ALARM DISPLAY PANEL INDICATORS

Three LED indicators naming A, B, C indicate to which system module display is connected. By pressing the SYS switch the connectivity of the display panel to the particular system module A, B, C can be selected.

Different alarms in the system normally displayed as 'alpha numeric' characters in the Display Panel during a faulty condition are given along with their corrective action in the tabular form below:

Nomenclature: SD = Shutdown   SSB = Safe standby   NML = Norm al

Alarm Display	Alarm type	Reason	Corrective Action
*INPUT X FAULTY (X = 1, 2...., 16)	Major : SD	Both front & back contacts of I/P relay either open or shorted.	Check the connectivity of the complementary contacts of respective input relay.
*IP-X NO MATCH (X = 1, 2...., 16)	Major : SD	Self input data different from both adjacent processors.	Reset UFSBI, if not retrieved into OK condition, change the respective I/P card.
*OUTPUT X FAULTY (X = 1, 2...., 16)	Major : SD	Both front & back contacts of OP relay either open or shorted. Final valid latch data different from OP relay status.	Reset UFSBI, if not retrieved into OK condition, then check contacts of the respective output relay, otherwise change the respective O/P FEEDBACK card.
*OP-X NO MATCH (X = 1, 2...., 16)	Major : SD	Self latch data different from both adjacent processors.	Reset UFSBI, if not retrieved into OK condition, change the respective O/P card.
*SPO X FAULTY (X = 1, 2...., 16)	Major : SD	Relay driver feedback wrong. Final valid latch data different from relay driver status.	Reset UFSBI, if not retrieved into OK condition, change the respective O/P card.
*INPUT-A FAULTY	Major : SD	Input card signature invalid. Self input data valid but different from adjacent processors.	Reset UFSBI, if not retrieved into OK condition, change the respective I/P card.

Alarm Display	Alarm type	Reason	Corrective Action
*OUTPUT-A FAULTY	Major : SD	Output card signature invalid.	Reset UFSBI, if not retrieved into OK condition, change the respective O/P card.
*FEEDBACK-A FLTY	Major : SD	Feedback card signature invalid. Self feedback data valid but different from adjacent processors.	Reset UFSBI, if not retrieved into OK condition, change the respective O/P FEEDBACK card.
*INPUT-B FAULTY	Major : SD	Input card signature invalid. Self input data valid but different from adjacent processors.	Reset UFSBI, if not retrieved into OK condition, change the respective I/P card.
*OUTPUT-B FAULTY	Major : SD	Output card signature invalid.	Reset UFSBI, if not retrieved into OK condition, change the respective O/P card.
*FEEDBACK-B FLTY	Major : SD	Feedback card signature invalid. Self feedback data valid but different from adjacent processors.	Reset UFSBI, if not retrieved into OK condition, change the respective O/P FEEDBACK card.
*ROM FAULTY	Major : SD	Computed ROM checksum different from that of stored value.	Reset UFSBI, if not retrieved into OK condition, change the respective SYSTEM card(s).
*RAM FAULTY	Major : SD	Test pattern written to a particular RAM location is different from that of read-back value.	Reset UFSBI, if not retrieved into OK condition, change the respective SYSTEM card(s).
*TIMER ERROR	Major : SD	Timer 2 value not within tolerable range.	Reset UFSBI, if not retrieved into OK condition, change the respective SYSTEM card(s).
*TASK ERROR	Major : SD	Five ms. task / second task if not executed properly.	Reset UFSBI, if not retrieved into OK condition, change the respective SYSTEM card(s).
*PROC ID ERR	Major : SD	Identity & inverted identity mismatch. Identity read different from that of stored value.	Reset UFSBI, if not retrieved into OK condition, change the respective SYSTEM card(s).

