

CONSIDERATIONS IN CHAIN SWITCHING IBUCS

The Issue:

Terrasat developed an advanced 1+1 protection switching system that is fully redundant, including power supplies. The IBUC switching system is completely independent from the modem switching system. In TX/RX systems, the LNBS are switched independently from the IBUCs. This is a pure “Independent Switching” system and is the most reliable.

A second, lower cost, approach, is called “Stream Switching” or “Chain Switching”. This lowers the cost by switching BUCs and modems (and sometimes LNBS) by a complete chain or stream. Part of the thinking is to eliminate the modem switch and its cost. In the case of lower power systems, it is presumed that the IBUCs can be powered by the modem ODU power supply, thus eliminating the outdoor power supplies and their cost. This paper explores the considerations in going with the alternate approach.

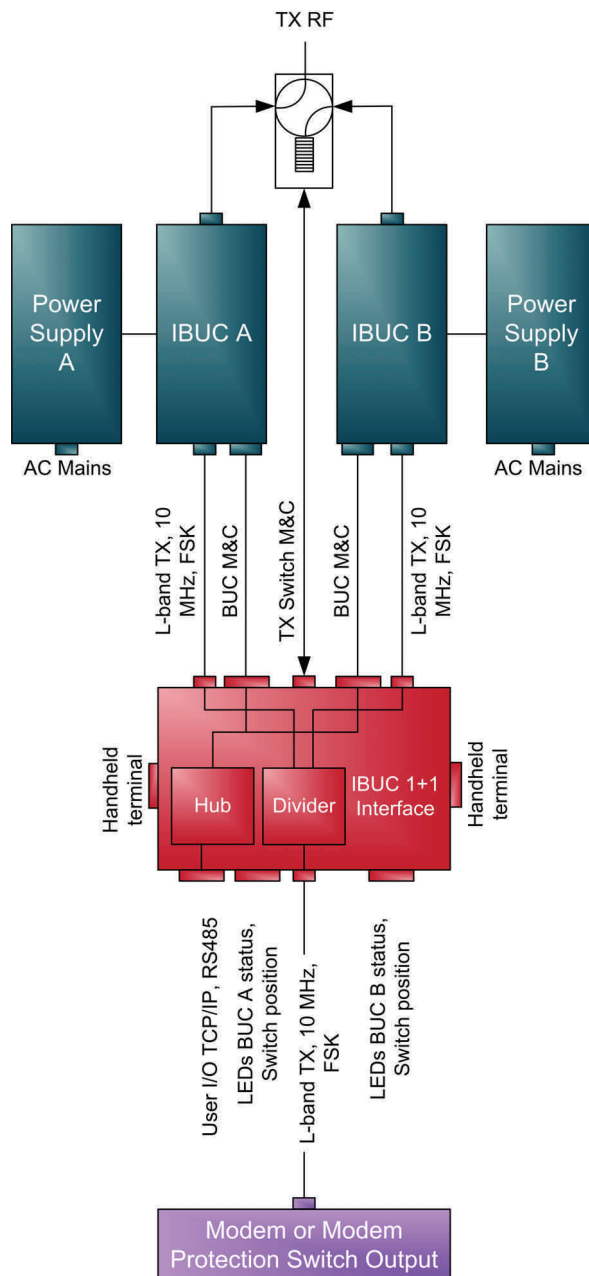
Some systems use a single power supply, which introduces a single point of failure. Although it may be called stream switching, it is no longer truly a redundant system.

Terrasat’s Solution:

The recommended redundancy solution is diagramed to the right. The design takes advantage of the intelligence of the IBUC for customer-configurable alarm thresholds and to effect the switching. If BUC A fails, BUC B immediately commands the switch to change position. There is no rack-mounted logic/controller unit and bundle of cables. We use redundant outdoor power supplies. In redundant receive systems, the LNBS are powered from the redundant power supplies as well. The system is detailed in the white paper “IBUC Redundant System Overview.”

Important to the current discussion is the single L-band feed from the modem or the modem protection switch. As you can see on the diagram, that L-band signal is split within the redundancy interface unit. This totally isolates the IBUC switching and the

modem switching functions. This is an important distinction over a chain switching system where a failure in either component in the chain switches the companion unit in the chain out of service.



