

1 Draft revision to  
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4 ANSI/IEEE Std 802.3, 1996 Edition  
5  
6 Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access  
7 Method & Physical Layer Specifications:  
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11 **Maintenance Revision #5 (100BASE-T)**  
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17 Sponsor: LAN MAN Standards Committee  
18 of the  
19 IEEE Computer Society  
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21 This is Draft 1.1 with items approved for balloting by IEEE 802.3 as its plenary meeting in Vancouver, November 1996 and for-  
22 mally approved for 802.3 Working Group Ballot at the March 1997 meeting in Irvine. This draft has been edited to reflect the title  
23 change agree to at Irvine and to provide additional clarity with respect to the changes requested. This draft is for 30 day ballot and  
24 is scheduled to close in time for comment resolution at the 802.3 Plenary meeting in Lahaina, HI the week of July 7-10, 1997. This  
25 document expires July 15, 1997.  
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1 **P802.3aa, 802.3 MAINTENANCE BALLOT #5 (100BASE-T)**  
2 **CHANGE 1: Changes to Partition State Diagram for Port X (Figure 27-8)**  
3 **Clause 27: Repeater for 100Mb/s baseband networks**  
4 **Proposed by: Lloyd Oliver**  
5 **Approved for ballot 11/12/96**  
6

7 **PROPOSED CHANGES**

8  
9 In Figure 27-8 Repeater Partition State Diagram for Port X:

10 1) Change transition:

11 COLLISION COUNT IDLE to WATCH FOR COLLISION

12 Update to read:

13  $(\text{scarrier\_present}(x) = \text{true}) + (\text{command}(x) = \text{quiet})$

14 This ensures that the COLLISION COUNT IDLE state is exited for both receive activity

15  $(\text{scarrier\_present}(x) = \text{true})$  and transmit activity  $(\text{command}(x) = \text{quiet})$ . The term  $(\text{command}(x) = \text{quiet})$  has to be ORed in to ensure transmits also cause an exit from the COLLISION COUNT

16 IDLE state.

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19  
20 2) Change transition:

21 WATCH FOR COLLISION to COLLISION COUNT IDLE

22 Update to read:

23  $(\text{scarrier\_present}(x) = \text{false}) * (\text{command}(x) = \text{quiet})$

24 This ensures that the collision counter is neither incremented nor cleared if both transmit and receive activity have ceased before the no\_collision\_timer has completed. The term  $(\text{com-$

25  $\text{mand}(x) = \text{quiet})$  has to replace the term  $(\text{command}(x) = \text{collision})$  to ensure that if the WATCH FOR COLLISION state is entered due to a transmit, it remains there until that transmit is completed.

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31 3) Change Transition:

32 WATCH FOR COLLISION to COLLISION COUNT INCREMENT

33 Update to read:

34  $(\text{command}(x) = \text{collision}) * (\text{scarrier\_present}(x) = \text{true})$

35 This change ensures that the counter is only incremented when a collision is happening on port X.

36 The term  $(\text{scarrier\_present}(x) = \text{true})$  is ANDed to qualify the fact that a collision is occurring and the fact that port x is receiving and hence taking part in a collision.

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38  
39  
40 4) Change transition:

41 WATCH FOR COLLISION to CLEAR COUNTER

42 Update to read:

43  $\text{no\_collision\_timer\_Done} * (\text{command}(x) = \text{collision}) * ((\text{scarrier\_present}(x) = \text{true}) + (\text{command}(x) = \text{copy}))$

44 This change ensures that either a transmit or a receive for duration greater than no\_collision\_timer will reset the collision counter.

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49 5) Change transition:

50 PARTITION HOLD to PARTITION COLLISION WATCH

51 Update to read:

52  $(\text{command}(x) = \text{quiet}) + (\text{scarrier\_present}(x) = \text{true})$

53  
54

1 This change ensures a receive or a transmit will start the no\_collision\_timer and un-partition the  
2 port once the timer is done.

3  
4 6) Change transition:

5 PARTITION COLLISION WATCH to PARTITION WAIT

6 Update to read:

7  
8 (command(x) quiet) \* (scarrier\_present(x) true)

9 This change ensures that if a receive is occurring while the port is transmitting (Command(x) =  
10 copy or collision) the port remains partitioned.

11 7) Change transition:

12 PARTITION COLLISION WATCH to WAIT TO RESTORE PORT

13 Update to read:

14  
15 no\_collison\_timer\_Done \* (((scarrier\_present(x) = false) \* (command(x) = copy) +  
16 (scarrier\_present(x) = true) \* (command(x) = quiet)))

17  
18 This change ensures that a receive of a good packet as well transmitting a packet without conten-  
19 tion restores the port to full operation.

20 8) Change Text in sub-clause 27.3.1.6 (Second paragraph):

21 Change "The count shall be incremented on each transmission that suffers a collision and shall be  
22 reset on a successful transmission." to read "The count shall be incremented each collision and  
23 shall be reset on a transmit or receive without incurring a collision."

