

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization

| Change Record | | |
|---------------|-----|--|
| Date | by | Change |
| 03-May-00 | MJG | Limited distribution as discussion document prior to phone conference on 05-May |
| 09-May-00 | MJG | First general release: +3v3 and +5V on J3P3, slot compatible power and ground |
| 10-May-00 | MJG | Card sizes, currents, and numbers added at end. Signal classes added to signal summary on Page 3 |
| 16-May-00 | RCJ | Added sign off page, 1 bit bus, deleted P0 reference and changed ROD DC power |
| 19-May-00 | RCJ | Added correction from J. Lane. Note TTC and ROD busy active Lo. P5-6 TTC bus terminated on slot 21. P3 row Z changed 3v3 to +5V pins 19-24-29. Updated TIM power for +-12V |
| 22-May-00 | RCJ | Added Crate power to power utilization table, Suggestion of J. Hill |
| 22-May-00 | RCJ | 1 Bussed added table 9 A21 ROD and BOC slots 6-21, correction on -12V power |
| 23-Jun-00 | RCJ | Changed the location of the TIM in the crate to slot 13. The following changes were made. Added TTC 0-7 B bus and changed name of TTC 0-7 to TTC 0-7 A on the TIM. Changed clock pin number on TIM. Changed name of signal on C21 TIM to bussed and changed ROD busy slot 14 to slot 5 on TIM. |
| 21-Jul-00 | RLW | Clock pinout change on the TIM slot 13 |
| 22-Jul-00 | MJG | US/A4 sizing. Header change. Corrections: HIGHLIGHTED YELLOW listed on temporary final page. Various inconsistencies rectified: also HIGHLIGHTED . TTC bus names format changed slightly: now typically TTC5-B |
| 24-Jul-00 | MJG | SSTBN corrected (was STBN) on pp 4, 8 & 9 |

Sign off

| Name | Subsystem | Date |
|------------------|-----------|------|
| Roy Wastie | Backplane | |
| John Lane | TIM | |
| Maurice Goodrick | BOC | |
| Richard Jared | ROD | |
| John Hill | SCT RCC | |
| Tom Meyer | Pixel RCC | |

Introduction

The back planes provide the interconnection between the ROD Crate Controller (RCC), Timing Interface Module (TIM), Read Out Driver (ROD), the Back Of the Crate (BOC) (optical interface card) and the power supplies. This interface specification defines the assignment of signal and power to the backplane pins. The card utilization of the crate is also defined because this effects the clock and busy signals.

More information on the off-detector electronics can be found at:

<http://www-wisconsin.cern.ch/~atlas/off-detector/off-detector.html>

General notes:

1. This document is based on an earlier, much modified document, the **final** version of which can be found at <http://www.hep.phy.cam.ac.uk/~goodrick/AtBOC/OldBackplane.pdf>
2. All signals are 3V levels, asserted high, unless indicated otherwise. The S-Link signals use a final “#” to indicate active low. Elsewhere, a final “N” is used for the same purpose. In addition, TTC[7:0] (**both -A and -B**) and ROD-Busy are active LOW.
3. S-Link UDW[1:0] lines hard wired on BOC. S-Link LRL[3:0] lines not routed.
4. To limit congestion, a maximum of 4 routed signals have been allocated per horizontal row on slots **5-12 and 14-21** of P3J3.

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5. The use of series resistors on the outputs of drivers to limit noise generation is recommended for at least some S-Link signals (L-UCLK, L-UWEN#, L-UCTRL#), and for the XC[47:0] (on the ROD) and RD[95:0] (on BOC).
6. TIM, ROD and BOC do not support live insertion.
7. Power pins are used extensively to screen fast signals and to provide good AC return paths; so it is important that they be well by-passed to ground on both ROD and BOC, and recommended for TIM.
8. Tables 8-12 are an alternative presentation of the data given in Tables 5-7 to allow pin usage at different slots to be compared.

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization – Tables and Conventions

| Table | Description |
|-------|--|
| 1 | P1 Connector as used by TIM, Crate Processor and RODs @ Slots 1:21 |
| 2 | P2/J2 Connector @ Slots 1:4 and 13 ... used by Crate Processor and TIM |
| 3 | P2/J2 Connector as used by ROD @ Slots 5:12 and 14:21 |
| 4 | P2/J2 Connector as used by BOC @ Slots 5:12 and 14:21 |
| 5 | P3/J3 Connector as used by TIM @ Slot 13 |
| 6 | P3/J3 Connector as used by RODs plugged into Slots 5:12 and 14:21 |
| 7 | P3/J3 as used by BOCs plugged into transition (Back-Of-Crate) Slots 5:12 and 14:21 |
| 8 | P3/J3 Connectors: use of Row Z |
| 9 | P3/J3 Connectors: use of Row A |
| 10 | P3/J3 Connectors: use of Row B |
| 11 | P3/J3 Connectors: use of Row C |
| 12 | P3/J3 Connectors: use of Row D |

| Key to Colours used for Signal Names in Tables 3-12 | |
|---|--------------------------------|
| NC | No Connection |
| Thru Pin | Through Connection: not bussed |
| RED | Signal Output |
| GREEN | Signal Input |
| BROWN | Bi-Directional |
| BLACK | Ground/Power |
| [n] | See Note [n] |

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SCT Off Detector Crate Backplane and Crate Card Utilization – Signal Summary

