We claim:

1. A test apparatus, independent of an aircraft, for testing aircraft message trigger logic for the aircraft, comprising:

a DFDAU (Digital Flight Data Acquisition Unit), which is configured to receive message trigger logic to be tested, wherein the message trigger logic is loaded onto the DFDAU:

an input interface, which is configured to receive data of aircraft condition; and

a simulation signal generator, which is connected to the input interface and configured to generate a simulation signal according to the data of aircraft condition, wherein a type and property of the simulation signal is identical to those of aircraft signals collected by aircraft sensors and data transmitted from other assemblies of aircraft condition:

wherein, the DFDAU is further configured to receive the simulation signal and generate a message according to the message trigger logic to be tested based on the simulation signal;

wherein the simulation signal generator comprises at least one of a discrete signal generation unit, a voltage signal generation unit, an analog signal generation unit or a bus signal generation unit;

wherein the input interface is connected to at least one of the discrete signal generation unit, the voltage signal generation unit, the analog signal generation unit or the bus signal generation unit via a bus system; and

a wiring extension device comprising a wiring board.

2. The test apparatus according to claim 1, wherein the data of aircraft condition comprise data of aircraft condition composed according to aviation communication criterion.

3. The test apparatus according to claim 1, wherein the data of aircraft condition comprise data of aircraft condition from QAR (Quick Access Recorder).

4. The test apparatus according to claim 1, wherein the discrete signal generation unit comprises an on/off signal generation unit.

5. The test apparatus according to claim 4, wherein the on/off signal generation unit comprises a relay array or a switch array.

6. The test apparatus according to claim 1, wherein analog signal generation unit comprises an alternating current voltage ratio (ACVR) signal generation unit, the ACVR signal generation unit comprises:

an alternating current voltage signal conversion unit, which is adapted to be connected to a power source and generate alternating current voltage signals with valid value and frequencies;

a digital signal subcircuit, which is configured to receive a digital signal;

a modulator, which is configured to receive the alternating current voltage signals and the digital signal, and generate alternating current voltage ratio signals according to the digital signal; and

an output transformer, which is configured to output the alternating current voltage ratio signals.

7. The test apparatus according to claim 6, wherein the digital signal subcircuit comprises:

a bus adapter, which is configured to connect the bus system for receiving a digital signal from the bus system;

a bus driving circuit, which is configured to drive the digital signal; and

a voltage level conversion circuit, which is configured to convert voltage level of the digital signal into a voltage level required by the modulator.

8. The test apparatus according to claim 6, wherein the modulator modulates valid value of the alternating current voltage signals according to the digital signal input from the digital signal subcircuit and generates corresponding alternating current voltage ratio signals.

9. The test apparatus according to claim 1, wherein analog signal generation unit comprises a sync signal generation unit, the sync signal generation unit comprises:

an alternating current voltage signal conversion unit, which is configured to be connected to a power source and generated two sets of alternating current voltage signals;

a digital signal subcircuit, which is configured to receive input digital signals;

a modulator, which is configured to convert the two sets of alternating current voltage signals into two sets of alternating current voltage signals having a phase difference, wherein the phase difference is based on the digital signal;

a first and second amplifiers, which are configured to amplify power of the two sets of alternating current voltage signals having the phase difference; and

an output transformer, which is configured to output amplified two sets of alternating current voltage signals having the phase difference.

10. The test apparatus according to claim 9, wherein the modulator comprises: a sin multiplier and a cos multiplier; wherein the two sets of alternating current voltage signals are input to the sin multiplier and the cos multiplier respectively and are converted into two sets of alternating current voltage signals having the phase difference.

11. The test apparatus according to claim 1, wherein the bus signal generation unit comprises ARINC429 bus signal generation unit, ARINC629 bus signal generation unit or a combination thereof.

12. The test apparatus according to claim 1, further comprises a signal conditioning adapter, which is configured to manipulate the simulation signals generated by the simulation signal generation module.

13. The test apparatus according to claim 1, wherein the wiring board comprises:

a wiring board panel, which comprises a plurality of sockets, each socket configured to be communicatively connected to an output signal of the simulation signal generator; and

a plurality of output interfaces, each output interface comprising a plurality of output terminals, wherein each output terminal corresponds to a socket of the wiring board panel;

wherein each output interface of a signal type is connected to an input interface of a corresponding signal type of the DFDAU.

14. The test apparatus according to claim 13, the wiring board panel comprises: analog signal zone, bus signal zone, power connection zone, and ground connection zone.

15. The test apparatus according to claim 13, the wiring board comprises an automatic switchover module, which is configured to automatically switch each input signal of the wiring board panel and each output terminal of the plurality of output interfaces.

16. The test apparatus according to claim 1, wherein the wiring extension device further comprises an input interface and an output interface;

Wherein the input interface comprises a plurality of input terminals, each input terminal configured to be communicatively connected to an output signal of the simulation signal generator;

the output interface comprises a plurality of output terminals, each output terminal corresponding to an input terminal of the input interface;

wherein the wiring extension device further comprises an automatic switchover module which is configured to automatically switch each input terminal of the input interface and each output terminal of the output interface.

17. The test apparatus according to claim 15, wherein the automatic switch module comprises a switch array arranged in row and column.

18. The test apparatus according to claim 1, wherein the wiring extension device further comprises:

a test module, which is configured to examine whether a connection circuit is invalid by measuring current and voltage of the connection; and

a circuit scanning module, which is configured to automatically switch between connections so as to connect the test module to different connections.

19. A method for testing aircraft message trigger logic, the method implemented by a test apparatus comprising:

a DFDAU (Digital Flight Data Acquisition Unit), which is configured to receive message trigger logic to be tested,

an input interface, which is configured to receive data of aircraft condition, and

a simulation signal generator, which is connected to the input interface and configured to generate a simulation signal according to the data of aircraft condition, wherein a type and property of the simulation signal is identical to those of aircraft signals collected by aircraft sensors and data transmitted from other assemblies of aircraft condition;

the method comprising:

loading the message trigger logic onto the DFDAU;

loading the data of aircraft condition composed according to aviation communication standard or data of aircraft condition from QAR, via the input interface, wherein the data of aircraft condition may trigger the message trigger logic to be tested;

generating, by the simulation signal generator, the simulation signal according to the data of aircraft condition, and connecting the simulation signal into the DFDAU;

generating, by the DFDAU, a message in response to the simulation signal connected to the DFDAU when data in the simulation signal triggers the message trigger logic; and

determining whether the message trigger logic is correct according to the message generated by DFDAU.

20. The method according to claim 19, the process further comprises: determining whether the message is correctly triggered.

21. The method according to claim 19,

wherein the message includes data regarding an aircraft condition, and

wherein the method further comprises determining whether the data of aircraft condition obtained in the message are the same with the data of aircraft condition from QAR.

22. The method of claim 21 further comprises: adjusting the message trigger logic.