PM7346

S/UNI-QJET

INTERFACING THE S/UNI-QJET TO THE RCMP-200

PRELIMINARY

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CONTENTS

1 OVERVIEW

The RCMP-200 device provides ATM Layer VPI/VCI address translation, cell appending, cell rate policing, counting and OAM functions. It supports Multi-PHY addressing for up to 32 PHY devices as outlined in Utopia Level 2 specification. The RCMP-200 is intended to be situated between a switch core and the physical layer devices in the ingress direction. The S/UNI-QJET provides the PHY transmission convergence function to the RCMP-200.

Interconnecting the S/UNI-QJET to the RCMP-200 in Multi-PHY setup can be achieved by utilizing one cell available (RCA) and one read enable (RENB) signals. As specified in Utopia Level 2, only one Multi-PHY port at a time is selected for a cell transfer. However, another Multi-PHY port may be polled for its cell available status while the selected Multi-PHY port transfers data.

2 INTERFACE CONSIDERATIONS

The S/UNI-QJET provides either a 50 MHz 8-bit wide or 16-bit wide FIFO interface to the RCMP-200. However, the RCMP-200 only supports 8-bit wide SCI-PHY interface at 25 MHz. The available ATM bandwidth of the RCMP-200 is limited to 180 Mbps because it requires three empty clock cycles after each received cell. The total number of QJETs that can be interfaced to the RCMP-200 can be decided by the system designer based on this available bandwidth. Table 1 shows typical QJET PHY port rates and the number of ports and QJETs that can be interfaced to one RCMP-200 at full traffic payload without dropping any cell. The maximum number of QJETs that can be interfaced to a single RCMP-200 device is 31. The QJET inputs present capacitive loading of 5 to 7 pF. The timing specifications described in the data sheets for the QJET and the RCMP-200 are measured at 50 pF load. It is recommended that buffering be provided when interfacing multiple QJETs to the RCMP-200.

Table 1: QJET Interface Rates

User Network Interface	ATM Payload Bandwidth (Mbits/s)*	Number of PHY Ports	Number of QJETs	Aggregate ATM Payload Bandwidth (Mbits/s)
T1	1.536	117	30	179.12
E1	1.920	93	24	178.56
J2	6.144	29	8	178.18
T3	39.34	4	1	157.36
E3	33.92	5	2	169.60