Alarm Display	Alarm type	Reason	Corrective Action
*BP BUS FAULTY	Major : SD	Stuck at fault at either I/O address lines or data lines or control lines.	Reset UFSBI, if not retrieved into OK condition, check the Euro connector of respective System card and BACKPLANE. If these are OK then problem is with System card or Backplane. Change one by one to identify the faulty card. Replace that and rectify the system.
*ADDR SETUP ERR	Major : SD	Difference between local & remote address not equal to 5. Self address setting different from adjacent values.	Check the proper value of hardware ADDRESS at BACKPLANE otherwise change the BACKPLANE.
*PROCESSING ERR	Major : SD	Normal input & complemented input mismatch. Data corruption (00 or 11) while processing. Software timer counters beyond limit.	Reset UFSBI, if not retrieved into OK condition, Change the respective I/P card.
*I/O CONFIG WRONG	Major : SD	I/O configuration of local & remote systems different. Configuration of I/O modules at the local end faulty.	Configure I/O cards properly in the respective I/O slots of UFSBI subrack.
*OUTPUT DISAGREE	Major : SD	Self output data different from both adjacent processors.	Reset UFSBI, if it is not retrieved into OK condition, check whether any "SD" alarm of System card exists. If found replace the System card otherwise replace the O/P card.
CNTL. VOLT ABSENT	Major : SD	Switched voltage at the output card not available.	Reset UFSBI, if not retrieved into OK condition, measure switched voltage (12V) at TB18A of BACKPLANE.
*MODE MISMATCH	Major : SD	Processor mode different from both adjacent processors.	Reset UFSBI, if not retrieved into OK condition, Change the respective SYSTEM card(s).

Alarm Display	Alarm type	Reason	Corrective Action
*TABLE CKSM ERR	Major : SD	Computed majority voter table checksum different from that of stored value.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
*SD WD HW FAULT	Major : SD	Feedback from various stages of shutdown and watchdog hardware different from the desired status.	Reset UFSBI, if not retrieved into OK condition, check SD1, SD2 & WD relays and their respective connections, if not yet retrieved, replace the Communication Driver card
*FAULT IN SD H/W	Major : SD	Feedback from various stages of shutdown hardware different from the desired status.	Reset UFSBI, if not retrieved into OK condition, check SD1 & SD2 relays and their respective connections, if not yet retrieved, replace the Communication Driver card
*STACK ERROR	Major : SD	Stack pointer not remain in its original position due to some software failure.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
*CPU ERROR	Major : SD	Instruction execution of CPU wrong.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
*INPUT-A ABSENT	Major : SD	Input card pulled out from the slot during operation.	Insert the card into the respective slot properly and reset UFSBI.
*INPUT-B ABSENT	Major : SD	Input card pulled out from the slot during operation.	Insert the card into the respective slot properly and reset UFSBI.
*OUTPUT-A ABSENT	Major : SD	Output card pulled out from the slot during operation.	Insert the card into the respective slot properly and reset UFSBI.
*OUTPUT-B ABSENT	Major : SD	Output card pulled out from the slot during operation.	Insert the card into the respective slot properly and reset UFSBI.
*FEEDBK-A ABSENT	Major : SD	Feedback card pulled out from the slot during operation.	Insert the card into the respective slot properly and reset UFSBI.

Alarm Display	Alarm type	Reason	Corrective Action
*FEEDBK-B ABSENT	Major : SD	Feedback card pulled out from the slot during operation.	Insert the card into the respective slot properly and reset UFSBI.
*IBC RX FAIL	Major : SSB	Non receipt of three successive interblock packets.	If remote UFSBI is in OK condition then check the communication link.
*IB ADDR MISMACH	Major : SSB	Address of local & remote systems different for three successive interblock packets.	Check the proper value of hardware ADDRESS at BACKPLANE for local and remote, otherwise change the BACKPLANE.
*IBC PKT MISMACH	Major : SD	No match in all three sub packets for three successive frames.	Reset UFSBI
*IBC TX FAIL	Major : SD	Protocol of IBC Trans Feedback frame wrong. Trans Feedback not available.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
*BOTH IPC RXFL	Major : SD	Non availability of IPC packets from both adjacent processors.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
*IPC TX FAIL	Major : SD	Receipt of IPC RXFL alarm from both adjacent processors.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
*PROC ACTV FAIL	Major : SD	Processor Activity signal in inactive state (logic high). During power on the software would check for both logic high & low status of Processor Activity signal. In case of anomaly, this alarm would be raised.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
*PROC ID ERR	Major : SD	System Activity signal in inactive state (logic high).	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
*FALSE INTERRUPT	Major : SD	Invoking of any undesired interrupt.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).

