

Towards a new specification of the physical layer of SpaceWire

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STAR-Dundee Low-Mass SpaceWire

- ESA contract to develop lower mass SpaceWire cable assemblies
- Led by Axon
- STAR providing support
 - Writing inputs to updated SpaceWire specification



STAR-Dundee Physical Layer Specification

- Work in progress
- Cables, Connectors, Cable Assemblies
- Signals
- Define characteristics
- Define specific types
 - E.g. Cable Assemblies



STAR-Dundee Connectors

- a. The connectors for the SpaceWire cable assembly shall be either Type A, Type B or Type C.
- b. The Type A SpaceWire connector shall be a microminiature Dtype connector with nine crimp or solder contacts, as defined in ESCC 3401/029 and ESCC3401/071.
- c. The Type B SpaceWire connector shall be a fifteen contact nano D-Type with crimp connector as defined in ESCC 3401-119.
- d. The Type C SpaceWire connector shall be any type connector with the following characteristics:
 1. Contacts pairs with differential impedance of $100 \pm 6 \Omega$,
 2. Compatible with ESCC 3902-003 cables,
 3. Compatible with the space environment .



STAR-Dundee Cable Assemblies

1. Cable assemblies for type A connectors

- a. Three types of standard cable assembly shall be permitted using type A connectors: type A1, A2 and AL.