| Summary of Signals | | | | | |
|--------------------|-------------------|-------------|---|----------------------|------------------|
| Signal Group/ Name | Con | Description | Direction | Class | |
| Control | XC[47:0] | P2 | Transmit Data | ROD > BOC | LV,Hi,r |
| RX Data | RD[95:0] | P3 | Receive Data | ROD < BOC | LV,Hi,r |
| SetUp Bus | SD[7:0] | P2 | SetUpBus Data | ROD <> BOC | LV,Hi,Bi |
| | SA[9:0] | P2 | SetUpBus Address | ROD > BOC | LV,Hi |
| | SWRN | P2 | SetUpBus Write Line (Lo) | ROD > BOC | LV,Lo |
| | SSTBN | P2 | SetUpBus Strobe (Lo) | ROD > BOC | LV,Lo |
| | SBUSY | P2 | SetUpBus Busy status line | ROD < BOC | LV,Hi |
| S-Link | L-UD[31:0] | P2 | Link User Data | ROD > S-Link | LV,Hi,r |
| | L-URESET# | P3 | Link User Reset | ROD > S-Link | LV,Lo,r |
| | L-UWEN# | P3 | Link Write Enable | ROD > S-Link | LV,Lo,r |
| | L-UTEST# | P3 | Link Test mode control line | ROD > S-Link | LV,Lo,r |
| | L-UCLK | P3 | Link User Clock | ROD > S-Link | LV,Hi,r |
| | L-UCTRL# | P3 | Link User Control | ROD > S-Link | LV,Lo,r |
| | L-LDOWN# | P3 | Link Failure line (Lo) | ROD < S-Link | LV,Lo,r |
| | L-LFF# | P3 | Link Full Flag (Lo) | ROD < S-Link | LV,Lo,r |
| Clock Distrib | CLK40+[21:5] | P3 | Balanced PECL Clock to BOC slots (+ copy to TIM) | TIM > BOCs | D5vP,Hi |
| | CLK40-[21:5] | P3 | | TIM > BOCs | D5vP,Lo |
| | RCLK40+ | P3 | Buffered copy of CLK40 for ROD | BOC > ROD | D5vP,Hi |
| | RCLK40- | P3 | | BOC > ROD | D5vP,Lo |
| TIM Signals | TTC[7:0]-A | P3 | Timing, Trigger and Control Bus -Slots 14:21 | TIM > RODs | LV,Lo,T21 |
| | TTC[7:0]-B | P3 | Timing, Trigger and Control Bus -Slots 5:12 | TIM > RODs | LV,Lo,T5 |
| | ROD-Busy | P3 | ROD asking for trigger throttle | RODs > TIM | LV,Lo,l |
| | TIM-Busy Out | P3 | OR of ROD-Busy's | Goes nowhere | LV,Hi |
| Misc | ROD-Sense | P3 | Module Mis-Location Interlock | Special | 2 |
| | Laser-Ilock | P3 | Laser-Access Gate Open on >=1 BOC | BOC > BPlane | 3 |

| Class Descriptions | |
|--------------------|---|
| Class | Description |
| LV | Driver meets or exceeds LV-TTL spec., Receiver can manage with LV-TTL inputs |
| D5vP | Differential PECL: i.e. ECL running between Ground and +5V. Note 220R or 270R resistors to Ground at Driver end: needs 100R between lines at receiver. |
| Hi | Active HIGH signal sense |
| Lo | Active LOW signal sense |
| Bi | Bi-Directional |
| T5 | Terminated on Backplane at slot 5 |
| T21 | Terminated on Backplane at slot 21 |
| r | Consideration should be given to having a series resistor (of c. 30 Ω) at driver end to limit slew rate, ground bounce and EMI. Could be replaced by zero-ohm links. |
| 1 | Resistive pull-up on TIM, so empty ROD slot is not seen as BUSY. |
| 2 | Pin sensed by TIM and BOC: if HIGH, they disable their outputs. Pulled High by TIM and BOC, grounded by ROD and on backplane at slot 5. |
| 3 | Electrical specification for this bussed line is still under consideration. |

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization – Power and Ground Summary

| Summary of Power and Ground Pins | | | | |
|----------------------------------|-----------|--------|-----------------------------------|-----------------------|
| | Connector | # Pins | Description | Notes |
| Std Gnd | P1 | 26 | Backplane Plane | Not accessible to BOC |
| Std +3v3 | P1 | 10 | Backplane Plane | Not accessible to BOC |
| Std +5V | P1 | 3 | Backplane Plane | Not accessible to BOC |
| Std VPC | P1 | 2 | Connected to +5V | Not accessible to BOC |
| Std +5VS | P1 | 1 | +5v Stand-By conn. to +5V | Not accessible to BOC |
| Std +12V | P1 | 1 | | Not accessible to BOC |
| Std -12V | P1 | 1 | | Not accessible to BOC |
| Std +V1 | P1 | 1 | Ret. For –V1 | Not accessible to BOC |
| Std +V2 | P1 | 1 | Ret. For –V2 | Not accessible to BOC |
| Std -V1 | P1 | 1 | Nom. 48V | Not accessible to BOC |
| Std -V2 | P1 | 1 | Nom. 48V | Not accessible to BOC |
| Std Gnd | P2 | 20 | Backplane Plane | |
| Std +5V | P2 | 3 | Backplane Plane | |
| Std VPC | P2 | 1 | Connected to +5V | |
| Std Gnd (ret) | P2 | 1 | Return for VPC: conn to Gnd plane | |
| Gnd | P2 | 7 | User-Defined (Thru Pins) | |
| Gnd | P3 | 22 | Backplane Plane | |
| +3v3 | P3 | 10 | Backplane Plane | BOC and ROD use |
| +5V | P3 | 8 | Backplane Plane | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
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Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P1

Table 1: P1 Connector as used by TIM, Crate Processor and RODs @ Slots 1:21

| Pin | Row Z | Row A | Row B | Row C | Row D |
|-----|----------------|-----------------|-----------------|-----------------|-----------------|
| 1 | Std Sig | Std Sig | Std Sig | Std Sig | Std VPC |
| 2 | Std Gnd | Std Sig | Std Sig | Std Sig | Std Gnd |
| 3 | Std Sig | Std Sig | Std Sig | Std Sig | Std +V1 |
| 4 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +V2 |
| 5 | Std Sig | Std Sig | Std Sig | Std Sig | Std Sig |
| 6 | Std Gnd | Std Sig | Std Sig | Std Sig | Std -V1 |
| 7 | Std Sig | Std Sig | Std Sig | Std Sig | Std -V2 |
| 8 | Std Gnd | Std Sig | Std Sig | Std Sig | Std Sig |
| 9 | Std Sig | Std Gnd | Std Sig | Std Gnd | Std Sig |
| 10 | Std Gnd | Std Sig | Std Sig | Std Sig | Std GA0 |
| 11 | Std Sig | Std Gnd | Std Sig | Std Sig | Std GA1 |
| 12 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 13 | Std Sig | Std Sig | Std Sig | Std Sig | Std GA2 |
| 14 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 15 | Std Sig | Std Gnd | Std Sig | Std Sig | Std GA3 |
| 16 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 17 | Std Sig | Std Gnd | Std Sig | Std Sig | Std GA4 |
| 18 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 19 | Std Sig | Std Gnd | Std Sig | Std Sig | Std Sig |
| 20 | Std Gnd | Std Sig | Std Gnd | Std Sig | Std +3v3 |
| 21 | Std Sig | Std Sig | Std Sig | Std Sig | Std Sig |
| 22 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 23 | Std Sig | Std Sig | Std Gnd | Std Sig | Std Sig |
| 24 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 25 | Std Sig | Std Sig | Std Sig | Std Sig | Std Sig |
| 26 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 27 | Std Sig | Std Sig | Std Sig | Std Sig | Std Sig |
| 28 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 29 | Std Sig | Std Sig | Std Sig | Std Sig | Std Sig |
| 30 | Std Gnd | Std Sig | Std Sig | Std Sig | Std +3v3 |
| 31 | Std Sig | Std -12V | Std +5VS | Std +12V | Std Gnd |
| 32 | Std Gnd | Std +5V | Std +5V | Std +5V | Std VPC |