Alarm Display	Alarm type	Reason	Corrective Action
PROC-A INACTIVE	Minor : NML	If A system goes to SD due to any reason, the other two processors would raise this alarm.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card.
PROC-B INACTIVE	Minor : NML	If B system goes to SD due to any reason, the other two processors would raise this alarm.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card.
PROC-C INACTIVE	Minor : NML	If C system goes to SD due to any reason, the other two processors would raise this alarm.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card.
IBC PACKET 2/3	Minor: NML	One of three sub packets of a frame does not match with other two for three successive frames.	Reset UFSBI, if not retrieved into OK condition, replace the respective SYSTEM card(s).
PROC-X IPC RXFL (X = A,B,C)	Minor : NML	If a system card goes to SD due to any reason, the other two processors would raise this alarm.	Check if other system card(s) are in OK or shutdown state. If so, reset UFSBI, if not retrieved into OK condition, replace the SYSTEM card(s) one by one to identify the faulty one. Replace the identified faulty one and restore the system.
PROC-B IPC RXFL	Minor : NML	If B system goes to SD due to any reason, the other two processors would raise this alarm.	Reset UFSBI, if not retrieved into OK condition, replace the SYSTEM –B card.
PROC-C IPC RXFL	Minor : NML	If C system goes to SD due to any reason, the other two processors would raise this alarm.	Reset UFSBI, if not retrieved into OK condition, replace the SYSTEM –C card.
PSU-A O/P ERROR	Minor : NML	Output of PSU A alarming but PSU-B OK.	Replace PSU-A card.
PSU-B O/P ERROR	Minor : NML	Output of PSU B alarming but PSU A OK.	Replace PSU-B card.

Alarm Display	Alarm type	Reason	Corrective Action
BAT BEYOND LIMIT	Minor : NML	Battery voltage exceeds its lower or upper limit.	Check and correct Battery, Charger or IPS.

DO'S AND DONT'S

DO'S

1. Trained and knowledgeable persons should operate & maintain the BPAC Double line.

2. Battery voltage for BPAC Double line should be checked periodically. It should be within the operating range (21.6V – 28.8V).

3. Connectors or Modules should be plugged / unplugged after switching off the Power Supply.

4. Replacements of modules should be done with proper spares supplied by the manufacturer.

5. Arbitrary or stray earthing connections are to be avoided. Periodic checking of earthing connection is recommended.

6. Modules are to be inserted with proper alignment and with reasonable pres sure to ensure that no damage to the connector pins occur.

7. In case of any alarm, all the processors alarm conditions are to be recorded for proper analysis and remedial measures.

DONT'S

1. The system should not be 'RESET' in case of link failure.

2. Relay testing should not be performed involving found 'PICK UP' or 'DROP' in on -line condition.

FRONT PANEL LED INDICATORS

The Front Panel of each module comes with some LED indicators for different status and alarms. For remedial action in case of alarm s, please refer to the corresponding alarm display in the "Display and Reset Panel" and take remedial action as per the tabular representation given at the end of this chapter.

POWER SUPPLY UNIT:

The PSU Card has the following PSU input alarm LEDs:

BATT

This is a **green** LED. This LED glows as long as the input Battery supply is present.

IP SHUT

This is a **red** LED. If the input Battery voltage goes beyond the tolerable range, then this LED glows. Under this condition the PSU card will not generate any outp ut voltages.

IP OV

This is **amber** LED. If the input Battery voltage goes above the stipulated level but is below the highest tolerable limit then this LED glows.

IP UV

This is **amber** LED. If the input Battery voltage falls below stipulated range then this LE D glows.

The PSU card has the following LEDs for +5 volt output (measured at the INT & BP test points):

OK

This is a **green** LED. When the +5 volt output is within tolerable range, this LED glows.

SHUT

This is a **red** LED. If the +5 volt output goes above the tolerable limit then this LED glows. Under this condition the PSU Card will not give +5volt output.

UV

This is **amber** LED. If the +5 volt output falls below the tolerable limit then this LED glows.

The PSU Card has the following LEDs for +12 volt outpu t (measured at the INT & BP test points) :

OK

This is a **green** LED. When the +12 volt output is within tolerable range, this LED glows.

SHUT

This is a **red** LED. If the +12 volt output goes above the tolerable limit then this LED glows. Under this condition the PSU card will not give +12 volt output.

UV

This is **amber** LED. If the +12 volt output falls below the tolerable limit then this LED glows.

COMMUNICATION DRIVER UNIT :

The Communication Driver card has the following LEDs:

SYS ACTV

This is a **green** LED. As long as the system works in 3/3 or 2/3 mode, this LED glows. But if the whole system goes to SD state then this LED becomes off.

TXA

This is a **green** LED. When this LED glows, it indicates that the inter block transmission takes place through System Mod ule A at the local end.

TXB

This is a **green** LED. When this LED glows, it indicates that the inter block transmission takes place through System Module B at the local end.