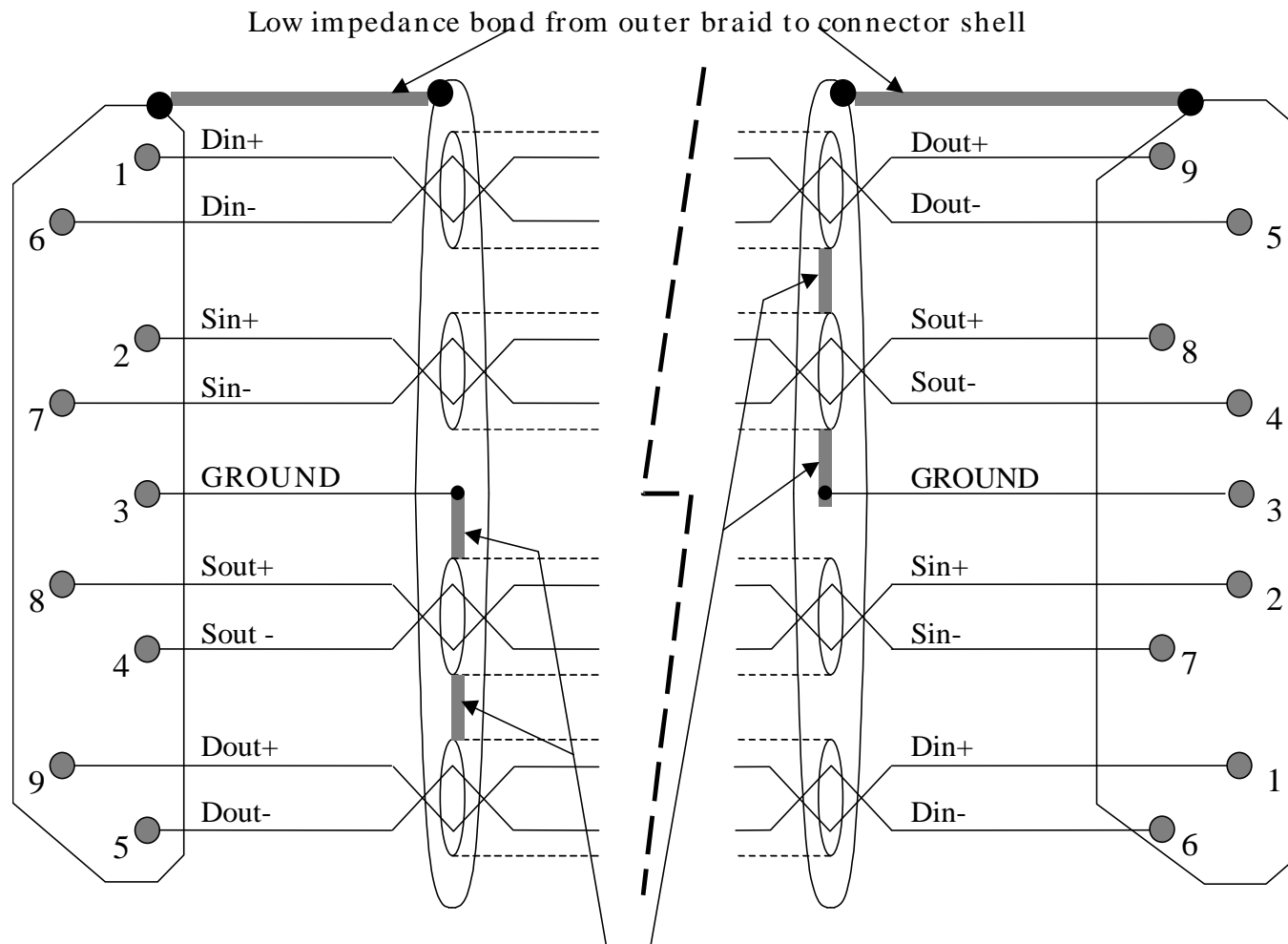
1. Cable assembly type A1

- a. Cable assembly A1 shall use type A connectors and cable with an outer shield as defined in clause 5.1.1.1.
- b. The connector contacts for cable assembly type A1 shall be terminated as shown in Figure 5-2 and Table 5-3.

Note The cable signal wires cross over to achieve the necessary transmit to receive interconnection, e.g. Dout+ is connected to Din+.



