



## IA3 - MIL-STD 1553B

This course covers the 1553 military bus

### Objectives

- The bus topology is explained.
- Bus frames are studied field per field.
- The architecture of a 1553 coupler is described.
- The course focuses on testing, covering also MIL-HDBK-1553A.
- The course details the software interface necessary to control the coupler.
- This course has been delivered several times to companies developing defense/avionics equipments.

*A more detailed course description is available on request at [training@ac6-training.com](mailto:training@ac6-training.com)*

### Prerequisites

- Basic knowledge of a processor or DSP.

### Plan

#### INTRODUCTION

- History
- Utilization domain
- Objectives of this bus
- Protocol overview
- The 3 node types: BC, RT and BM
- Multiplex selection criteria

#### PHYSICAL LAYER

- Introduction to differential transmission
- 1553B transmission medium
- Stubbing
- Connecting a terminal to a backbone, long stub
- Connection a terminal to a backbone, short stub
- Multi-stub couplers
- Terminal electrical characteristics

#### LINK LAYER

- Terminal operation

- Manchester bi-phase coding scheme
- Word formats, SYNC pattern
- Word validation
- Command word detail
- Data word detail
- Status word detail, studying various sequences in order to explain Status flags
- Terminal architecture, word controller, message controller, frame controller

## MESSAGE FORMATS

- Remote Terminal operation, assigning an address
- The 10 message types
- Point-to-point messages
- Broadcast messages
- Studying various sequences explaining the way of transferring data from terminal to terminal
- Message timings, taking into account the round-trip delay
- Illegal commands vs invalid commands

## MODE CODES

- Management messages
- Command format, subaddress specific usage
- Mode codes supporting data
- Dynamic bus control
- Synchronize commands, usage to implement a heartbeat
- Transmit Status word and Transmit Last command use cases
- Interface with self tests in both RT and subsystems
- Transmitter shutdown commands used in redundant systems

## SYSTEM ISSUES

- Using subaddress
- Double buffering
- Framing in the BC to support both periodic transfers and asynchronous transfers

## REDUNDANT DATA BUS REQUIREMENTS

- Electrical isolation
- Dual standby redundant data bus operation
- Superseding commands
- High reliability requirements

## TESTING

- Test plans described in 1553A handbook
- Using an analyzer to capture traffic
- Generating traffic to check how the system react in case of errors
- Data wrap around mechanism, remote loopback test

## Renseignements pratiques

Durée : 2 jours  
Prix : 1450 € HT