Note that there are no connections to the Back-Of-Crate for P1

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SCT Off Detector Crate Backplane and Crate Card Utilization of P2/J2

Table 2: P2/J2 Connector @ Slots 1-4 and 13: used by Crate Processor and TIM

| Pin | Row Z | Row A | Row B | Row C | Row D |
|-----|---------|-------|---------|-------|-------------------|
| 1 | | | Std +5V | | Gnd |
| 2 | Std Gnd | | Std Gnd | | |
| 3 | | | Std Sig | | |
| 4 | Std Gnd | | Std Sig | | |
| 5 | | | Std Sig | | |
| 6 | Std Gnd | | Std Sig | | |
| 7 | | | Std Sig | | |
| 8 | Std Gnd | | Std Sig | | |
| 9 | | | Std Sig | Gnd | |
| 10 | Std Gnd | | Std Sig | | Gnd |
| 11 | | | Std Sig | | |
| 12 | Std Gnd | | Std Gnd | | |
| 13 | | | Std +5V | | |
| 14 | Std Gnd | | Std Sig | | |
| 15 | | | Std Sig | | |
| 16 | Std Gnd | | Std Sig | | Gnd |
| 17 | | | Std Sig | | |
| 18 | Std Gnd | | Std Sig | | |
| 19 | | | Std Sig | | |
| 20 | Std Gnd | | Std Sig | Gnd | |
| 21 | | | Std Sig | | |
| 22 | Std Gnd | | Std Gnd | | |
| 23 | | | Std Sig | | |
| 24 | Std Gnd | | Std Sig | | |
| 25 | | | Std Sig | | Gnd |
| 26 | Std Gnd | | Std Sig | | |
| 27 | | | Std Sig | Gnd | |
| 28 | Std Gnd | | Std Sig | | |
| 29 | | | Std Sig | | |
| 30 | Std Gnd | | Std Sig | | |
| 31 | | | Std Gnd | | Std Gnd (VPC ret) |
| 32 | Std Gnd | | Std +5V | | Std VPC |

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P2/J2

Table 3: P2/J2 Connector as used by ROD @ Slots 5:12 and 14:21

| Pin | Row Z | Row A | Row B | Row C | Row D |
|-----|---------|-------|---------|--------|-------------------|
| 1 | XC46 | XC47 | Std +5V | SD0 | Gnd |
| 2 | Std Gnd | XC45 | Std Gnd | SD1 | L-UD0 |
| 3 | XC43 | XC44 | Std Sig | SD2 | L-UD1 |
| 4 | Std Gnd | XC42 | Std Sig | SD3 | L-UD2 |
| 5 | XC40 | XC41 | Std Sig | SD4 | L-UD3 |
| 6 | Std Gnd | XC39 | Std Sig | SD5 | L-UD4 |
| 7 | XC37 | XC38 | Std Sig | SD6 | L-UD5 |
| 8 | Std Gnd | XC36 | Std Sig | SD7 | L-UD6 |
| 9 | XC34 | XC35 | Std Sig | Gnd | L-UD7 |
| 10 | Std Gnd | XC33 | Std Sig | SA0 | Gnd |
| 11 | XC31 | XC32 | Std Sig | SA1 | L-UD8 |
| 12 | Std Gnd | XC30 | Std Gnd | SA2 | L-UD9 |
| 13 | XC28 | XC29 | Std +5V | SA3 | L-UD10 |
| 14 | Std Gnd | XC27 | Std Sig | SA4 | L-UD11 |
| 15 | XC25 | XC26 | Std Sig | SA5 | L-UD12 |
| 16 | Std Gnd | XC24 | Std Sig | SA6 | Gnd |
| 17 | XC22 | XC23 | Std Sig | SA7 | L-UD13 |
| 18 | Std Gnd | XC21 | Std Sig | SA8 | L-UD14 |
| 19 | XC19 | XC20 | Std Sig | SA9 | L-UD15 |
| 20 | Std Gnd | XC18 | Std Sig | Gnd | L-UD16 |
| 21 | XC16 | XC17 | Std Sig | SWRN | L-UD17 |
| 22 | Std Gnd | XC15 | Std Gnd | STBN | L-UD18 |
| 23 | XC13 | XC14 | Std Sig | SBUSY | L-UD19 |
| 24 | Std Gnd | XC12 | Std Sig | | L-UD20 |
| 25 | XC10 | XC11 | Std Sig | | Gnd |
| 26 | Std Gnd | XC9 | Std Sig | L-UD22 | L-UD21 |
| 27 | XC7 | XC8 | Std Sig | Gnd | L-UD23 |
| 28 | Std Gnd | XC6 | Std Sig | L-UD25 | L-UD24 |
| 29 | XC4 | XC5 | Std Sig | L-UD27 | L-UD26 |
| 30 | Std Gnd | XC3 | Std Sig | L-UD29 | L-UD28 |
| 31 | XC1 | XC2 | Std Gnd | L-UD30 | Std Gnd (VPC ret) |
| 32 | Std Gnd | XC0 | Std +5V | L-UD31 | Std VPC |

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SCT Off Detector Crate Backplane and Crate Card Utilization of P2/J2