STAR-Dundee Cable Assembly Type AL

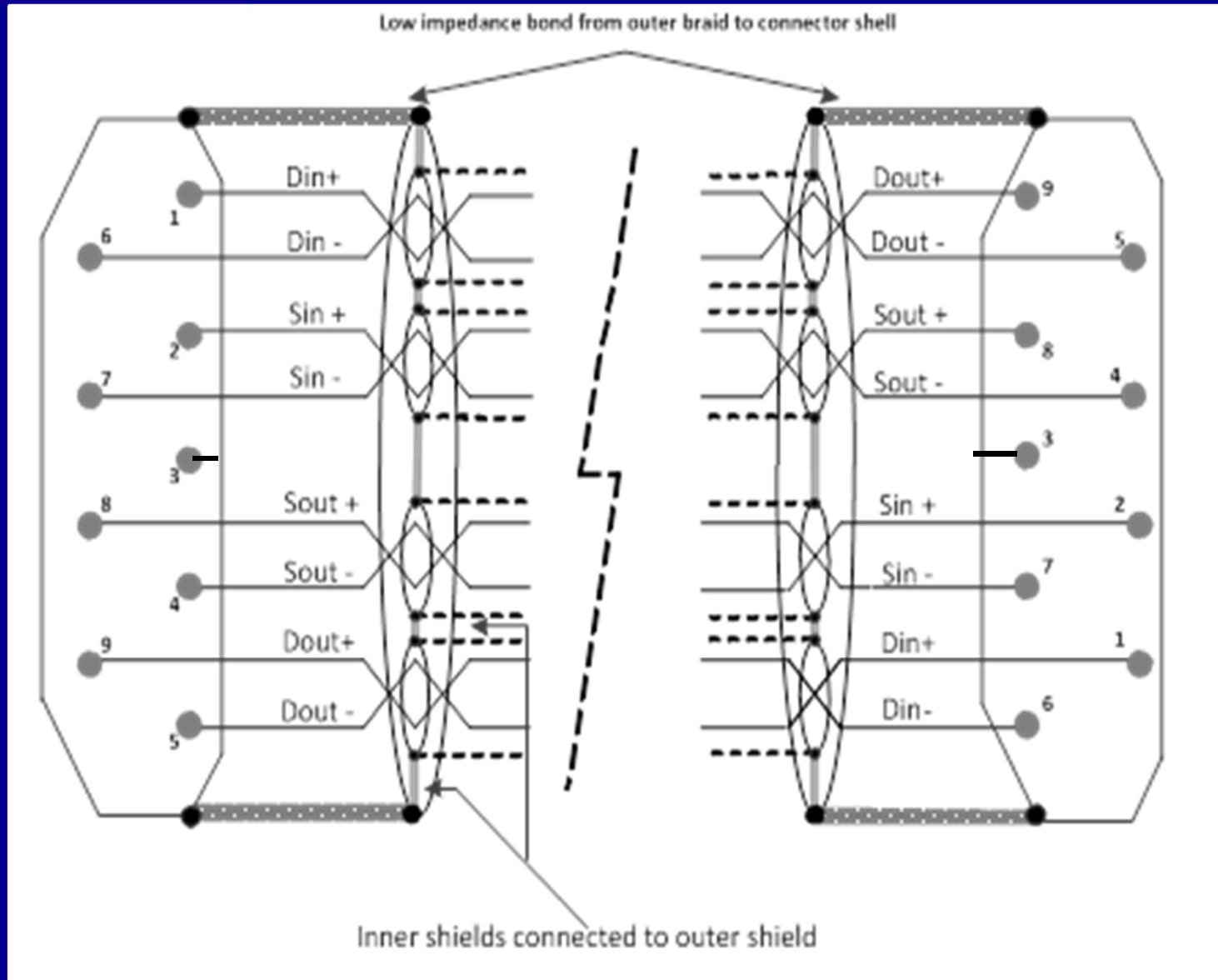


Inner shields are isolated from one another.

Inner shields around Sout and Dout pairs are connected together and to pin 3 of connector.

