Update on the ATCA chassis

Procurement Framework
Current procurement framework for ATCA shelf and - 48V rectifier
(Since 2017)

- nVent/Schroff ATCA shelves
  - 14 ATCA slots w. RTM
  - Vertical or Horizontal cooling
  - DS or FM topology
  - 40G backplane (100G optional)
  - Bussed IPMB
  - 1 Shelf man. included

- 48Vdc rectifier system (Eltek)
  - Up to 18 kW max output pwr (w. expansion unit)
  - 9 kW with N+1 redund. (w. one 1U unit)
  - Based on 5 pwr bricks
  - Bulk power output
  - Ctrl module (SNMP over eth.)

---

**DO-30700**

<table>
<thead>
<tr>
<th>Shelf type</th>
<th>unit price</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, vertical, DS, 40G. Mfg. ref. 11990-190</td>
<td></td>
</tr>
<tr>
<td>1 unit</td>
<td>6,461 €</td>
</tr>
<tr>
<td>3 units</td>
<td>6,120 €</td>
</tr>
<tr>
<td>5 units</td>
<td>5,783 €</td>
</tr>
<tr>
<td>10 units</td>
<td>5,510 €</td>
</tr>
</tbody>
</table>

**DO-31625**

<table>
<thead>
<tr>
<th>Flatpack S-48</th>
<th>unit price</th>
</tr>
</thead>
<tbody>
<tr>
<td>base unit (incl. controller and 5 1.8kW rectifiers)</td>
<td></td>
</tr>
<tr>
<td>1 unit</td>
<td>1,533.18 €</td>
</tr>
<tr>
<td>2 units</td>
<td>1,510.23 €</td>
</tr>
<tr>
<td>5 units</td>
<td>1,497.88 €</td>
</tr>
<tr>
<td>10 units</td>
<td>1,425.79 €</td>
</tr>
</tbody>
</table>

**DO-31625**

<table>
<thead>
<tr>
<th>Flatpack S expansion unit (incl. 6 1.8kW rectifiers)</th>
<th>unit price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 unit</td>
<td>1,577.78 €</td>
</tr>
<tr>
<td>2 units</td>
<td>1,546.42 €</td>
</tr>
<tr>
<td>5 units</td>
<td>1,532.42 €</td>
</tr>
<tr>
<td>10 units</td>
<td>1,521.32 €</td>
</tr>
</tbody>
</table>

---

Open commitment for up to 190 kCHF

Spending limit exceeded since a few months!

https://espace.cern.ch/ph-dep-ESE-BE-ATCAEvaluationProject/Procurement/SitePages/Home.aspx
Procurement framework for ATCA shelf and - 48V rectifier

Information received during the 2019 xTCA interest group

Confirmed during the December 2019 ECB

- Requirements:
  - ATLAS: 100 - 130 units
  - CMS: 100 - 130 units

- No change on the technical requirements

Total estimated cost (250 chassis): 2+ MCHF

Blanket purchase contracts

- CERN procurement asks for MS + IT (+ Finance committee authorization)
- Rectifier system can be based on IT only

- 48Vdc rectifier system (Eltek)
  - Up to 18 kW max output pwr (w. expansion unit)
  - 9 kW with N+1 redund. (one 1U unit)
  - Based on 5 pwr bricks
  - Single bulk power output
  - Ctrl module (SNMP over eth.)

https://espace.cern.ch/ph-dep-ESE-BE-ATCAEvaluationProject/Procurement/SitePages/Home.aspx
## Procurement framework for ATCA shelf and - 48V rectifier

### Status of MS + IT process for the ATCA chassis

<table>
<thead>
<tr>
<th>Task</th>
<th>Date</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>First draft of MS documents</td>
<td>April 2020</td>
<td>✓</td>
</tr>
<tr>
<td>Finalisation of MS documents</td>
<td>End April</td>
<td>✓</td>
</tr>
<tr>
<td>Technical auditing</td>
<td>Mid May</td>
<td>✓</td>
</tr>
<tr>
<td>Dispatch of MS documents</td>
<td>Mid May</td>
<td>✓</td>
</tr>
<tr>
<td>First draft of IT documents</td>
<td>Beginning July</td>
<td></td>
</tr>
<tr>
<td>Finalisation of IT documents</td>
<td>End July</td>
<td></td>
</tr>
<tr>
<td>Specification Committee date</td>
<td>Mid August</td>
<td></td>
</tr>
<tr>
<td>Dispatch of IT documents</td>
<td>Mid August</td>
<td></td>
</tr>
<tr>
<td>Submission deadline for bidders</td>
<td>Mid September</td>
<td></td>
</tr>
<tr>
<td>Date of FC meeting</td>
<td>Dec 2020</td>
<td></td>
</tr>
<tr>
<td><strong>Blanket contract start date</strong></td>
<td>Jan 2021</td>
<td></td>
</tr>
</tbody>
</table>