Table 4: P2/J2 Connector as used by BOC @ Slots 5:12 and 14:21

| Pin | Row Z | Row A | Row B | Row C | Row D |
|-----|---------|-------|---------|--------|-------------------|
| 1 | XC46 | XC47 | Std +5V | SD0 | Gnd |
| 2 | Std Gnd | XC45 | Std Gnd | SD1 | L-UD0 |
| 3 | XC43 | XC44 | Std Sig | SD2 | L-UD1 |
| 4 | Std Gnd | XC42 | Std Sig | SD3 | L-UD2 |
| 5 | XC40 | XC41 | Std Sig | SD4 | L-UD3 |
| 6 | Std Gnd | XC39 | Std Sig | SD5 | L-UD4 |
| 7 | XC37 | XC38 | Std Sig | SD6 | L-UD5 |
| 8 | Std Gnd | XC36 | Std Sig | SD7 | L-UD6 |
| 9 | XC34 | XC35 | Std Sig | Gnd | L-UD7 |
| 10 | Std Gnd | XC33 | Std Sig | SA0 | Gnd |
| 11 | XC31 | XC32 | Std Sig | SA1 | L-UD8 |
| 12 | Std Gnd | XC30 | Std Gnd | SA2 | L-UD9 |
| 13 | XC28 | XC29 | Std +5V | SA3 | L-UD10 |
| 14 | Std Gnd | XC27 | Std Sig | SA4 | L-UD11 |
| 15 | XC25 | XC26 | Std Sig | SA5 | L-UD12 |
| 16 | Std Gnd | XC24 | Std Sig | SA6 | Gnd |
| 17 | XC22 | XC23 | Std Sig | SA7 | L-UD13 |
| 18 | Std Gnd | XC21 | Std Sig | SA8 | L-UD14 |
| 19 | XC19 | XC20 | Std Sig | SA9 | L-UD15 |
| 20 | Std Gnd | XC18 | Std Sig | Gnd | L-UD16 |
| 21 | XC16 | XC17 | Std Sig | SWRN | L-UD17 |
| 22 | Std Gnd | XC15 | Std Gnd | SSTBN | L-UD18 |
| 23 | XC13 | XC14 | Std Sig | SBUSY | L-UD19 |
| 24 | Std Gnd | XC12 | Std Sig | | L-UD20 |
| 25 | XC10 | XC11 | Std Sig | | Gnd |
| 26 | Std Gnd | XC9 | Std Sig | L-UD22 | L-UD21 |
| 27 | XC7 | XC8 | Std Sig | Gnd | L-UD23 |
| 28 | Std Gnd | XC6 | Std Sig | L-UD25 | L-UD24 |
| 29 | XC4 | XC5 | Std Sig | L-UD27 | L-UD26 |
| 30 | Std Gnd | XC3 | Std Sig | L-UD29 | L-UD28 |
| 31 | XC1 | XC2 | Std Gnd | L-UD30 | Std Gnd (VPC ret) |
| 32 | Std Gnd | XC0 | Std +5V | L-UD31 | Std VPC |

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SCT Off Detector Crate Backplane and Crate Card Utilization of P3/J3

Table 5: P3/J3 Connector as used by TIM @ Slot 13

| Pin | Row Z | Row A | Row B | Row C | Row D |
|-----|-------|----------------------------|----------------------------|------------|---------------------------|
| 1 | NC | Gnd | | +3v3 | ROD-Busy5 ¹ |
| 2 | NC | | Gnd | ROD-Busy6 | +3v3 |
| 3 | NC | CLK40+ slot5 ³ | CLK40- slot5 ³ | +3v3 | ROD-Busy7 |
| 4 | Gnd | CLK40+ slot14 ³ | CLK40- slot14 ³ | ROD-Busy8 | +3v3 |
| 5 | NC | Gnd | | Gnd | |
| 6 | NC | CLK40+ slot6 ³ | CLK40- slot6 ³ | ROD-Busy9 | +3v3 |
| 7 | NC | CLK40+ slot15 ³ | CLK40- slot15 ³ | +3v3 | ROD-Busy10 |
| 8 | NC | CLK40+ slot7 ³ | CLK40- slot7 ³ | +3v3 | +3v3 |
| 9 | Gnd | | Gnd | ROD-Busy11 | +3v3 |
| 10 | NC | CLK40+ slot16 ³ | CLK40- slot16 ³ | Gnd | +3v3 |
| 11 | NC | Gnd | | ROD-Busy12 | Laser-Ilock ⁴ |
| 12 | NC | CLK40+ slot8 ³ | CLK40- slot8 ³ | ROD-Busy14 | Gnd |
| 13 | NC | CLK40+ slot17 ³ | CLK40- slot17 ³ | ROD-Busy15 | ROD-sense ⁵ |
| 14 | Gnd | | Gnd | ROD-Busy16 | ROD-Busy17 |
| 15 | NC | CLK40+ slot9 ³ | CLK40- slot9 ³ | Gnd | ROD-Busy18 |
| 16 | NC | CLK40+ slot18 ³ | CLK40- slot18 ³ | ROD-Busy19 | ROD-Busy20 |
| 17 | NC | Gnd | | ROD-Busy21 | +5V |
| 18 | NC | CLK40+ slot10 ³ | CLK40- slot10 ³ | | CLK40+ _Ret |
| 19 | +5V | CLK40+ slot19 ³ | CLK40- slot19 ³ | | CLK40- _Ret |
| 20 | NC | Gnd | | Gnd | +5V |
| 21 | NC | CLK40+ slot11 ³ | CLK40- slot11 ³ | Bussed | TIM-Busy Out ⁶ |
| 22 | NC | CLK40+ slot20 ³ | CLK40- slot20 ³ | | +5V |
| 23 | NC | | Gnd | TTC7-B | TTC7-A |
| 24 | +5V | CLK40+ slot12 ³ | CLK40- slot12 ³ | TTC6-B | TTC6-A |
| 25 | NC | CLK40+ slot21 ³ | CLK40- slot21 ³ | Gnd | TTC5-A |
| 26 | NC | Gnd | | TTC5-B | TTC4-A |
| 27 | NC | CLK40+ slot13 ² | CLK40- slot13 ² | TTC4-B | +5V |
| 28 | NC | | Gnd | TTC3-B | TTC3-A |
| 29 | +5V | | | TTC2-B | TTC2-A |
| 30 | NC | | | Gnd | TTC1-A |
| 31 | NC | Gnd | | TTC1-B | TTC0-A |
| 32 | NC | | | TTC0-B | +5V |

Note: TTC0-A to TTC7-A TIM outputs are bussed to ROD Slots 14-21, terminated on BPlane slot 21
TTC0-B to TTC7-B TIM outputs are bussed to ROD Slots 5-12 . terminated on BPlane at slot 5.
They as active low.

¹ These ROD-Busy signals are routed from Slots 5-12 and 14-21, P3J3, pin 21. They are active LOW, LV-TTL totem-pole signals.

² This copy of CLK-40 signal is routed to Slot13, P3J3, pins D18 and D19: this path is the same length as CLK-40 signals destined for other slots.

³ These copies of the CLK-40 signal are routed to the BOCs at slots 5-12 and 14-21; they all have the same electronic length, and are 100 ohm differential impedance.

⁴ The state of the bussed Laser-Ilock line appears as a bit in a Set-Up bus register. It is also available to RODs and the TIM.