* T1, E1, E3, J2 based on ATM Cell Mapping, T3 based on PLCP Mapping

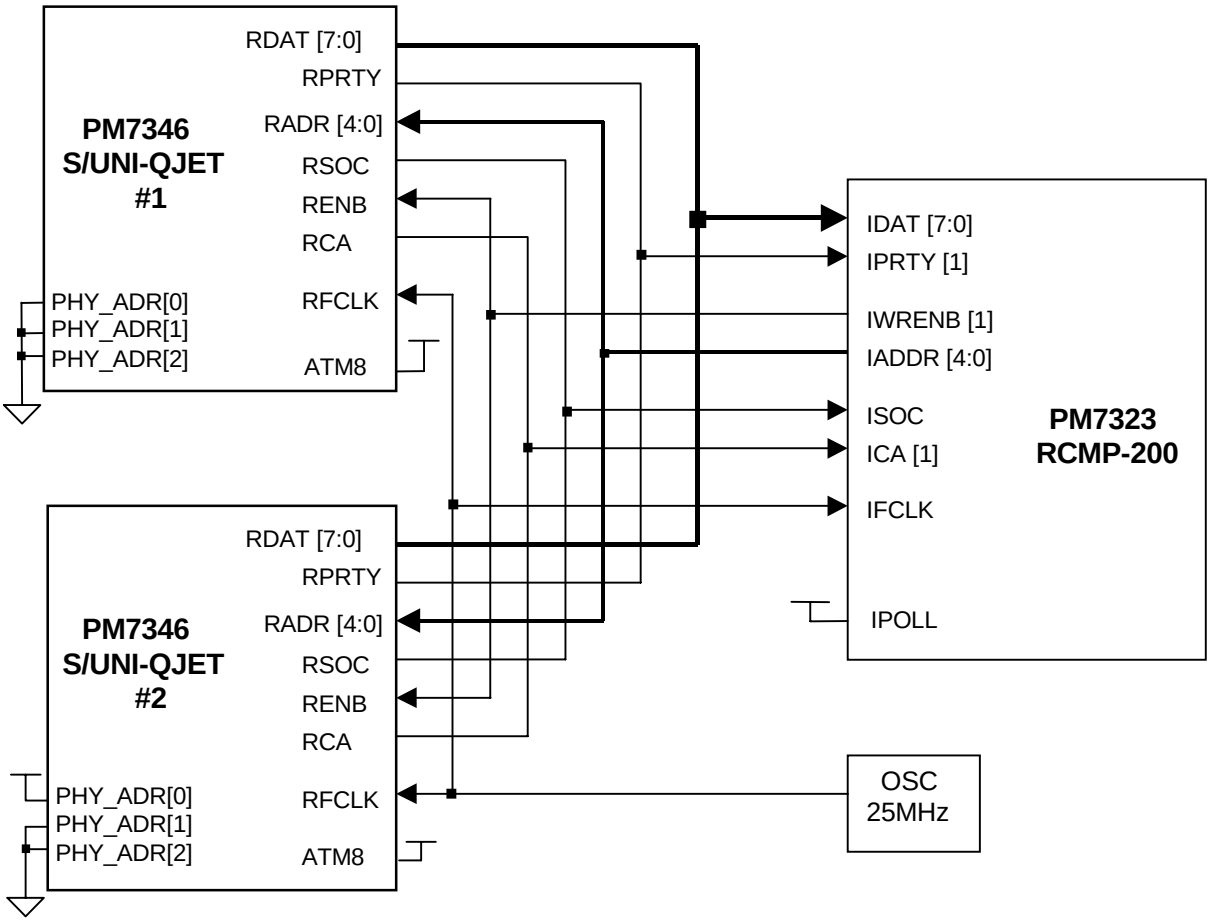
The logic address of each QJET is determined by its PHY_ADR[2:0] inputs. The PHY_ADR[2:0] inputs correspond to the three most-significant bits of the RCMP's Multi-PHY addressing pins, IADDR[4:0]. The lower two bits, IADDR[1:0], determine which one of the four quadrants in the QJET is selected for transmit and receive access.

The TPTYP bit in QJET's in registers 08H, 180H, 280H, 380H and the IPTYP bit in RCMP's register 08H need to be set to the same parity selection for IDAT[7:0].

3 CONNECTING THE S/UNI-QJET TO THE RCMP-200

Figure 1 shows the connections between 8 PHY ports on two S/UNI-QJETs and one RCMP-200. The ATM8 pin on the S/UNI-QJET is pulled high to select 8-bit wide data bus between the two devices. A 25 MHz oscillator is used to provide clocks to QJET's RFCLK and RCMP's IFCLK inputs. The IPOLL pin is pulled high to enable multi-PHY address polling function on the RCMP-200. The PHY_ADR[2:0] pins for QJET#1 and QJET#2 are tied to "000" and "001" respectively. Up to 31 QJETs can be connected to the RCMP-200 using the same connections as shown below using PHY addresses from 00H to 1EH.

Figure 1 Connections - Two S/UNI-QJETs and the RCMP-200



4 MULTI-PHY INTERFACE TIMING

The clock rate between the S/UNI-QJET and the RCMP-200 is 25 MHz and the clock period is 40 ns. Figure 2 shows the QJET's output timings and the RCMP-200's timing requirements. For QJET outputs, the maximum time from clock high to output valid is 12 ns. This gives RCMP a minimum setup time of 28 ns. Also, for QJET outputs, the minimum time from clock high to output tristate is 1 ns. The minimum timing requirements for the RCMP Multi-PHY input pins, ICA[1], IDAT[7:0], IPRTY[1], and ISOC are 4 ns for setup and 1 ns for hold time. The S/UNI-QJET meets RCMP's setup and hold time requirements at 25 MHz with a 24 ns margin. The extra timing margin will allow buffering to be provided between the QJET and the RCMP while still meeting the timing requirements. Buffers chosen to be added must contribute less than 24 ns of propagation delay to the data signals.

