack Used for Application Task is 57.91**%** and Stack Free Application Task is 42.09**%**

**Poller Task:**

Poller Task stack index is logged in the byte 3 and 4 of payload in CAN Message ID 156435232.

Calculation:

**Stack Used** in % = (47/ 1024) \* 100

= 4.58%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 4.58

= 95.41%

Stack Used for Poller Task is **4.58%** and Stack Free Poller Task is **95.41%**

**CBIT Task:**

CBIT Task stack index is logged in the byte 5 and 6 of payload in CAN Message ID 156435232

Calculation:

**Stack Used** in % = (47 / 1024) \* 100

= 4.58%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 4.58

= 95.41%

Stack Used for CBIT Task is **4.58%** and Stack Free CBIT Task is **95.41%**

**Idle Task:**

Idle Task stack index is logged in the byte 7 and 8 of payload in CAN Message ID 156435232

Calculation:

**Stack Used** in % = (36 / 512) \* 100

= 7.03%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 7.03

= 92.96%

Stack Used for Idle Task is **7.03%** and Stack Free Idle Task is **92.96%**

**Init Task:**

Init Task stack index is logged in the byte 1 and 2 of payload in CAN Message ID 156435236

Calculation:

**Stack Used** in % = (97.57/ 1024) \* 100

= 9.52%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 9.52

= 90.47%

Stack Used for Init Task is **9.52%** and Stack Free Init Task is **90.47%**

**A825 Communication#1 Task**:

A825 Communication#1 Task stack index is logged in the byte 3 and 4 of payload in CAN Message ID 156435236

Calculation:

**Stack Used** in % = (81/ 1024) \* 100

= 7.91%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 7.91

= 92.08%

Stack Used for A825 Communication#1 Task is **7.91%** and Stack Free A825 Communication#1 Task is **92.08%**

**A825 Communication#2 Task:**

A825 Communication#2 Task stack index is logged in the byte 5 and 6 of payload in CAN Message ID 156435236

Calculation:

**Stack Used** in % = (52/ 1024) \* 100

= 5.07%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 5.07

= 94.92%

Stack Used for A825 Communication#2 Task is **5.07%** and Stack Free A825 Communication#2 Task is **94.92%**

**Demo Task:**

Demo Task stack index is logged in the byte 7 and 8 of payload in CAN Message ID 156435236

Calculation:

**Stack Used** in % = (48/ 1024) \* 100

= 4.68%

**Stack Free** in % = 100 – (Stack Used in %)

= 100 – 4.68

= 95.31%

Stack Used for Demo Task is **4.68%** and Stack Free Demo Task is **95.31%**

## **1.5 Stack Depth Analysis Result**

### **1.5.1 HDU Communication Application Software (HDU-004-003)**

Summary of Stack Depth Analysis Results for each task of HDU Communication Application Software considering the maximum stack usage index.

**Table 1: Stack Depth Analysis Result of HDU Communication Application Software**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No** | **Task** | **Maximum Stack Size** | **Maximum Stack Index Obtained from Log Files** | **Stack usage in**  **percentage** |
| 1. | A429 Task | 1024 | 50 | 4.88 |
| 2. | Application Task | 1024 | 70 | 6.83 |
| 3. | CBIT Task | 1024 | 47 | 4.58 |
| 4. | Idle Task | 512 | 35 | 6.83 |
| 5. | Init Task | 1024 | 78 | 7.61 |
| 6 | Log Task | 1024 | 47 | 4.58 |

### **1.5.2 HDU Display Application Software (HDU-004-001)**

Summary of Stack Depth Analysis Results for each task of HDU Display Application Software considering the maximum stack usage index.

**Table 2: Stack Depth Analysis Result of HDU Display Application Software**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Sl No** | **Task** | **Maximum Stack Size** | **Maximum Stack Index Obtained from Log Files** | **Stack usage in**  **percentage** |
| 1. | Application Task | 1024 | 593 | 57.91 |
| 2. | Poller Task | 1024 | 47 | 4.58 |
| 3. | CBIT Task | 1024 | 47 | 4.58 |
| 4. | Idle Task | 512 | 36 | 7.03 |
| 5. | Init Task | 1024 | 97.57 | 9.52 |
| 6. | A825Communication#1 Task | 1024 | 81 | 7.91 |
| 7. | A825Communication#2 Task | 1024 | 52 | 5.07 |
| 8. | Demo task | 1024 | 48 | 4.68 |