⁵ ROD-Sense grounded on ROD, pulled high through resistor on TIM and BOC. Grounded on backplane at slot 13.

⁶ TIM-Busy Out is provided by TIM, but is not routed on the backplane at slot 13.

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P3/J3

Table 6: P3/J3 Connector as used by RODs plugged into Slots 5:12 and 14:21

| Pin | Row Z | Row A | Row B | Row C | Row D |
|-----|-------|--------|-------|-------------------|--------------------------|
| 1 | RD94 | Gnd | RD95 | +3v3 ¹ | L-UWEN# |
| 2 | RD92 | RD93 | Gnd | L-URESET# | +3v3 |
| 3 | RD89 | RD90 | RD91 | +3v3 | L-UCLK |
| 4 | Gnd | RD87 | RD88 | L-UTEST# | +3v3 |
| 5 | RD85 | Gnd | RD86 | Gnd | L-UCTRL# |
| 6 | RD82 | RD83 | RD84 | L-LDOWN# | +3v3 |
| 7 | RD79 | RD80 | RD81 | +3v3 | L-LFF# |
| 8 | RD76 | RD77 | RD78 | +3v3 | +3v3 |
| 9 | Gnd | RD74 | Gnd | RD75 | +3v3 |
| 10 | RD71 | RD72 | RD73 | Gnd | +3v3 |
| 11 | RD68 | Gnd | RD69 | RD70 | Laser-Ilock ² |
| 12 | RD64 | RD65 | RD66 | RD67 | Gnd |
| 13 | RD60 | RD61 | RD62 | RD63 | ROD-sense ³ |
| 14 | Gnd | RD58 | Gnd | RD59 | |
| 15 | RD55 | RD56 | RD57 | Gnd | RCLK40+ ⁴ |
| 16 | RD51 | RD52 | RD53 | RD54 | RCLK40- |
| 17 | RD48 | Gnd | RD49 | RD50 | +5V |
| 18 | RD44 | RD45 | RD46 | RD47 | NC |
| 19 | +5V | RD41 | RD42 | RD43 | NC |
| 20 | RD39 | Gnd | RD40 | Gnd | +5V |
| 21 | RD36 | Bussed | RD37 | RD38 | ROD-Busy ⁵ |
| 22 | RD32 | RD33 | RD34 | RD35 | +5V |
| 23 | RD29 | RD30 | Gnd | RD31 | TTC7 |
| 24 | +5V | RD26 | RD27 | RD28 | TTC6 |
| 25 | RD23 | RD24 | RD25 | Gnd | TTC5 |
| 26 | RD20 | Gnd | RD21 | RD22 | TTC4 |
| 27 | RD16 | RD17 | RD18 | RD19 | +5V |
| 28 | RD13 | RD14 | Gnd | RD15 | TTC3 |
| 29 | +5V | RD10 | RD11 | RD12 | TTC2 |
| 30 | RD7 | RD8 | RD9 | Gnd | TTC1 |
| 31 | RD4 | Gnd | RD5 | RD6 | TTC0 |
| 32 | RD0 | RD1 | RD2 | RD3 | +5V |

Note: TTC0-A to TTC7-A TIM outputs are bussed to ROD Slots 14-21, terminated on BPlane slot 21
TTC0-B to TTC7-B TIM outputs are bussed to ROD Slots 5-12 . terminated on BPlane at slot 5.
They as active low.

¹ BOC 3v3 power is only drawn exclusively from these 3v3 supply pins – the RODs may also draw some of their 3v3 power from them.

² The state of the bussed Laser-Ilock line appears as a bit in a Set-Up bus register. It is also available to RODs and the TIM.

³ ROD-Sense grounded on ROD, pulled high through resistor on TIM and BOC. Grounded on backplane at slot 13.

⁴ RCLK-40 is buffered copy of CLK-40 signal received by BOC on P3J3, pins D18 and D19.

⁵ These ROD-Busy signals are routed to pins on P3J3 @ Slot 13. They are active LOW, LV-TTL totem-pole signals.

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P3/J3

Table 7: P3/J3 as used by BOCs plugged into transition (Back-Of-Crate) Slots 5:12 and 14:21

| Pin | Row Z | Row A | Row B | Row C | Row D |
|-----|-------|--------|-------|-------------------|--------------------------|
| 1 | RD94 | Gnd | RD95 | +3v3 ¹ | L-UWEN# |
| 2 | RD92 | RD93 | Gnd | L-URESET# | +3v3 |
| 3 | RD89 | RD90 | RD91 | +3v3 | L-UCLK |
| 4 | Gnd | RD87 | RD88 | L-UTEST# | +3v3 |
| 5 | RD85 | Gnd | RD86 | Gnd | L-UCTRL# |
| 6 | RD82 | RD83 | RD84 | L-LDOWN# | +3v3 |
| 7 | RD79 | RD80 | RD81 | +3v3 | L-LFF# |
| 8 | RD76 | RD77 | RD78 | +3v3 | +3v3 |
| 9 | Gnd | RD74 | Gnd | RD75 | +3v3 |
| 10 | RD71 | RD72 | RD73 | Gnd | +3v3 |
| 11 | RD68 | Gnd | RD69 | RD70 | Laser-Ilock ² |
| 12 | RD64 | RD65 | RD66 | RD67 | Gnd |
| 13 | RD60 | RD61 | RD62 | RD63 | ROD-sense ³ |
| 14 | Gnd | RD58 | Gnd | RD59 | |
| 15 | RD55 | RD56 | RD57 | Gnd | RCLK40+ ⁴ |
| 16 | RD51 | RD52 | RD53 | RD54 | RCLK40- |
| 17 | RD48 | Gnd | RD49 | RD50 | +5V |
| 18 | RD44 | RD45 | RD46 | RD47 | CLK40+ |
| 19 | +5V | RD41 | RD42 | RD43 | CLK40- |
| 20 | RD39 | Gnd | RD40 | Gnd | +5V |
| 21 | RD36 | Bussed | RD37 | RD38 | NC |
| 22 | RD32 | RD33 | RD34 | RD35 | +5V |
| 23 | RD29 | RD30 | Gnd | RD31 | NC |
| 24 | +5V | RD26 | RD27 | RD28 | NC |
| 25 | RD23 | RD24 | RD25 | Gnd | NC |
| 26 | RD20 | Gnd | RD21 | RD22 | NC |
| 27 | RD16 | RD17 | RD18 | RD19 | +5V |
| 28 | RD13 | RD14 | Gnd | RD15 | NC |
| 29 | +5V | RD10 | RD11 | RD12 | NC |
| 30 | RD7 | RD8 | RD9 | Gnd | NC |
| 31 | RD4 | Gnd | RD5 | RD6 | NC |
| 32 | RD0 | RD1 | RD2 | RD3 | +5V |

¹ BOC 3v3 power is only drawn exclusively from these 3v3 supply pins – the RODs may also draw some of their 3v3 power from them.