Figure 2: The S/UNI-QJET to the RCMP-200 timing

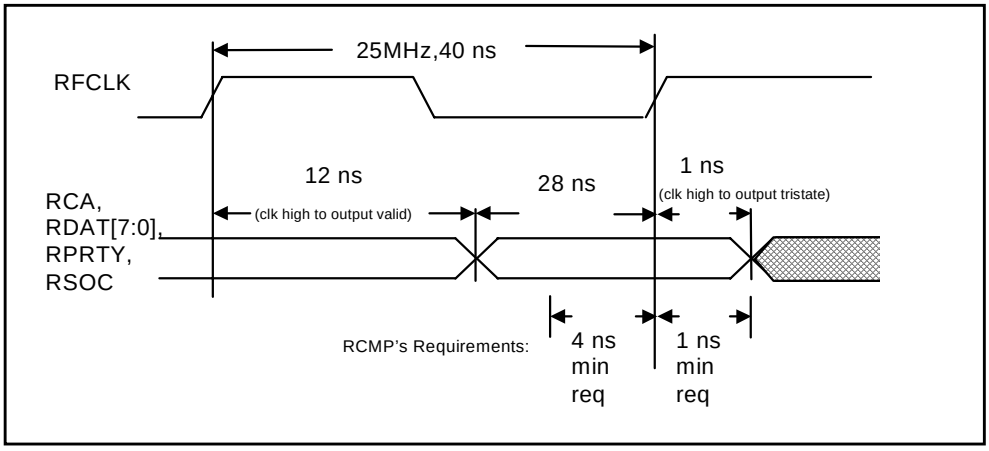
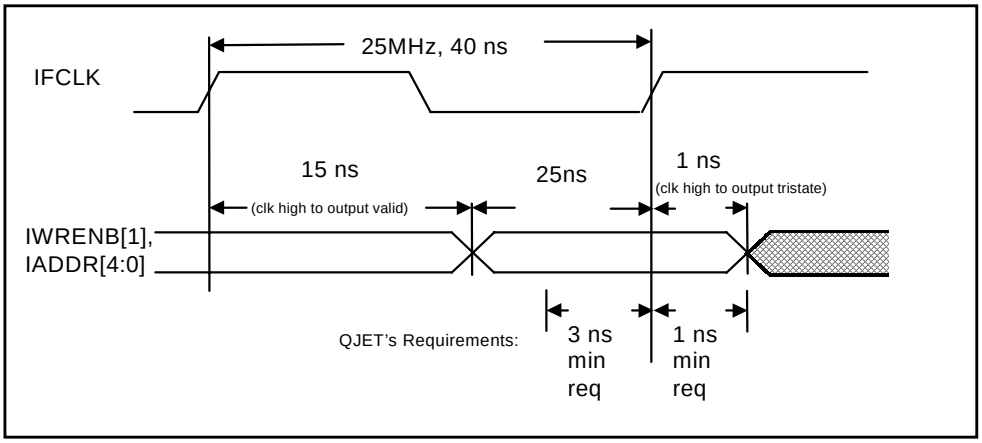


Figure 3 shows the timing requirements for the RCMP-200 to the S/UNI-QJET interface. Since both devices conforms to the Multi-PHY specs, the S/UNI-QJET has similar timing as the RCMP-200. The RCMP has a longer maximum propagation delay of 15 ns for its outputs. This still meets the timing requirements of the QJET inputs, RENB and RADR[4:0], set-up time of 3 ns. So the RCMP-200 meets the timing requirements of the QJET for both the setup and hold time of RENB, and ADDR[4:0] signals.

Figure 3: The RCMP-200 to the S/UNI-QJET timing



5 REFERENCES

- PM7323 RCMP-200 Long Form Datasheet, PMC-960543, Issue 1
- PM7346 S/UNI-QJET Long Form Datasheet, PMC-960835, Issue 1
- ATM Forum, UTOPIA, An ATM-PHY Interface Specification, Level 2, Version 1.0
- ITU-T, G.804, ATM Cell Mapping into Plesiochronous Digital Hierarchy (PDH), Nov 1993

NOTES

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