**Function Requirements**

It is a 3 relay configuration (Main relay, Standby relay, Common relay) which is monitored by two systems, System1, System2.Each systems health is assessed by two flags namely data flag and OK flag.

Function Inputs:

* System1 health flags: sys1\_notok, No\_sys1\_data which decides System1 health status (System1 is treated as healthy if and only if both No\_sys1\_data and sys1\_notok flag values are 0’s. Otherwise, it is treated as un-healthy )
* System1 health flags: sys2\_notok, No\_sys2\_data which decides System2 health status. (System2 is treated as healthy if and only if both No\_sys2\_data and sys2\_notok flag values are 0’s. Otherwise, it is treated as un-healthy )
* Sys1buf: It is a global buffer. Used to extract msstat and mcstat
  + Main relay status acquired by system1 denoted by variable “msstat” is extracted from this buffer based on channel number (chno).
  + Common relay status acquired by system1 denoted by variable “mcstat” is extracted from this buffer based on common number (common).
* Sys2buf: It is a global buffer. Used to extract sstat and scstat
  + Standby relay status acquired by system2 denoted by variable “sstat” is extracted from this buffer based on channel number (chno).
  + Common relay status acquired by system2 denoted by variable “scstat” is extracted from this buffer based on common number (common).
* SYS1DC\_DC, SYS2DC\_DC flags used to define the return value of the function for two special cases ( Sys1DC\_DC = false implies NOTOK)
* Common, chno –used to extract msstat, mcstat, sstat, scstat

Main relay status is monitored by System1, standby relay status is monitored by System2 and Common relay status is monitored by both Systems. Therefore, the function will receive two statuses from each system. If both the systems are healthy, for deciding the output status, function has to consider four statuses. If either of the system is healthy then only the corresponding buffer to be considered for determining the state, i.e., when data from one System is not available, decision is based on the two statuses available from other System. In some combinations of statuses, it is not possible to define the output. In such cases, output status should be undefined state.

* S1M- Main status acquired by System1 (referred as msstat in code)
* S1C – Common status acquired by System1 (referred as mcstat in code)
* S2S - Standby status acquired by System2 (referred as sstat in code)
* S2C – Common status acquired by System2 (referred as scstat in code)

The decision making table is given below:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Sl No. | Status combination  (Order:: S1M: S1C: S2S: S2C) | Output (return value) | | |
| Both Systems OK | Sys1 : OK  Sys2 : Not OK | Sys1 : Not OK  Sys2 : OK |
|  | 0000 | 0 | 0 | 0 |
|  | 0001 | 0 | 0 | ND |
|  | 0010 | 0 | 0 | ND |
|  | 0011 | Note1 | 0 | 1 |
|  | 0100 | 0 | ND | 0 |
|  | 0101 | 0 | ND | ND |
|  | 0110 | ND | ND | ND |
|  | 0111 | 1 | ND | 1 |
|  | 1000 | 0 | ND | 0 |
|  | 1001 | ND | ND | ND |
|  | 1010 | 1 | ND | ND |
|  | 1011 | 1 | ND | 1 |
|  | 1100 | Note1 | 1 | 0 |
|  | 1101 | 1 | 1 | ND |
|  | 1110 | 1 | 1 | ND |
|  | 1111 | 1 | 1 | 1 |

ND: Not defined - return value of the function should be 2.

Return value of the function is either 0 or 1 or 2, depending on the acquired statuses.

**Note 1: This case is applicable only when both the systems are in healthy state (0011 and 1100)**

Out of the four statuses, if two status from one System is ‘1’ and the other two status from second System is ‘0’, then the output status has to be defined based on the following criteria:

* if SYS2\_DC\_DC NOT OK and Sys1 main status is 1 then, output should be equal to 1.
* if SYS1\_DC\_DC NOT OK and Sys2 standby status is 1 then, output should be equal to 1.

Otherwise, output state is undefined.