² The state of the bussed Laser-Ilock line appears as a bit in a Set-Up bus register. It is also available to RODs and the TIM.

³ ROD-Sense grounded on ROD, pulled high through resistor on TIM and BOC. Grounded on backplane at slot 5.

⁴ RCLK40 is buffered copy of the CLK40 signal received by BOC on P3J3, pins D18 and D19.

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P3/J3

Table 8: P3/J3 Connectors: use of Row Z

| Pin | TIM @ Slot 13 | Backplane @ Slot 13 | Backplane @ Slots 5:12 and 14:21 | ROD @ Slots 5:12 and 14:21 | BOC @ rear of Slots 5:12 and 14:21 |
|-----|------------------|------------------------|--|----------------------------------|--|
| 1 | NC | Thru Pin | Thru Pin | RD94 | RD94 |
| 2 | NC | Thru Pin | Thru Pin | RD92 | RD92 |
| 3 | NC | Thru Pin | Thru Pin | RD89 | RD89 |
| 4 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 5 | NC | Thru Pin | Thru Pin | RD85 | RD85 |
| 6 | NC | Thru Pin | Thru Pin | RD82 | RD82 |
| 7 | NC | Thru Pin | Thru Pin | RD79 | RD79 |
| 8 | NC | Thru Pin | Thru Pin | RD76 | RD76 |
| 9 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 10 | NC | Thru Pin | Thru Pin | RD71 | RD71 |
| 11 | NC | Thru Pin | Thru Pin | RD68 | RD68 |
| 12 | NC | Thru Pin | Thru Pin | RD64 | RD64 |
| 13 | NC | Thru Pin | Thru Pin | RD60 | RD60 |
| 14 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 15 | NC | Thru Pin | Thru Pin | RD55 | RD55 |
| 16 | NC | Thru Pin | Thru Pin | RD51 | RD51 |
| 17 | NC | Thru Pin | Thru Pin | RD48 | RD48 |
| 18 | NC | Thru Pin | Thru Pin | RD44 | RD44 |
| 19 | +5V | +5V.. Plane | +5V.. Plane | +5V | +5V |
| 20 | NC | Thru Pin | Thru Pin | RD39 | RD39 |
| 21 | NC | Thru Pin | Thru Pin | RD36 | RD36 |
| 22 | NC | Thru Pin | Thru Pin | RD32 | RD32 |
| 23 | NC | Thru Pin | Thru Pin | RD29 | RD29 |
| 24 | +5V | +5V.. Plane | +5V .. Plane | +5V | +5V |
| 25 | NC | Thru Pin | Thru Pin | RD23 | RD23 |
| 26 | NC | Thru Pin | Thru Pin | RD20 | RD20 |
| 27 | NC | Thru Pin | Thru Pin | RD16 | RD16 |
| 28 | NC | Thru Pin | Thru Pin | RD13 | RD13 |
| 29 | +5V | +5V .. Plane | +5V.. Plane | +5V | +5V |
| 30 | NC | Thru Pin | Thru Pin | RD7 | RD7 |
| 31 | NC | Thru Pin | Thru Pin | RD4 | RD4 |
| 32 | NC | Thru Pin | Thru Pin | RD0 | RD0 |

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P3/J3

Table 9: P3/J3 Connectors: use of Row A

| Pin | TIM @ Slot 13 | Backplane @ Slot 13 | Backplane @ Slots 5:12 and 14:21 | ROD @ Slots 5:12 and 14:21 | BOC @ rear of Slots 5:12 and 14:21 |
|-----|------------------|------------------------|--|----------------------------------|--|
| 1 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 2 | | | Thru Pin | RD93 | RD93 |
| 3 | CLK40+ slot 5 | To J3D18, slot 5 | Thru Pin | RD90 | RD90 |
| 4 | CLK40+ slot 14 | To J3D18, slot 14 | Thru Pin | RD87 | RD87 |
| 5 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 6 | CLK40+ slot 6 | To J3D18, slot 6 | Thru Pin | RD83 | RD83 |
| 7 | CLK40+ slot 15 | To J3D18, slot 15 | Thru Pin | RD80 | RD80 |
| 8 | CLK40+ slot 7 | To J3D18, slot 7 | Thru Pin | RD77 | RD77 |
| 9 | | | Thru Pin | RD74 | RD74 |
| 10 | CLK40+ slot 16 | To J3D18, slot 16 | Thru Pin | RD72 | RD72 |
| 11 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 12 | CLK40+ slot 8 | To J3D18, slot 8 | Thru Pin | RD65 | RD65 |
| 13 | CLK40+ slot 17 | To J3D18, slot 17 | Thru Pin | RD61 | RD61 |
| 14 | | | Thru Pin | RD58 | RD58 |
| 15 | CLK40+ slot 9 | To J3D18, slot 9 | Thru Pin | RD56 | RD56 |
| 16 | CLK40+ slot 18 | To J3D18, slot 18 | Thru Pin | RD52 | RD52 |
| 17 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 18 | CLK40+ slot 10 | To J3D18, slot 10 | Thru Pin | RD45 | RD45 |
| 19 | CLK40+ slot 19 | To J3D18, slot 19 | Thru Pin | RD41 | RD41 |
| 20 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 21 | CLK40+ slot 11 | To J3D18, slot 11 | Bussed | Bussed | Bussed |
| 22 | CLK40+ slot 20 | To J3D18, slot 20 | Thru Pin | RD33 | RD33 |
| 23 | | | Thru Pin | RD30 | RD30 |
| 24 | CLK40+ slot 12 | To J3D18, slot 12 | Thru Pin | RD26 | RD26 |
| 25 | CLK40+ slot 21 | To J3D18, slot 21 | Thru Pin | RD24 | RD24 |
| 26 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 27 | CLK40+ slot 13 | To J3D18, slot 13 | Thru Pin | RD17 | RD17 |
| 28 | | | Thru Pin | RD14 | RD14 |
| 29 | | | Thru Pin | RD10 | RD10 |
| 30 | | | Thru Pin | RD8 | RD8 |
| 31 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 32 | | | Thru Pin | RD1 | RD1 |

