E U R O P E A N S O U T H E R N O B S E R V A T O R Y

Organisation Européenne pour des Recherches Astronomiques dans l'Hemisphère Austral
Europäische Organisation für astronomische Forschung in der südlichen Hemisphäre

INFRARED INSTRUMENTATION

VERY LARGE TELESCOPE

Infrared Array Control Electronics

(IRACE)

Interface Description

Doc. No.: VLT-TRE-ESO-14100-1561

ISSUE: 1.1

DATE: SEPTEMBER 14, 1999

Prepared: **M. Meyer**

DATE **SIGNATURE**

Approved: **M. Meyer**

DATE **SIGNATURE**

Released: **A. Moorwood**

DATE **SIGNATURE**

CHANGE RECORD

Issue/Revision	Date	Part Affected	Reason/Remarks
Issue 1.0	**21 January, 1999**	**All**	**First issue**
Issue 1.1	**September 14, 1999**	**Connectors**	**Update**

Table of Contents

1 Introduction

2 Overview

The IRACE system is designed to read out IR arrays detectors. The system design is modular and can be scaled to the given application, what means that all modules can be stacked if this is required by the application.
Examples: more clocks required than available on one clock driver module → stack CLDC modules
data transmission bandwidth > 1Gbit/s between DFE and BE → stack GIGA modules...)
Fig.1 shows the IRACE system interfaces to the instrument side and to the number cruncher (SUN ULTRA SPARK as standard solution - connections for other NC's is possible).

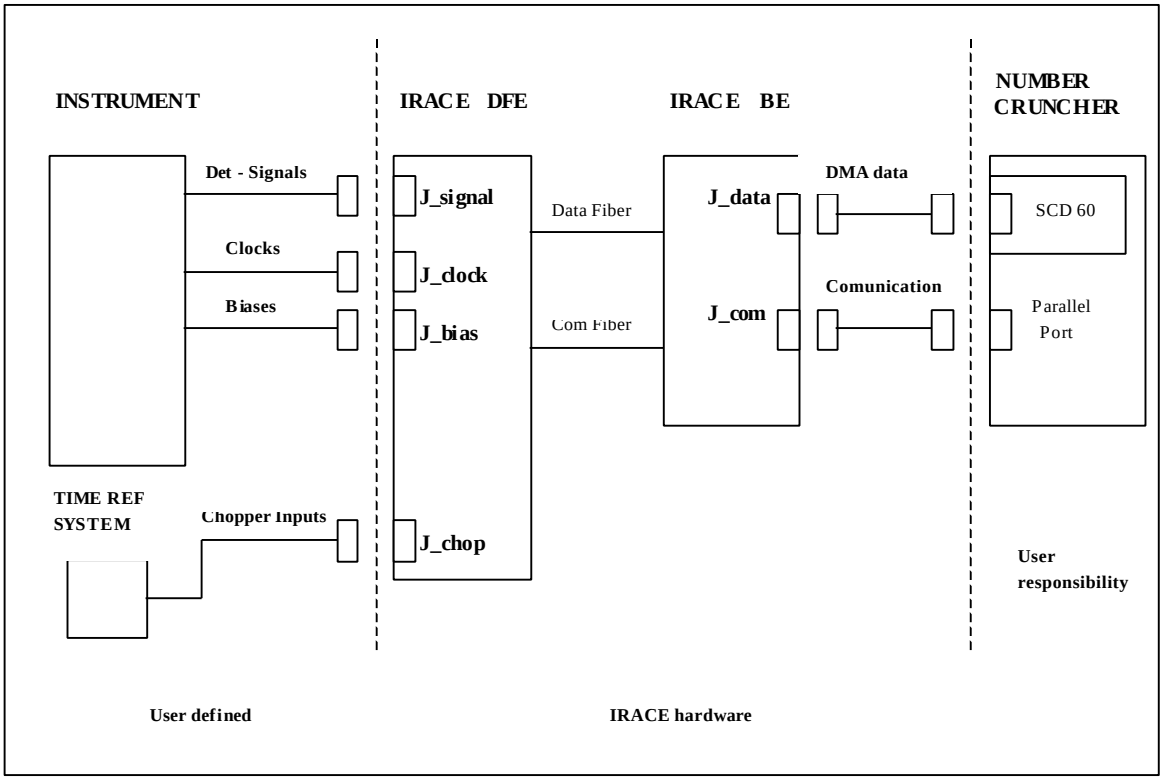

Fig.1 IRACE System Interfaces

On the instrument side IRACE interfaces are the connectors of the modules in the DFE crate.
There are:

- Detector video signal inputs – J-signal
- Detector clock outputs – J-clock
- Detector bias outputs – J-bias
- Chopper control input – J-chop

(The cables from the connectors to the instrument are IRACE users responsibility)

On the number cruncher side IRACE interfaces are the connectors of the modules in the BE crate. There are

- Detector video data – J-data
- Detector communication – J-com

(The cables from the connectors to the NC are delivered together with IRACE, if the standard NC solution SUN ULTRA Spark 2 SBUS Version is used)

2.1 Instrument Side

3 Detector Video Signals (J-Signal)

The detector video signals enter IRACE on the front-panel(s) of the AQ modules or their interface panels. The input signals for the AQ_4 modules are on VME-P2 but a interface card (just a galvanic connection) brings the signals also to a front-panel connector of similar type as for AQ-16 . The connectors and the pin-out for a 16 channel system (a 32 channel system input consists of two 16 channel system inputs) and a four channel system are shown below :

