



# **IMUX SYSTEM OVERVIEW**

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## IMUX

- **System Features**
- **General Architecture**
- **System Performance**
- **Tape Structure**
- **Input Characteristics**
- **Input Channel Data Structures**
- **Output Characteristics**
- **COTS Single Board Computer**
- **Configurability**
- **Series 30 Operation**
- **Environmental Specifications**



## System Features

- **Multiple Recorder Interfaces with User Selectable Data Filtering**
- **Accepts IRIG A, B, and G Timecodes**
- **Configurable for up to 60 Input and Output Channels**
- **Concurrent Series 30 Operation**
- **Computer Readable Data Structures**
- **Recorder Interfaces:**
  - DCRsi 240, DCRsi 107 Parallel Interface
  - VLDS SCSI Interface
  - DIS 120, DIS 160 SCSI Interface



## General Architecture

- **Veda Systems VME Bus Extension**
  - **GME Bus**
  - **Synchronous Data and Tag Bus**
  - **Throughput > 500 Mbits/sec**
- **Fully Functional VME Bus for setup and control**
- **VME 6U Form Factor**
- **User Interface for Configuration and Control Through and RS-232/RS-422 Serial Channel**
- **Capacity for up to 60 Channels**



## General Architecture

- **System Components**
  - **Input Channel Cards Hosted on a 4 Channel Quadraplex Board**
  - **Output Channel Cards Hosted on a 4 Channel Quadraplex Board**
  - **Recorder I/O and Time Keeper Card**
  - **Time Card (Translator and Digitizer)**
  - **VME Processor (COTS)**



## General Architecture

- **Input/Output Channels**
  - **PCM Data**
  - **MIL-STD-1553 Data**
  - **Parallel Digital Data**
  - **Analog Data**
  - **Voice**
  - **IRIG Time**
  - **RS 232/ RS-422 Serial Data**



## System Performance

- **Multiplexer**
  - **Throughput > 500 Mbits/sec**
  - **Multiple Recorder I/O Boards**
    - » **1 Master Bus Arbiter**
    - » **Remainder are Passive**
    - » **Selectable Fill Capability**
    - » **Selectable Tag Filtering**
    - » **System Error Status Insertion**
  - **Concurrent Series 30 Operation**

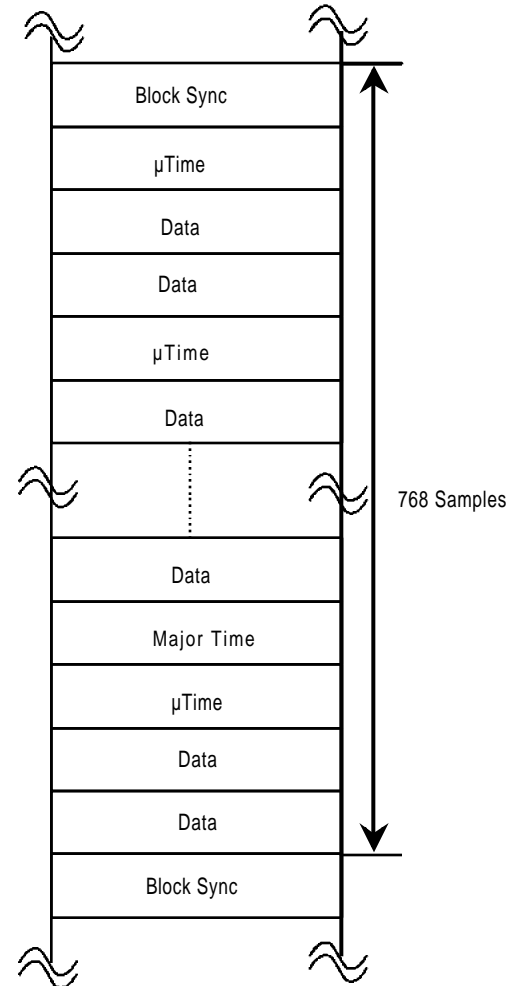


## System Performance

- **Demultiplexer**
  - **Throughput > 500 Mbits/sec**
  - **Playback Reconstruction Timing to Within 1 Microsecond of Data Time-of-Arrival**
    - » **PCM Accuracy is 32 bit times + a fraction of 1 microsecond**
    - » **1553 Accuracy is 20 microseconds (1553 message time) + a fraction of 1 microsecond**
    - » **Others, Accuracy is a fraction of 1 microsecond**
  - **Concurrent Series 30 Operation**



# IMUX Tape Structure



Notes: Block Sync every 768 Samples.  
 Major time word every 10 msec.  
 Minor time marks time of arrival (TOA)  
 of each succeeding data word.