Chain Switching:

The diagram on this page shows a chain switching system. Two IFL cables are now required. Each carries the composite L-band signal from each modem to its companion IBUC, circumventing the redundancy interface unit. Important to note is that each IBUC derives power from the ODU power supply in its corresponding modem.

Management and Control is still via the redundancy interface unit except the FSK. So the user can connect to the Ethernet port of the interface unit and communicate with both IBUCs. He has RS232 connectivity for the handheld controller.

Now the customer must make some provision for data switching. He can send the data to both modems continuously, or use a modified modem switching system. Important to note: If the modem fails by losing data but continues to send an L-band signal, there is no condition to activate a switchover of the chain.

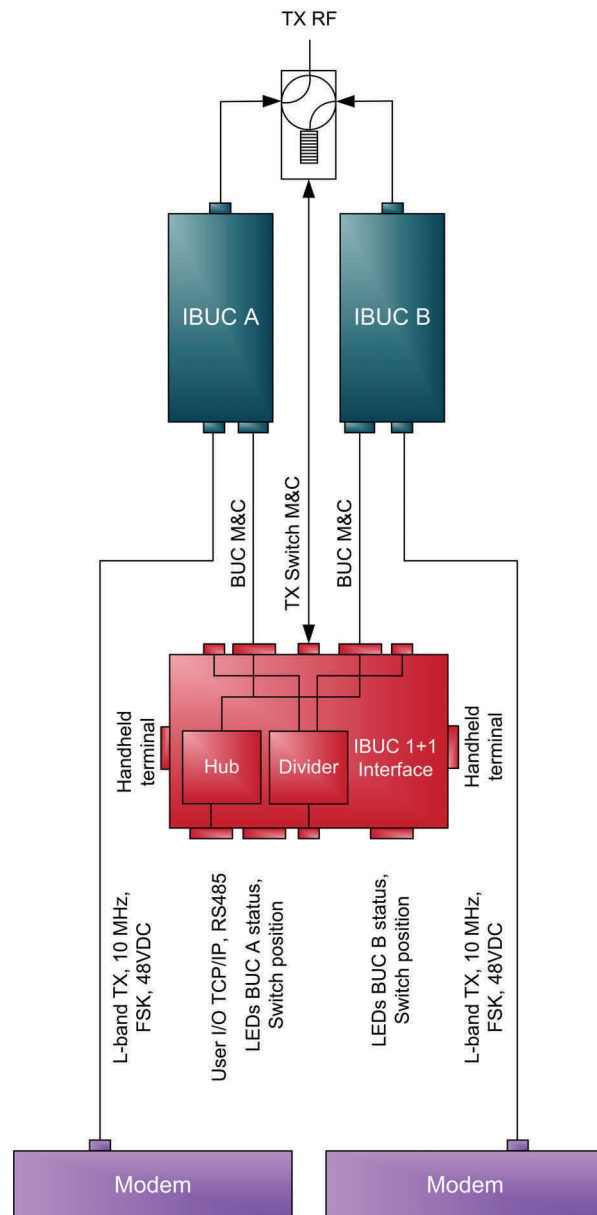
We provide a contact closure if a BUC fails. But there has to be provision to then switch the modem as well.

A significant consideration is the DC power budget. You must determine if the modem has enough DC power to supply a BUC, waveguide switch, and perhaps the LNB. A C-band waveguide switch draws 22W (60ms pulse).

C-band waveguide switch 22W (60ms pulse)

Ku-band waveguide switch 22W (50 ms pulse)

We provide figures on individual IBUCs in other documentation to help calculate the budget. Or you can contact Terrasat Sales.



Redundant LNB Considerations:

In a TX/RX system the LNB must be taken into account. You can see a diagram of the Terrasat TX/RX switching system below. LNBs are switched independently from IBUCs, which again, is a more robust system. If chain switching is pursued, now the modem, BUC, and LNB are all in one chain, reducing the availability of the system.

We use the 48VDC IBUC power supply to power the LNB and it's waveguide switch. This provides redundant power to the LNBs. In a chain-switched alternative, there must be provision for powering

these elements. In addition, you must contend with any delay in the modem's recognizing an LNB failure. Some modems purposely count a delay period before switching, assuming some signal loss is not unusual.

RX 1+1 Interface Unit	7.2W
C-band LNB	8.5W x 2
C-band RX waveguide switch	28W (100ms pulse)
Ku-band LNB	8.5W x 2
Ku-band RX waveguide switch	22W (50 ms)