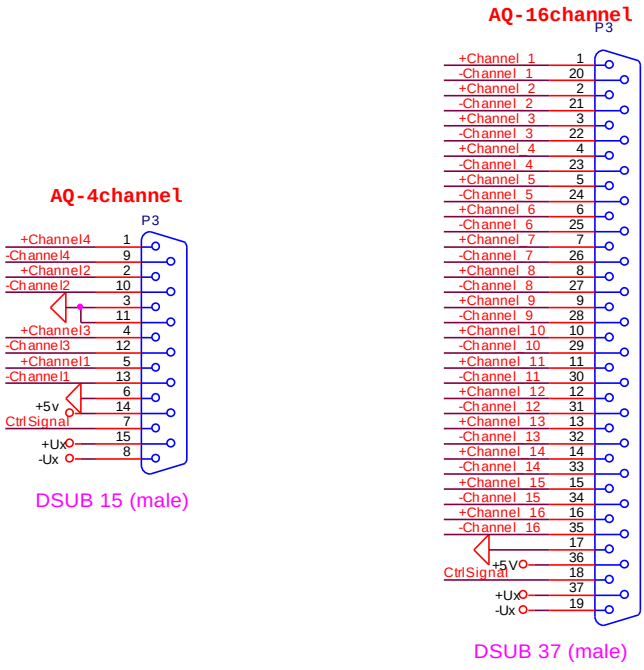

Fig 2 Detector Signal Input Connector 16 Channels and 4 Channels

The data acquisition modules signal input characteristics are

Board Type	Input type	Differential Input Range [Volt]	Max Input Voltage [Volt]	Bandwidth [MHz]
AQ-4 channel	True differential input/dc coupled	5	+/- 5.0	0 till 2
AQ16 channel	True differential input/dc coupled	5	+/- 2.5	0 till 0.6

4 Detector Clocks and Biases (J-Clock and J-Bias)

Detector clocks and biases leave IRACE on the front-panels of the clock and bias driver module CLDC. There is a connector for the clocks and a connector for the bias voltages on each CLDC. There are 16 clocks (cl...) and 16 biases (dc...) on each CLDC. Voltage levels are between plus and minus 10V, continuous current per channel is 20mA and peak current with 10% duty cycle and maximum duration of 100µs 80mA. Clock rise/fall-times are 50ns. DC 16 is a relay switched output for higher voltages/currents and configured at user demand.

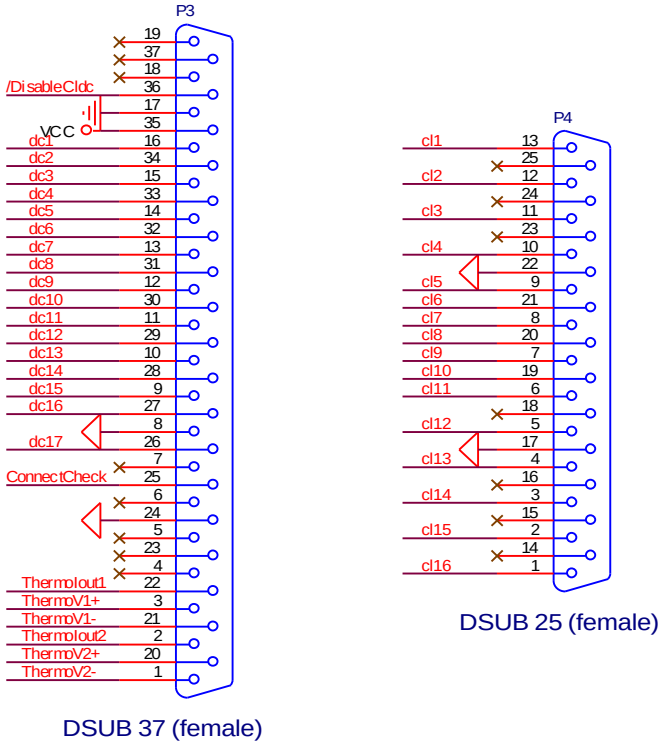

Fig 3 Detector Bias Connector J Bias and Detector Clock Connector J Clock

5 Chopper Control Input

The chopper control inputs are on the front panel of sequencer. Two inputs are provided one for the positive chopper phase and the other for the negative. The lines are named Trigger 1 Cathode, Trigger 1 Anode, Trigger 2 Cathode and Trigger 2 Anode. Four opto de-coupled lines for TTL level drive signals with minimum pulse width of 2µs (The inputs are the diodes of an opto coupler with a 1KΩ resistor in series).

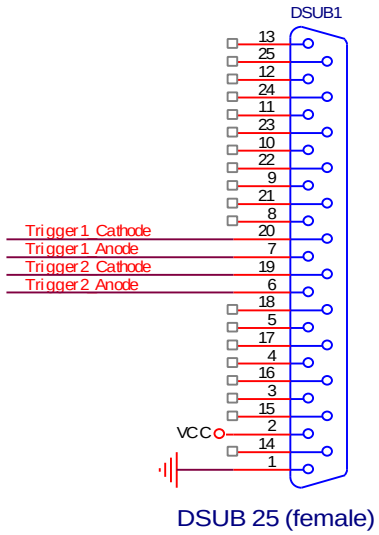

Fig 4 Sequencer Front Panel Auxiliary Connector

5.1 NC Side

6 Data Channel (J-Data)

Data from the DMA interface DMA-IF are 16Bit differential LVTTL signals with standard handshake protocol as required by the SCD 60 SBUS DMA interface (a identical pin-out PCI bus interface is also available) from EDT.
The data channel interface cable is part of IRACE.
Connector layout and signal descriptions are in manual SCD 60 by EDT.

7 Communication Channel (J-Com)

The communication interface also has a bi-directional handshake protocol, it is a standard printer port I/O with printer port pin-out and the cable is a high quality printer cable.
The communication channel interface cable is part of IRACE.
Connector layout and signal description in manual SUN Ultra2.