## Input Characteristics

- **PCM (NRZ-L, Bi-Phase, RNRZ-L)**
  - **TTL Clock and Data**
  - **Differential TTL Clock and Data**
- **MIL-STD-1553**
  - **Transformer Coupled Stub**
  - **Direct Coupled Stub**
  - **Selectable Filtering to the Subaddress and/or Remote Terminal Level**



## Input Characteristics

- **Parallel Data**
  - **TTL Data and Latch Strobe**
  - **Data Format**
    - » 8, 16 or 32 Bit Words
- **Low Rate Analog Data**
  - **0 To 5 V or  $\pm 2.5V$  Input Level**
  - **0 - 1 MSa/Sec Sampling Rate**
  - **Programmable 1, 2, 4, or 8 Gain**
  - **Programmable 1, 2, 4, or 8 Attenuation**



## Input Characteristics

- **Low Rate Analog (Cont..)**
  - 8, and 12 Bit Resolution Available
- **Voice**
  - Isolation Transformer Coupled
  - $\pm 5V$  Maximum Input Level
  - CVSD Encoder @ 16 Kb/sec
- **IRIG Timecode**
  - Formats A, B, and G
- **RS-232 / RS-422 Serial Data**
  - Input Levels IAW appropriate specification



## Input Characteristics

- **RS-232 / RS-422 Serial Data (cont.)**
  - Data Rates (38.4K, 19.2K, 9600, 4800, 2400, 1200)
- **High Rate Analog Data**
  - $\pm 1$  V Maximum Input Level
  - 0 To 10 Msamples/ Second
  - 8 or 12 Bit Resolution
  - Stand Alone 6U VME Card
  - COTS Board



# Input Channel Data Structures

PCM, Analog, Parallel Digital, Voice, and IRIG Time Code



RS-232 and RS-422



MIL-STD-1553



$\mu$ Time



Major Time





## Output Characteristics

- **PCM**
  - **Output Format Identical to Input**
  - **Single Ended TTL or Differential TTL**
- **MIL-STD-1553**
  - **Outputs MIL-STD-1553 Traffic**
  - **Recreates All Intermessage Timing**
  - **Transformer Coupled or Direct Coupled**



## Output Characteristics

- **Parallel Digital**
  - **Outputs the Same Word Format as Recorded**
  - **Outputs an Update Strobe Indicating a Word(s) has been Updated**
  - **TTL Output**
- **Low Rate Analog**
  - **0 To 5 V or  $\pm 2.5V$  Full Scale Output**
  - **0 - 1 MSa/sec Conversion Rate**
  - **8, and 12 Bit Resolution Available**





## Output Characteristics

- **Voice**
  - Isolation Transformer Coupled
  - $\pm 5$  V Full Scale Output
  - CVSD Decoder @ 16 Kb/sec
- **IRIG Timecode**
  - Formats A, B, and G
- **RS-232 / RS-422 Serial Data**
  - Output Levels IAW appropriate specification
  - Data Rate Identical to Input Rate



## Output Characteristics

- **High Rate Analog**
  - **$\pm 1$  V Maximum Output Level**
  - **0 to 10 Msamples/Second**
  - **8 or 12 Bit Resolution**
  - **Stand Alone 6U VME Card**
  - **COTS Board**



## COTS Single Board Computer

- **Force Computers CPU40**
- **Motorola 68040 Based**
- **Four Serial Channels**
- **Optional IEEE 802.3 Ethernet Interface**
- **Optional SCSI Interface**
- **NvRAM Segment**
- **1024 Kbyte ROM Sector**
- **On-Board FLASH Program Capability**



## Configurability

- **Configurable for up to 60 Input and 60 Output Channels**
- **Any Mix of Channels Types Available**
- **User Interface Via COTS Processor Serial Port**
  - **Control via VT-100 or equivalent**
  - **Control via Windows Application**
- **5 Configurations Stored in Non-Volatile Memory**
- **Multiplexer Record Configuration is also placed in a Header on the Tape at the Start of each Record Session to Support Auto Configuration During Playback.**



## Configurability

- **Selectable Minor Time Resolution:**
  - 1 microsecond
  - 8 microseconds
  - 128 microseconds
  - 1 millisecond



## IMUX/Series 30 Operations

- **Concurrent Series 30 Operations**
  - **IMUX Control via X Windows Environment**
  - **Real-time Monitor and Display of Data**
  - **Record On/Off Trigger Capability**
    - » Trigger from any input source
  - **Ethernet Interface to Workstations**



## Environmental Specifications

- **Laboratory Version**
  - **0 to +55 Degrees C**
  - **19 Inch Rack Mount Chassis**
  - **115 Volt 60 Hz AC Power**
- **Airborne Version**
  - **1 ATR Chassis**
  - **0 to +55 Degrees C**
  - **28 Volt DC Power**