TXC

This is a **green** LED. When this LED glows, it indicates that the inter block tran smission takes place through System Module C at the local end.

CNTL VOLT

These constitute of two amber LEDs. Normally any of two LEDs glows. Under normal working condition +12 volt is supplied from the PSU card through SD1 / SD2 relay (Front contact) to th e Output module to drive the output relays. When upper LED glows SD1 relay is activated and when lower LED glows SD2 relay is activated. But when the system goes to SD state, the power used for driving the output relays is removed i.e., SD1 / SD2 relay dro ps and both the LEDs become off.

SYSTEM MODULE:

The System Module has the following LEDs:

ALM

This is a **red** LED. Under normal operating condition this LED is off. If there is any alarm in the UBX 2000 system, then this LED glows.

RMT

This is an **amber** LED. Under normal operating condition this LED is off. If there is any alarm at the remote end UBX 2000, then this LED glows.

2/3

This is an **amber** LED. Under normal operating condition this LED is off. If the system works in 2 out of 3 modes, then this LED g lows.

SD

This is a **red** LED. Under normal operating condition this LED is off. If a Processor goes to shut down state due to any failure, then this LED glows. However, if such failure is common to all the 3 Processors or common to at least 2 Processors then all the 3 Processors go to shut down state, irrespective of the input condition. In SD state all the outputs are driven to deactivate state. The power used for driving the outputs is also removed. The system remains locked to this state and after the rect ification job has been carried out the system comes out of the SD state only by resetting the system.

SSB

This is a **red** LED. Under normal operating condition this LED is off. If the system fails to receive valid packets from the remote end, then the syste m enters into the Safe Standby state and this LED in all the System cards glows. In the SSB state all the outputs are driven to deactivate state irrespective of the input conditions. However, as soon as the system starts receiving valid packets continuously from the remote end, it will come out of the SSB state automatically and this LED in each of the system card will become off.

RSSB

This is an **amber** LED. This LED glows if the local end system does not have any failure but the remote end system has gone to SSB state i.e., if inter block receive fail occurs at the remote end.

LNK OK

This is a **green** LED. Normally this LED glows as long as the Tx-Rx path is OK between the local end UBX 2000 and the remote end UBX 2000. If any problem occurs in the communicat ion link then this LED will become off.

SYS OK

This is a **green** LED. Normally this LED glows as long as there is no alarm in the system. However, if any alarm occurs in the system then this LED will become off.

PROC ACTV

This is a **green** LED. This LED reflects the health of the System card and its associated hardware in other cards. Under normal working condition this LED glows. However, if any problem occurs in the System card or in its associated hardware then this led will become off.

INPUT INTERFACE MODULE:

The Input Module can accept 8 C/O inputs through 8 independent channels. There are two LEDs corresponding to each channel.

When the input channel senses the back contact of the input relay, corresponding **green** LED glows.

When the input channel senses the front contact of the input relay, corresponding **amber** LED glows.

FEEDBACK MODULE :

The Feedback Module reads back the status of the 8 output relays from the spare front & back contacts of the respective output relays through 8 independent channels . There are two LEDs corresponding to each channel.

When the Feedback Card senses the back contact of an output relay, it's corresponding **green** LED glows.

When the Feedback Module senses the front contact of an output relay, it's corresponding **amber** LED glows.

RELAY OUTPUT MODULE :

The Output Module has 8 LEDs corresponding to 8 output relays. When any output relay activates, the corresponding **amber** LED glows.

The Output Card has also 3 **red** LEDs:

DAG-A

When System A is in disagreement regarding the status of the output relays, this LED glows. Normally this LED is off.

DAG-B

When System B is in disagreement regarding the status of the output relays, this LED glows. Normally this LED is off.

DAG-C

When System C is in disagreement regarding the status of the output relays, this LED glows. Normally this LED is off.

ALARM EXTENDER MODULE :

The Alarm Extender Module has the following LEDs:

SYS-FAIL (SINGLE)

This is an **amber** LED. Under normal operating condition, this LED is OFF. When this LED glows, it indicates that the system works in 2 out of 3 mode.

PSU-FAIL (SINGLE)

This is an **amber** LED. Under normal operating condition, this LED is OFF. When this LED glows, it indicates that any one of the two power supply unit goes into shutdown condition.

LINK-FAIL

This is a **red** LED. Under normal operating condition, this LED is OFF. If any problem occurs in the communication link between the local end and remote end of UFSBI the will glow.

