

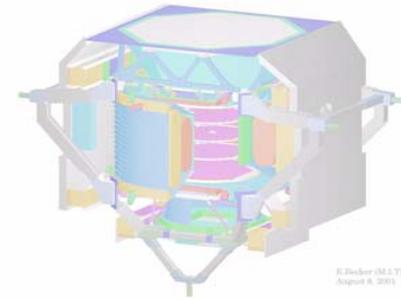
# AMS-02 Digital Data Recorder System 2 (DDRS2)

Peter Dennett  
PADSOFT, Inc

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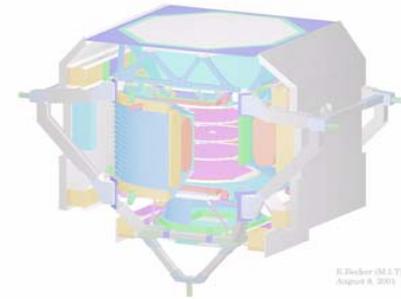
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# Jobs Of DDRS2



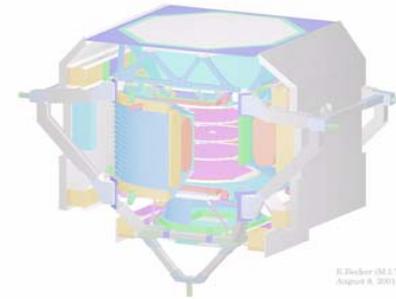
- ❖ **Data Recording** - Preserve all AMS-02 data from checkout on disk.
- ❖ **Crew Operations** - Man machine interface for monitoring and control of AMS-02 by the STS crew.
- ❖ **Data Downlink** - Transfer requested data sets to the ground (off nominal).
- ❖ **GSE During Launch Ops** - A version of the same system used in Rm 10 of pad during launch ops to support monitoring until T-9 minutes.

# DDRS2 Design



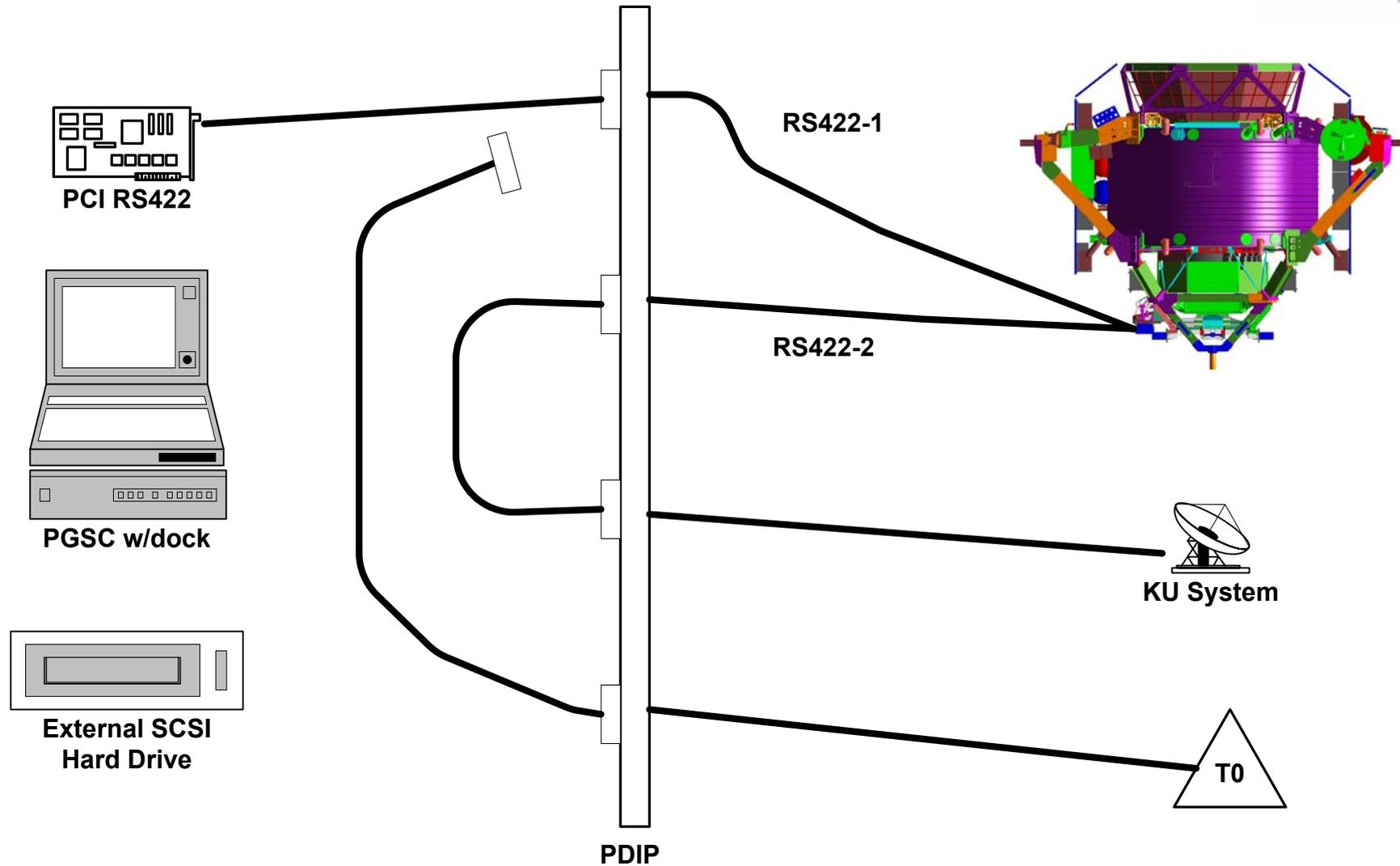
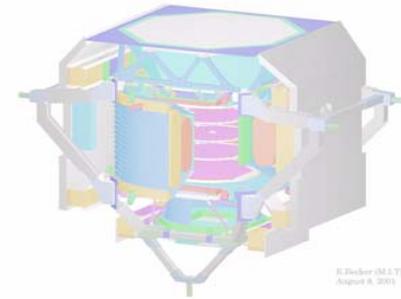
- ❖ The baseline DDRS2 system is based on the standard STS PGSC.
- ❖ Utilizes a commercial synchronous RS422 card to provide the interface to either AMS-02 or KU (crew selectable).
- ❖ Requires ThinkPad docking station to support PCI card.
- ❖ Original design based on 760xd requires external SCSI hard drive (as used on STS-91).
- ❖ Study in progress of impact of possible PGSC upgrade (assuming PGSC will follow the PCS lead and become based on A31p ThinkPad).
  - A31p Docking station not modified for power or qualified.
  - Would not require external hard drive (would require one disk swap).
  - PCMCIA serial card might be possible.
- ❖ Fall back - use 760xd with external SCSI hard drive.