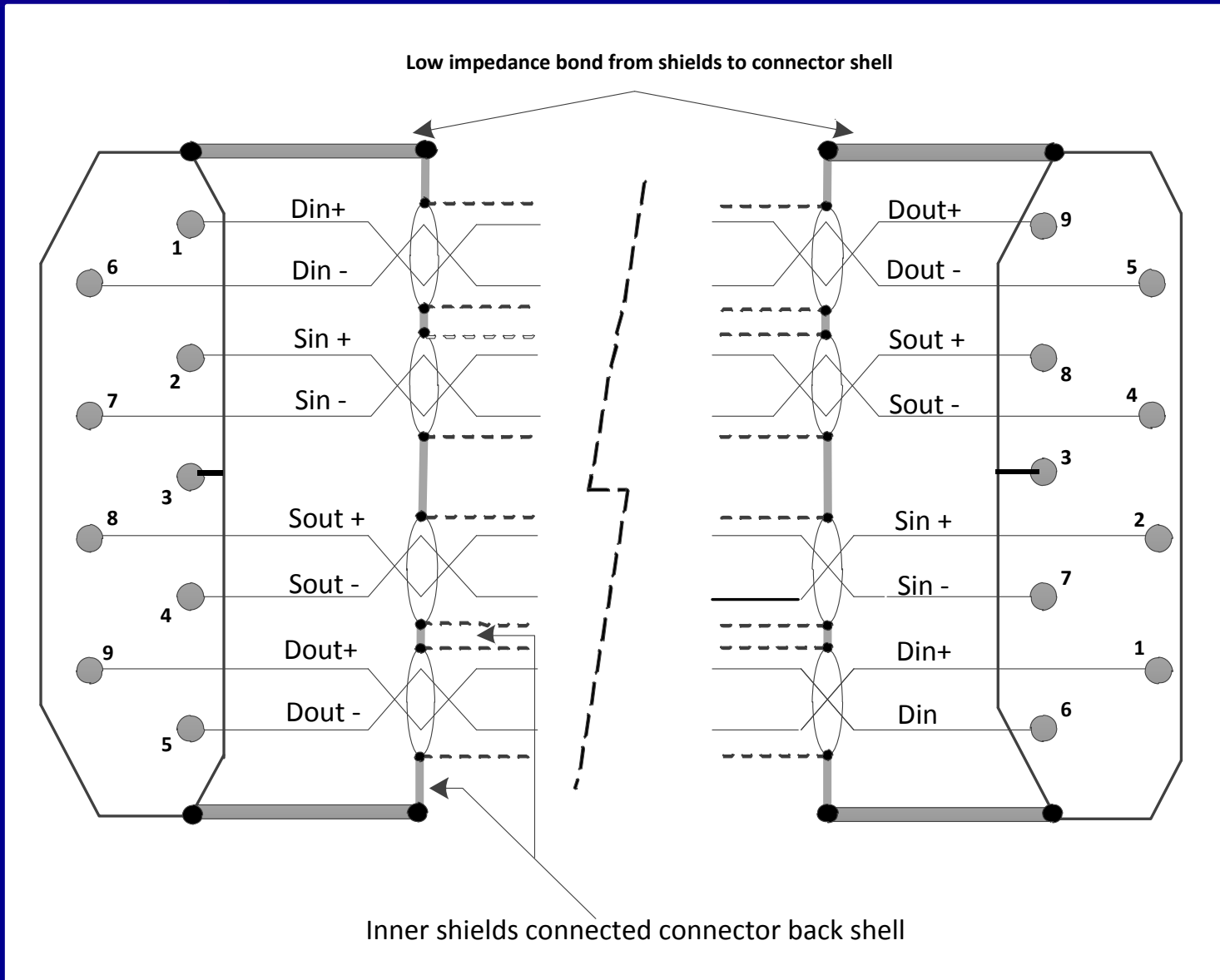


STAR-Dundee Cable Assembly Type A1





STAR-Dundee Cable Assembly Type A2



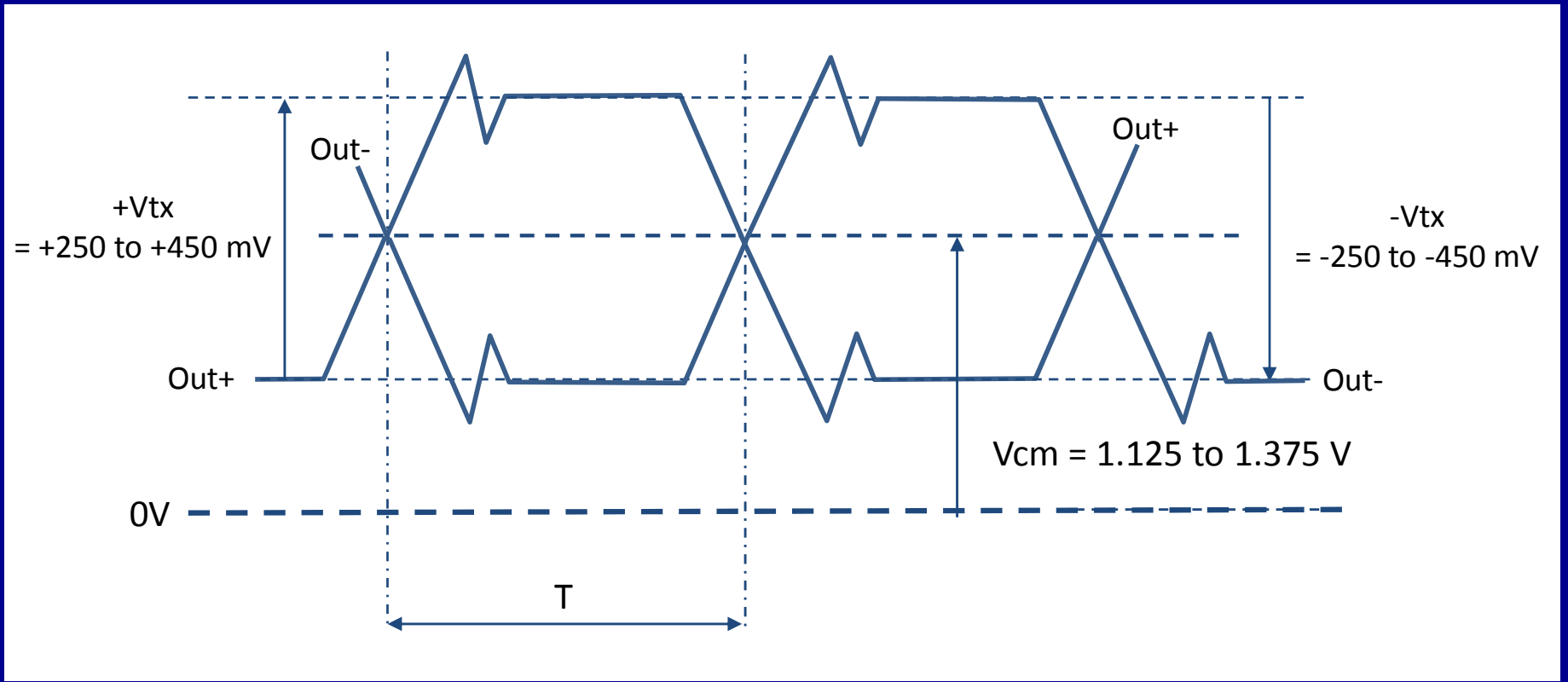


STAR-Dundee Proposed approach to specification

- Cables
 - Parameters per m
- Connectors
 - Parameters
- Cable Assemblies
 - Combination of
 - Connector parameters
 - Cable parameters per m
- SpaceWire Link
 - Combination of
 - Everything between one port and the port at the far end of the link
- Parameters rather than assigned budget