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P3/J3

Table 10: P3/J3 Connectors: use of Row B

| Pin | TIM @ Slot 13 | Backplane @ Slot 13 | Backplane @ Slots 5:12 and 14:21 | ROD @ Slots 5:12 and 14:21 | BOC @ rear of Slots 5:12 and 14:21 |
|-----|------------------|------------------------|--|----------------------------------|--|
| 1 | | | Thru Pin | RD95 | RD95 |
| 2 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 3 | CLK40- slot5 | To J3D19, slot 5 | Thru Pin | RD91 | RD91 |
| 4 | CLK40- slot14 | To J3D19, slot 14 | Thru Pin | RD88 | RD88 |
| 5 | | | Thru Pin | RD86 | RD86 |
| 6 | CLK40- slot6 | To J3D19, slot 6 | Thru Pin | RD84 | RD84 |
| 7 | CLK40- slot15 | To J3D19, slot 15 | Thru Pin | RD81 | RD81 |
| 8 | CLK40- slot7 | To J3D19, slot 7 | Thru Pin | RD78 | RD78 |
| 9 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 10 | CLK40- slot16 | To J3D19, slot 16 | Thru Pin | RD73 | RD73 |
| 11 | | | Thru Pin | RD69 | RD69 |
| 12 | CLK40- slot8 | To J3D19, slot 8 | Thru Pin | RD66 | RD66 |
| 13 | CLK40- slot17 | To J3D19, slot 17 | Thru Pin | RD62 | RD62 |
| 14 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 15 | CLK40- slot9 | To J3D19, slot 9 | Thru Pin | RD57 | RD57 |
| 16 | CLK40- slot18 | To J3D19, slot 18 | Thru Pin | RD53 | RD53 |
| 17 | | | Thru Pin | RD49 | RD49 |
| 18 | CLK40- slot10 | To J3D19, slot 10 | Thru Pin | RD46 | RD46 |
| 19 | CLK40- slot19 | To J3D19, slot 19 | Thru Pin | RD42 | RD42 |
| 20 | | | Thru Pin | RD40 | RD40 |
| 21 | CLK40- slot11 | To J3D19, slot 11 | Thru Pin | RD37 | RD37 |
| 22 | CLK40- slot20 | To J3D19, slot 20 | Thru Pin | RD34 | RD34 |
| 23 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 24 | CLK40- slot12 | To J3D19, slot 12 | Thru Pin | RD27 | RD27 |
| 25 | CLK40- slot21 | To J3D19, slot 21 | Thru Pin | RD25 | RD25 |
| 26 | | | Thru Pin | RD21 | RD21 |
| 27 | CLK40- slot13 | To J3D19, slot 13 | Thru Pin | RD18 | RD18 |
| 28 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 29 | | | Thru Pin | RD11 | RD11 |
| 30 | | | Thru Pin | RD9 | RD9 |
| 31 | | | Thru Pin | RD5 | RD5 |
| 32 | | | Thru Pin | RD2 | RD2 |

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P3/J3

Table 11: P3/J3 Connectors: use of Row C

| Pin | TIM @ Slot 13 | Backplane @ Slot 13 | Backplane @ Slots 5:12 and 14:21 | ROD @ Slots 5:12 and 14:21 | BOC @ rear of Slots 5:12 and 14:21 |
|-----|------------------|------------------------|--|----------------------------------|--|
| 1 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 2 | ROD-Busy6 | From J3D21, slot 6 | Thru Pin | L-URESET# | L-URESET# |
| 3 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 4 | ROD-Busy8 | From J3D21, slot 8 | Thru Pin | L-UTEST# | L-UTEST# |
| 5 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 6 | ROD-Busy9 | From J3D21, slot 9 | Thru Pin | L-LDOWN# | L-LDOWN# |
| 7 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 8 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 9 | ROD-Busy11 | From J3D21, slot 11 | Thru Pin | RD75 | RD75 |
| 10 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 11 | ROD-Busy12 | From J3D21, slot 12 | Thru Pin | RD70 | RD70 |
| 12 | ROD-Busy14 | From J3D21, slot 14 | Thru Pin | RD67 | RD67 |
| 13 | ROD-Busy15 | From J3D21, slot 15 | Thru Pin | RD63 | RD63 |
| 14 | ROD-Busy16 | From J3D21, slot 16 | Thru Pin | RD59 | RD59 |
| 15 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 16 | ROD-Busy19 | From J3D21, slot 19 | Thru Pin | RD54 | RD54 |
| 17 | ROD-Busy21 | From J3D21, slot 21 | Thru Pin | RD50 | RD50 |
| 18 | | | Thru Pin | RD47 | RD47 |
| 19 | | | Thru Pin | RD43 | RD43 |
| 20 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 21 | Bussed | | Thru Pin | RD38 | RD38 |
| 22 | | | Thru Pin | RD35 | RD35 |
| 23 | TTC7-B | TTC7-B bussed | Thru Pin | RD31 | RD31 |
| 24 | TTC6-B | TTC6-B bussed | Thru Pin | RD28 | RD28 |
| 25 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 26 | TTC5-B | TTC5-B bussed | Thru Pin | RD22 | RD22 |
| 27 | TTC4-B | TTC4-B bussed | Thru Pin | RD19 | RD19 |
| 28 | TTC3-B | TTC3-B bussed | Thru Pin | RD15 | RD15 |
| 29 | TTC2-B | TTC2-B bussed | Thru Pin | RD12 | RD12 |
| 30 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 31 | TTC1-B | TTC1-B bussed | Thru Pin | RD6 | RD6 |
| 32 | TTC0-B | TTC0-B bussed | Thru Pin | RD3 | RD3 |

Note: TTC0-A to TTC7-A TIM outputs are bussed to ROD Slots 14-21, terminated on BPlane slot 21
TTC0-B to TTC7-B TIM outputs are bussed to ROD Slots 5-12 . terminated on BPlane at slot 5.
They as active low.

