# IC7 - VME

## This course covers VME bus, including 2eSST

## Objectives

- This course is based on the ANSI-VITA 1 1994 specification and ANSI-VITA 1.1 extensions.
- The new 2eSST protocol is also described.
- The training highlights synchronization methods like mailbox generally used in VME based calculators.
- The daisy-chain acknowledge mechanism is viewed in detail.
- Shared resource management is also emphasized.
- The training shows how to configure a VME backplane.
- After having reminded the 68K interrupt management, the VME priority interrupt bus is described.
- VME timing diagrams are studied with the assistance of the VSYSTEMS analyser board.
- The course focuses on the configuration space specified in the VME64 and VME64x standards.

- This course has been delivered several times to companies developing defence and avionics equipments.

*A more detailed course description is available on request at formation@ac6-formation.com*

## *Prerequisites*

- Experience of a parallel digital bus is recommended.

## *Course Environment*

- Theoretical course
  - PDF course material (in English) supplemented by a printed version for face-to-face courses.
  - Online courses are dispensed using the Teams video-conferencing system.
  - The trainer answers trainees' questions during the training and provide technical and pedagogical assistance.
- At the start of each session the trainer will interact with the trainees to ensure the course fits their expectations and correct if needed

## *Target Audience*

- Any embedded systems engineer or technician with the above prerequisites.

## *Evaluation modalities*

- The prerequisites indicated above are assessed before the training by the technical supervision of the traineein his company, or by the trainee himself in the exceptional case of an individual trainee.
- Trainee progress is assessed by quizzes offered at the end of various sections to verify that the trainees have assimilated the points presented
- At the end of the training, each trainee receives a certificate attesting that they have successfully completed the course.
  - In the event of a problem, discovered during the course, due to a lack of prerequisites by the trainee a different or additional training is offered to them, generally to reinforce their prerequisites,in agreement with their company manager if applicable.

# Plan

## INTRODUCTION TO THE VME BUS

- VME based calculator architecture
- Connectors pinout
- The four bus parts

## THE ARBITRATION BUS

- Explanation of the daisy-chain acknowledge mechanim
- RRS, PRI and ONE Arbiter options
- RWD, ROR, FAIR requester options
- Arbitration sequence analysis

## THE DATA TRANSFER BUS

- Byte locations accessed during a data transfer
- Address pipelining
- Burst transfers
- Address Only transactions
- BTO timer utility
- Shared resource management

## THE INTERRUPT BUS

- Interrupt generator structure
- Interrupt handler structure
- Status/ID read cycle
- ROAK and RORA interrupt generator options

## THE UTILITY BUS

- SYSFAIL management
- Reset timing diagram
- Power control
- Auto system controller

## ELECTRICAL SPECIFICATION

- The 5 signal types
- Bus driving and receiving requirements
- Noise margins
- Board powering, current ratings for power pins
- Line terminations
- The ETL transceiver logic required for 2eSST

## THE CONFIGURATION SPACE

- Determination of the mapping of the A24 config space
- Detail of the CR and CSRs
- Auto slot ID mechanism

## VME64x EXTENSIONS

- New P0/J0 connector
- P1/J1, P2/J2 connectors pinouts, rows z and d pin assignments
- Live insertion support

- EMC front panel and subracks
- ESD protection
- ETL technology
- 2eVME protocol

## *2eSST PROTOCOL*

- 3U and 6U implementations
- Broadcast transfers
- Source synchronous transfers, data centered strobes
- Skew calculation

## Renseignements pratiques

**Duration : 4 days**
**Cost : 1950 € HT**