# Operations Profile

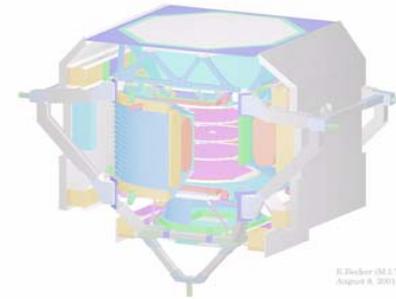


- ❖ **Deployed Prior to AMS-02 Power Up** - Must record AMS-02 data on its power up.
- ❖ **Crew Operations** - Provides a means for the crew to monitor and participate in the AMS-02 checkout.
- ❖ **Disk Change Out** - Require 40 hours of recording media. This may require the crew change out a hard drive (pending final decision on hard drive media).
- ❖ **Stowed** - After AMS-02 hand off to station.

# AFD Sketch - Flight



# Communication Specifications



## ❖ Electrical Characteristics of Signals

- Conforms to TIA/EIA-422-B
- Terminated by 78 ohm resistors

## ❖ Signals Required

- For AMS-02 Data and clock.
- For KU Data only (PCM)
- Data bits are valid at the falling edge of the clock.

## ❖ Data Format

- Byte oriented synchronous mode, eight bits per character, non-return to zero (NRZ-L) data encoding. Data bytes shall be transmitted the most significant bit first (MSB).
- The bit ordering is the opposite of normal commercial standards, which use LSB.

## ❖ Data Frames

- Each frame will consist of 4084 bytes.
- Frames are synchronized with a four byte pattern of: 1111 1010 1111 0011 0010 0000 xxxx xxxx (HEX FAF320xx) where XX is a rolling frame counter.

## ❖ KU Band Modulation Requirements

- To support Pulse Code Modulation (PCM) for clock recovery on the ground the data stream is "pseudo-randomized" . There can be no more than 64 successive bits without a bit transition and at least 128 bit transitions must occur within any 512 bits of data.
- To assure continuous clock recovery the data stream is designed to ensure continuous transmission of data using fill frames meeting these modulation requirements.

## ❖ Clock Rate

- The data is transmitted at a rate of 1.9608 mbits/second. This rate shall not deviate by from its nominal value by more than +/- 1.0 percent.