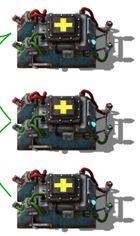
Multi Item Cargo Rocket with Brownout Protection

Adding a * 1 combinator here prevents combined signals later on from back-propagating.

Remote
From Signal Receiver

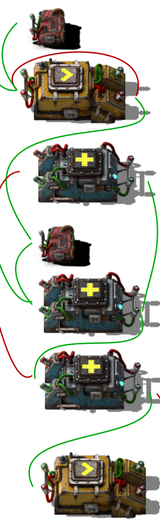
Each * 1 → Each



Brownout Protection

Inputs: Remote + Requested
Outputs: Very large positive value for each requested item if brownout is detected.
Launch condition: No brownout detected.

Remote signal needs to include 1 Black (from a constant combinator).
This is summed to a -1 Black on the sending side to zero it out in normal circumstances.
In brownout, the positive signal will be lost and Black will go negative.
This is captured by a flip-flop such that it will require a manual reset (by turning the reset constant combinator off and on again.)
This is them multiplied out against requested items to "pretend" that the remote is full and prevent further loading.



Blue = 1

Black > Blue → Black

Each * -1 → Each

Black = -1

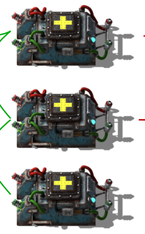
Black * -1000000

Each * Black → Each

Black >= 0 → Yellow

Requested
From Constant Combinator (negative values)

Each * 1 → Each

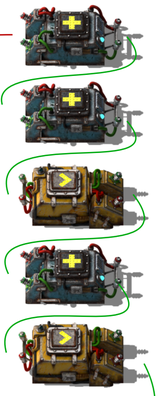


Remote empty

Inputs: Remote + Requested
Outputs: Quantity of each requested item present in remote, plus one.
Launch condition: Remote has run out of at least one item.

Filter remote signals to only those requested by temporarily adding a large number to the requested items, summing the two, filtering to include only large numbers, then subtracting that large number again.

We need to be able to detect if a remote item is nearly empty ... but if it is zero it will dissappear from the signal set and we won't know. To work around this, we "pretend" that there is at least 1 of each requested item.



Each * -1 → Each

Each + 1000001 → Each

Each >= 1000000 → Each

Each - 1000000 → Each

Any <= 2 → Yellow

Loading

Inputs: Remote + Requested + Brownout Protection + Cargo Hold
Outputs: Positive value for each item still to be loaded
Launch condition: When no items remain to be loaded

Sum all inputs together. Any negatives values are items to be loaded.
Multiply by negative 1 and filter >= 0 to isolate them.

Rocket
Signal from rocket aunch pad (cargo hold)

Each * -1 → Each

Each >= 0 → Each

All <= 0 → Yellow

Launch

When each section's launch criteria is met - 3 yellow signals detected - then emit green signal for launch.

Yellow >= 3 → Green

Rocket
To rocket launch pad