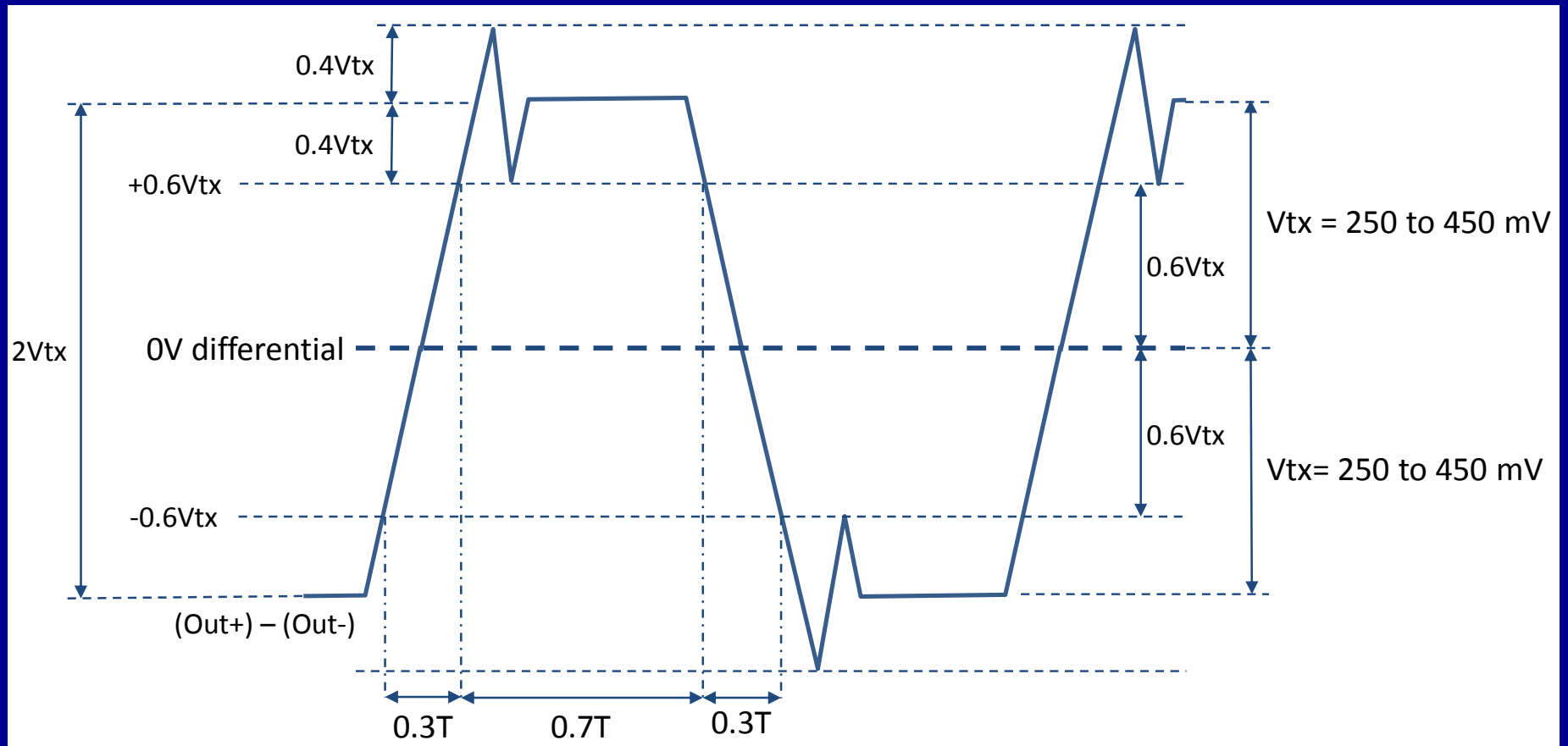


STAR-Dundee SpW Transmitter Outputs



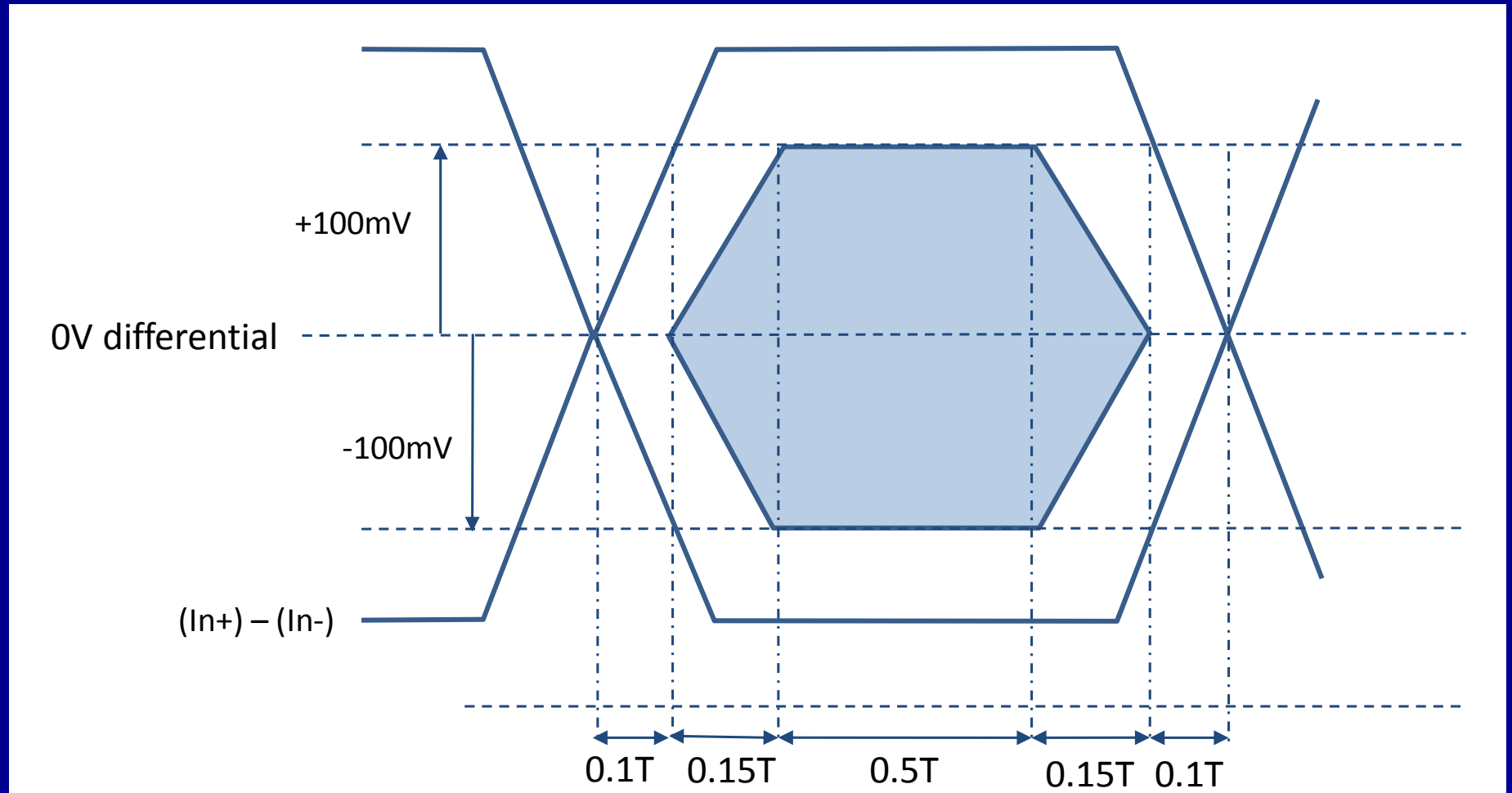


STAR-Dundee Transmitter Outputs Differential