SYS-FAIL (SD)

This is a **red** LED. Under normal operating condition, this LED is O FF. When this LED glows, it indicates that the UFSBI has gone into SD State.

PSU-FAIL (SD)

This is a **red** LED. Under normal operating condition, this LED is OFF. . When this LED glows, it indicates that both the power supply units go into shutdown condition resulting in SD mode of the UFSBI.

UFSBI-OK

This is a **green** LED. Under normal operating condition, this LED is ON. When any alarm appears in UFSBI this LED becomes OFF.

CNTL.-VOLT.

This is a **red** LED. Under normal operating condition, this LED is OFF. This LED glows in absence of Control voltage.

ALMOD-OK

This is a **green** LED. Under normal operating condition, this LED is ON confirming that the health of the Alarm Extender Module is OK.

SM PANEL:

The SM Panel has the following LEDs:

1PSU

This is an **amber** LED. Under normal operating condition, this LED is OFF. When this LED glows, it indicates that any one of the two power supply unit goes into shutdown condition.

1SYS

This is an **amber** LED. Under normal operating condition, this LED is OFF. When this LED g lows, it indicates that the system works in 2 out of 3 modes.

2PSU

This is a **red** LED. Under normal operating condition, this LED is OFF. . When this LED glows, it indicates that both the power supply units go into shutdown condition resulting in SD state o f UFSBI.

2SYS

This is a **red** LED. Under normal operating condition, this LED is OFF. When this LED glows, it indicates that the UFSBI has gone into SD State.

LINK

This is a **red** LED. Under normal operating condition, this LED is OFF. If any problem occurs i n the communication link between the local end and remote end of UFSBI, this will glow.

ALMOD

This is a **red** LED. Under normal operating condition, this LED is OFF confirming that the health of the Alarm Extender Module is OK. This LED becomes ON when Alar m Extender Module goes faulty.

UFSBI

This is a **bicoloured** LED. Under normal operating condition, this LED is green. When any alarm appears in UFSBI due to any reason, internal or external, this LED becomes red.

MAINTENANCE & TROUBLESHOOTING

Preventive maintenance

Power supply: In tropical countries power unit of any type is the single source responsible for most of the equipment faults and malfunctioning. A regular check on external power supply units such as battery banks, battery charger is mand atory.

Relays: BPAC Double line has used most reliable type of relays, but special care and testing is required for those to be used after long storage. No attempt should be made to repair a relay. Use a new one.

Maintenance of Communication Link

a. Telecom cable should be protected from damage during other kinds of installation at its vicinity.

b. If disconnection of cable is required, the cable terminal should be refitted firmly.

c. The loss of signal due to lossy cable should be kept under ch eck.

d. The transmit and receive path are to be checked if there is 'IBC RX FAIL' on both sides.

Maintenance of Equipment

BPAC Double line unit will automatically trip -off if the Battery supply goes beyond the normal operating range. In case of repeated tr ip-off, both the DC supply level and the loading are to be checked. A healthy BPAC Double line should not normally draw more than 3 Amp for normal operation.

No attempt of "resetting" should be made in case of supply impairment or link failure.

If a faulty BPAC Double line system is not brought back to normal after "resetting" one must check:

i)   If there is any loosely fitted connector or improperly pressed PCB module.
ii)   Connecting leads inserted in Barrier / Phoenix Terminal.
iii) Battery and Power Supply voltages.

For specific information and corrective action of faults, refer to

i)   The tabular representation of the alarms on the **Alarm Display Panel Indicators** and their corrective action given later.

ii)   The LED indication on the **Front Panel LED indicators** (module wise) given later.

As long as no failure occurs in the system, the display remains "SYSTEM OK". But if any failure occurs then the buzzer will start beeping and the summarized alarm will come in the display in the form "MAJOR: X MINOR: Y", where X & Y are integers. The operator / maintainer will then have to press the ACKN switch to see the alarm status. As soon as the ACKN switch is pressed, the buzzer will stop beeping and the relevant faulty message information will be displayed. Accordingly the maintainer will carry out the rectification job (e.g. replacement of card, checking of wiring) at the site and after the rectification is complete he should reset the system and record "the cause for resetting the system" in the log-book. If the rectification job is not possible by the maintainer at the site then he will have to inform the manufacturer.

Once a fault is found, the user should not attempt repairing at component level. The impaired module / PCB needs to be replaced by a spare one.