*June-July review of the tech specifications via the ECB for both, the ATCA shelf and the rectifier system*

*Same steps for the -48V rectifier (IT only)*
Procurement framework for ATCA shelf and - 48V rectifier

Existing procurement framework

- Based on open commitment
- Only for limited quantities!
- Release purchase orders as needed
  - At fixed negotiated prices
  - Individual DAI from users directly
  - Order can be placed whenever needed
  - No equipment tracking upon reception

New procurement framework (after the MS)

- Based on framework contracts (as for Wiener VME crates today)
- Ok for large quantities
- Purchase orders placed in common at the end of every quarter
  - Requests to be submitted via dedicated online DB
  - Fixed negotiated prices
  - TID (money transfer) to a common account prior to common PO (DAI)
  - Equipment tracked in the DB from common PO on
ATCA equipment available at the Epool (Reminder)

AdvancedTCA available at the electronics pool

- nVent/Schroff reference: 11990-707
- 2 slots Shelf
- 2 cooling units and 2 AC-DC included
- 3U rackable solution

Thanks for your attention
ATCA shelf and - 48V rectifier specification summary

Physical shelf baseline:

- 19” rack system compatible card cage
- 14 ATCA blade slots with RTM
- 2 shelf manager slots
- 2 redundant power entry module (PEM) slots (-48Vdc input)
- Removable cable management trays (front and rear)
- Hot-swappable cooling units
- Cooling variants:
  - Variant 1: Shelf compatible with in-rack vertical air flow
  - Variant 2: Shelf compatible with PICMG standard front to back air flow
- Shelf maximum height: 14U with variant 1; 16U with variant 2

Backplane requirements:

- Topology 1: Dual star
- Topology 2: Full mesh
- Fabric lane bit rate: 40Gbase-KR4
- Option: 100Gbase-KR4 (for phase 2)

Module location and accessibility:

- Front access:
  - 14 ATCA blades
  - 2 shelf managers
  - Air filter
- Rear access:
  - 14 RTM
  - 2 PEM
ATCA shelf and - 48V rectifier specification summary

Other requirements:

**Electrical**
- Shelf power distribution for minimum: 400W (front blade) + 50W (RTM) to each slot

**Shelf manager**
- Based on Pigeon Point Systems ShMM700 or newer
- Support the following protocols and interfaces: RMCP, SNMP, SSH
- Support for HPM.1 and HPM.3

**Standards, Rules and Regulations:**

- PICMG standard:
  - AdvancedTCA base specification PICMG-3.0 Revision-3.0
  - AdvancedTCA base extensions specification PICMG-3.7 Revision-1.0 section 5 for cooling aspects
- Intel specification: IPMI v2.0
- EMC compliance: CISPR22 and CISPR24 Class A and IEC/EN 61000-6-3
- Safety standard: IEC/EN 60950-1 and CERN IS-23 and IS-41
- Ethernet standard: IEEE standard 802.3
- ROHS compliance: WEEE Directive 2012/19/EU
- CE compliance and related regulations
ATCA Schroff 100G backplane – VNA measurements

Measurements performed on the dual star 100G backplane for Schroff standard airflow shelves

- Measurements between adjacent slots
- Slot 1 to Slot 2
- Reference lines:
  - IEEE 802.3 100Gbase-KR4
ATCA Schroff 100G backplane – VNA measurements

Measurements performed on the dual star 100G backplane for Schroff standard airflow shelves

- Measurements between distant slots
- Slot 1 to Slot 14

- Reference lines:
  IEEE 802.3 100Gbase-KR4
Backplane is compliant with IEEE 802.3 100Gbase-KR4

Few very minor reflection peaks on adjacent slots might be induced by the test setup (adapter cards)

In comparison the Comtel 100G backplane has slightly worst results

*Measurements tools:*
- Keysight N5225A PNA 50 GHz
- Comtel ATCA adapter cards with coaxial cables