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane and Crate Card Utilization of P3/J3

Table 12: P3/J3 Connectors: use of Row D

| Pin | TIM @ Slot 13 | Backplane @ Slot 13 | Backplane @ Slots 5:12 | Backplane @ Slots 14:21 | ROD @ Slots 5:12 and 14:21 | BOC @ rear of Slots 5:12 and 14:21 |
|-----|------------------|------------------------------------|---------------------------|----------------------------|-------------------------------------|--|
| 1 | ROD-Busy5 | From J3D21, slot 5 | Thru Pin | Thru Pin | L-UWEN# | L-UWEN# |
| 2 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 3 | ROD-Busy7 | From J3D21, slot 7 | Thru Pin | Thru Pin | L-UCLK | L-UCLK |
| 4 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 5 | | | Thru Pin | Thru Pin | L-UCTRL# | L-UCTRL# |
| 6 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 7 | ROD-Busy10 | From J3D21, slot 10 | Thru Pin | Thru Pin | L-LFF# | L-LFF# |
| 8 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 9 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 10 | +3v3 | +3v3 .. Plane | +3v3 .. Plane | +3v3 .. Plane | +3v3 | +3v3 |
| 11 | Laser-Ilock | Laser-Ilock-Bussed | Laser-Ilock-Bussed | Laser-Ilock-Bussed | Laser-Ilock | Laser-Ilock |
| 12 | Gnd | Gnd .. Plane | Gnd .. Plane | Gnd .. Plane | Gnd | Gnd |
| 13 | ROD-sense | Gnd .. Plane | Thru Pin | Thru Pin | ROD-sense | ROD-sense |
| 14 | ROD-Busy17 | From J3D21, slot 17 | Thru Pin | Thru Pin | | |
| 15 | ROD-Busy18 | From J3D21, slot 18 | Thru Pin | Thru Pin | RCLK40+ | RCLK40+ |
| 16 | ROD-Busy20 | From J3D21, slot 20 | Thru Pin | Thru Pin | RCLK40- | RCLK40- |
| 17 | +5V | +5V .. Plane | +5V .. Plane | +5V .. Plane | +5V | +5V |
| 18 | CLK40+_Ret | CLK40+ Routed | CLK40+ Routed | CLK40+ Routed | NC | CLK40+ |
| 19 | CLK40-_Ret | CLK40- Routed | CLK40- Routed | CLK40- Routed | NC | CLK40- |
| 20 | +5V | +5V .. Plane | +5V .. Plane | +5V .. Plane | +5V | +5V |
| 21 | TIM-Busy Out | TIM-Busy Out thru pin .. unused | ROD-Busy- Routed | ROD-Busy- Routed | ROD-Busy | NC |
| 22 | +5V | +5V .. Plane | +5V .. Plane | +5V .. Plane | +5V | +5V |
| 23 | TTC7-A | TTC7-A Bus | TTC7-B Bus | TTC7-A Bus | TTC7 | NC |
| 24 | TTC6-A | TTC6-A Bus | TTC6-B Bus | TTC6-A Bus | TTC6 | NC |
| 25 | TTC5-A | TTC5-A Bus | TTC5-B Bus | TTC5-A Bus | TTC5 | NC |
| 26 | TTC4-A | TTC4-A Bus | TTC4-B Bus | TTC4-A Bus | TTC4 | NC |
| 27 | +5V | +5V .. Plane | +5V .. Plane | +5V .. Plane | +5V | +5V |
| 28 | TTC3-A | TTC3-A Bus | TTC3-B Bus | TTC3-A Bus | TTC3 | NC |
| 29 | TTC2-A | TTC2-A Bus | TTC2-B Bus | TTC2-A Bus | TTC2 | NC |
| 30 | TTC1-A | TTC1-A Bus | TTC1-B Bus | TTC1-A Bus | TTC1 | NC |
| 31 | TTC0-A | TTC0-A Bus | TTC0-B Bus | TTC0-A Bus | TTC0 | NC |
| 32 | +5V | +5V .. Plane | +5V .. Plane | +5V .. Plane | +5V | +5V |

Note: TTC0-A to TTC7-A TIM outputs are bussed to ROD Slots 14-21, terminated on BPlane slot 21
TTC0-B to TTC7-B TIM outputs are bussed to ROD Slots 5-12, terminated on BPlane at slot 5.
They as active low.

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane: Utilization of Slots and Power Requirements

The crate has 16 slots for the RODs (16 ea.) with the BOCs (16 ea.) plugged into the card cage behind the backplane, 1 slot for the TIM, 1 slot for the 6U to 9U divider and 2 slots for the crate processor. The table below shows the assignments.

| Slot Number | Item in slot |
|-------------|--|
| 1 | Crate processor, Front 6Ux160 mm |
| 2 | Reserved for crate processor use, Front 6Ux160mm |
| 3 | TBD, Front card 6Ux160 mm |
| 4 | Divider for 6U to 9U card sizes |
| 5 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 6 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 7 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 8 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 9 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 10 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 11 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 12 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 13 | TIM <i>Terminate all ROD-Busy on TIM</i> |
| 14 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 15 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 16 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 17 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 18 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 19 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 20 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |
| 21 | ROD and BOC Front 9Ux400 mm, Back 9Ux240 mm |

Power Utilization:

| Item | Number Of Cards | 5 Volts | 3.3 Volts | -12 volts | +12 Volts |
|--------------------|-----------------|--------------------------|--------------------------|-----------|--------------------------|
| ROD | 16 | 9 A each 144 A total | 11 A each 176 A total | 0 | 0 |
| BOC | 16 | 4.5 A each 72 A total | 3 A each 48 A total | 0 | 0.1A each 1.6 A total |
| TIM | 1 | 15 A each | 8 A each | 1.5A each | 1.5 |
| RCC | 1 | 3.5 A each | 0 | 1 A each | 0 |
| Total Amps: | | 234 A | 232 A | 2.5A | 3.1 A |
| Power | | 1170W | 765W | 30W | 37W |

Crate Total Power 2002W

Backplane Interface and Crate Utilisation

SCT Off Detector Crate Backplane: General Information

Number of RODs and BOCs (1 BOC needed per ROD) :

The number of RODs and BOCs is reasonably stable but changes of a few percent could be needed.

| Application | Number Needed |
|--------------------------------|---------------|
| SCT barrel | 44 |
| SCT forward | 48 |
| Total SCT | 92 |
| | |
| Pixel barrel | 49 |
| Pixel forward disks 1-3 | 13 |
| Pixel forward disk 4 | 9 |
| Pixel B-layer | 39 |
| Total Pixels | 110 |
| | |
| Grand Total RODs + BOCs | 202 |

Number of crates:

The number of crates should be stable.

| Application | Number Needed |
|-----------------------------------|---------------|
| SCT | 8 |
| Pixel | 8 |
| | |
| Total SCT and Pixel Crates | 16 |

Backplane Interface and Crate Utilisation

Temporary list of changes to RLW version of 21-Jul-00:

This sheet and the highlighting within the body of the document will be removed before it is signed off.

[illegible]