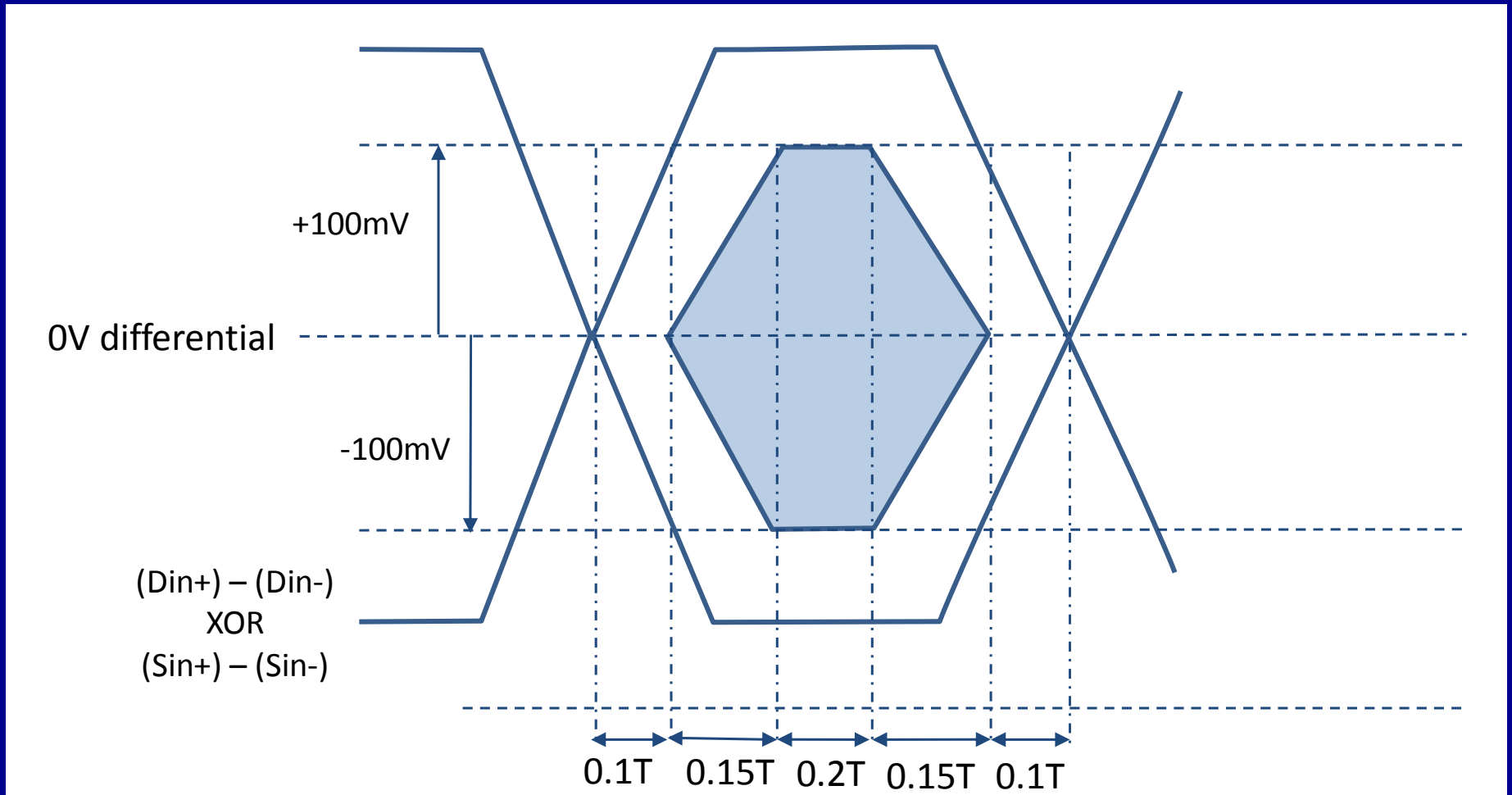


STAR-Dundee Receive Signal Eye Pattern Mask





STAR-Dundee "Receive Clock" Eye Pattern Mask



Work in Progress...