

# DBBC3: VLBI at 32 Gbits per second ... and beyond

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## DBBC Evolution

### DBBC1 (2004 - 2008)

input: 4 IFs 512 MHz wide  
output: 16 Digital Down Converters (DDCs) tunable 1-2-4-8-16 MHz sub-bands  
maximum data-rates: **0.512 / 1.024 Gbps**

### DBBC2010 (2009 - to date)

input: 8 IFs 512 or 1024MHz wide  
output: PFB / Direct Sampling Conversion (DSC = no sub-bands)  
Maximum data-rate: **16.384 / 32.768 Gbps**

### DBBC2 (2007 - to date)

input: 4 IFs 512 or 1024MHz  
output: 16 DDCs with tunable 1-2-4-8-16 MHz sub-bands or Polyphase Filter Bank (PFB) 16 x 32 MHz sub-bands per IF (non-tunable)  
Maximum data-rates: **4.096 / 8.192 Gbps**

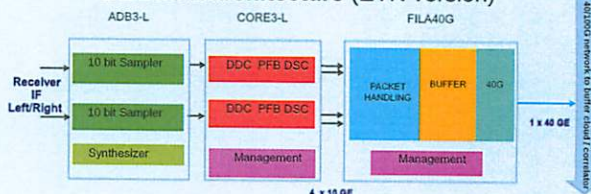
### DBBC3 (under development; supported by Radionet3 JRA PIVA)

DBBC3-L for EVN/Radionet  
DBBC3-H sampling at RX (or IF) up to 14 GHz bandwidth + band filtering in CORE3-H ("digital receiver"); at IF replaces Up-/Down-Converter. Internal data transfer via high-speed serial links

## DBBC3-L specifications

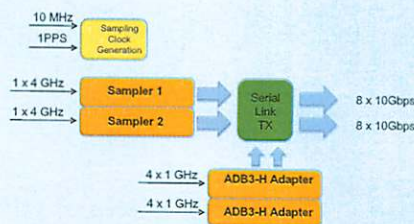
- Number of input IFs: **1 - 4**
- Instantaneous bandwidth at RF: **≥ 4 GHz**
- Sampling representation: **8-10 bit**
- Processing capability: **max 10 TMACS** (multiplication-accumulations per second)
- Output: **VDIF Ethernet packets**
- Data-rate: **≥ 32 Gbps**
- Compatibility with existing DBBC environment

## DBBC3-L architecture (EVN version)



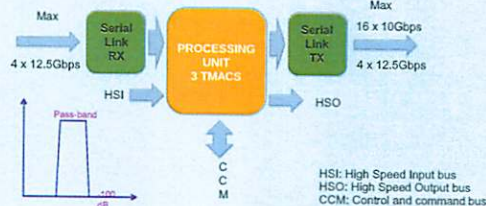
## ADB3-L Sampler specifications and architecture

- Number of IFs: **2**
- Equivalent sample rate ea. IF: **8 GSps**
- Instantaneous bandwidth ea. IF: **4 GHz**
- Sampling representation: **10 bit**
- Real/complex sampling
- Compatibility with existing DBBC environment



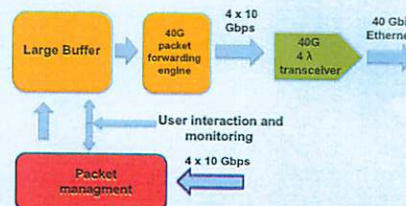
## CORE3-L processing unit

- Number of inputs: **max 16 serial links 10Gbps**
- Number of Outputs: **max 16 serial links 10Gbps**
- Input sampling representation: **8-10 bit**
- Processing capability: **max 3 TMACS** (multiplication-accumulation per second)
- Processing capability: **wide-band DDC, wide-band PFB, DCS**
- Output: **VDIF Ethernet packets, ≥ 32 Gbps**
- Compatibility with existing DBBC environment
- Pass-band filtering with 100 dB out of band suppression possible



## FiLA40G specifications and architecture

- Serial link inputs: **4 x 10Gbps**
- Serial link outputs: **4 x 10Gbps**
- Serial link output: = **1 x 40Gbps**
- **Packet manipulating** capability (filtering, pulsar gating, burst mode, etc.)
- **Packet forwarding** capability (different correlator nodes, different correlator sites, etc)
- **Packet monitoring** capability
- **Large buffer** to accommodate sluggish recorders/network



## ADB3-H specifications (sampler)

- Number of IFs: **4**
- Equivalent Sample Rate each IF: **28.672 GSps**
  - Instantaneous bandwidth each IF: **14.336 GHz**
  - Sampling representation: **8 bit**
- Real Sampling

## Core3-H specifications (processing unit)

- Number of inputs: **max 48 serial links 11.2 Gbps**
- Number of outputs: **max 48 serial links 11.2 Gbps**
- Input sampling representation: **8-10 bit**
- Processing capability: **max 5 TMACS** (multiplication-accumulation per second)
- Processing capability: **wide-band DDC, wide-band PFB, DCS**
- Output: **VDIF Ethernet packets, ≥ 32 Gbps**