24  
25 9) Change Text in subclause 27.7.4.8 (PICS items PA3 & PA4).

26 Change PA3 comment "Count incremented on each transmission that suffers a collision" to  
27 "Count incremented on a collision".

28 Change PA4 comment "Count reset on successful collision" to "Count reset on a transmit or  
29 receive without incurring a collision".

30  
31 **Rationale for revision:**

32 1. Cater for "capture" effect on heavily loaded network where one node could be streaming lots  
33 of packets under burst mode with a second node experiencing short term unfairness once it lost  
34 the first collision leading it to see a few max. collisions which can lead to partition of the node as  
35 only successful receives (from the repeaters viewpoint) currently clear the collision count. Newer  
36 protocols being investigated are looking at windows of up to 128kbytes which may highlight this  
37 behavior more.

38 2. To fix the inconsistencies between the text describing the partition function (27.3.1.6) and the  
39 state diagram of figure 27-8.

40 3. To modify the Partition state machine to be the same as the 10Mb/s partition algorithm of chap-  
41 ter 9 providing symmetrical operation (Partition and Un-Partition for the same reasons.)

42  
43 **Impact on existing networks:**

44 Reduces or eliminates the potential to partition a 100Mb/s network port unless a real fault has  
45 occurred rather than normal collisions. This proposal is a "superset" of the existing state diagram  
46 and would inter-operate with repeaters implementing existing state diagram.

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1 **CHANGE 2: Change to Repeater Core State Diagram (Figure 27-2)**

2 **Clause 27: Repeater for 100Mb/s baseband networks**

3 **Proposed by: Lloyd Oliver**

4 **Approved for ballot 11/12/96**

5 **PROPOSED CHANGE**

6 In Figure 27-2 Repeater Core State Diagram, change exit term out of ACTIVE state.

7 FROM: (activity(ALL) = 0) \* (all\_data\_sent = true)

8 TO: (activity(N) = 0) \* (all\_data\_sent = true)

10 **Rationale for revision:**

11 Fixes anomaly of repeater operation during collision storms at high traffic loading. During these  
12 periods, inter-packet gaps seen from the perspective of the Repeater Core State Diagram regard-  
13 ing multiple ports, can become zero or, in fact, overlap. The proposed change allows the core to  
14 enable sourcing packet activity from the remaining port active and reassign N based on real activ-  
15 ity rather than going blind until all network activity stops.

17 Current operation isolates port N such that a station (or repeater) attached to this port is isolated  
18 from carrier activity until all carrier activity is halted. This effects stations connected (in any way;  
19 i.e. through a repeater or direct) to port N from properly deferring to network traffic.

21 **Impact on existing networks:**

22 Reduces or eliminates late collision events recorded by management tools during periods of peak  
23 traffic loading.

26 **CHANGE 3: Change Repeater Partition State Diagram (Figure 27-8)**

27 **Clause 27: Repeater for 100Mb/s baseband networks**

28 **Proposed by: Lloyd Oliver**

29 **Approved for ballot 11/12/96**

30 **PROPOSED CHANGE**

31 In Figure 27-8 Partition State Diagram, change right exit term out of COLLISION COUNT  
32 INCREMENT state to PARTITION WAIT state;

33 FROM: CC(X) \_ CCLimit

34 TO: CC(X) \_ CCLimit + jabber\_timer\_done

36 **Rationale for revision:**

37 Consider a case where loop back plugs are present on multiple ports of a repeater. Further, that a  
38 station on yet another port initiates a packet transmission. The loop back plugs cause a collision  
39 and the station backs off. But, the event lingers. The ports with loop back plugs cause the  
40 Repeater Core State Diagram to remain in the JAM state since "activity(ALL) > 1". Which, of  
41 course, holds all of the Transmit state machines in the COLLISION state, sending Jam. The loop  
42 back continues. This situation is maintained until the Receive Timer State Diagram intervenes  
43 when the "jabber\_timer\_done" interrupts the looped back carrier by forcing the Receive State  
44 Diagram into SILENT and the Transmit State Diagram (for that port) into QUIET. But, only  
45 briefly. The Receive State Diagram would reset to NO INPUT state when carrier is interrupted.  
46 However, due to the tolerancing of the Jabber timers, other ports with loop back plugs are still  
47 holding the Repeater Core in JAM state. This cycling repeats ad infinitum. Even the Partition  
48 State diagram can't help because it is stuck in the COLLISION COUNT INCREMENT state wait-  
49 ing for the core to issue a quiet command. The change listed above cures this situation by isolat-  
50 ing the offending ports with loop back plugs attached.

1 **Impact on existing networks:**

2 Clears net for working traffic sooner when loop back plugs are present in system.

5 **CHANGED TEXT**

7 **27.3.1.6 Partition functional requirements**

9 In large multisegment networks it may be desirable that the repeater set protect the network from  
10 some fault conditions that would disrupt network communications. A potentially likely cause of  
11 this condition could be due to a cable fault.

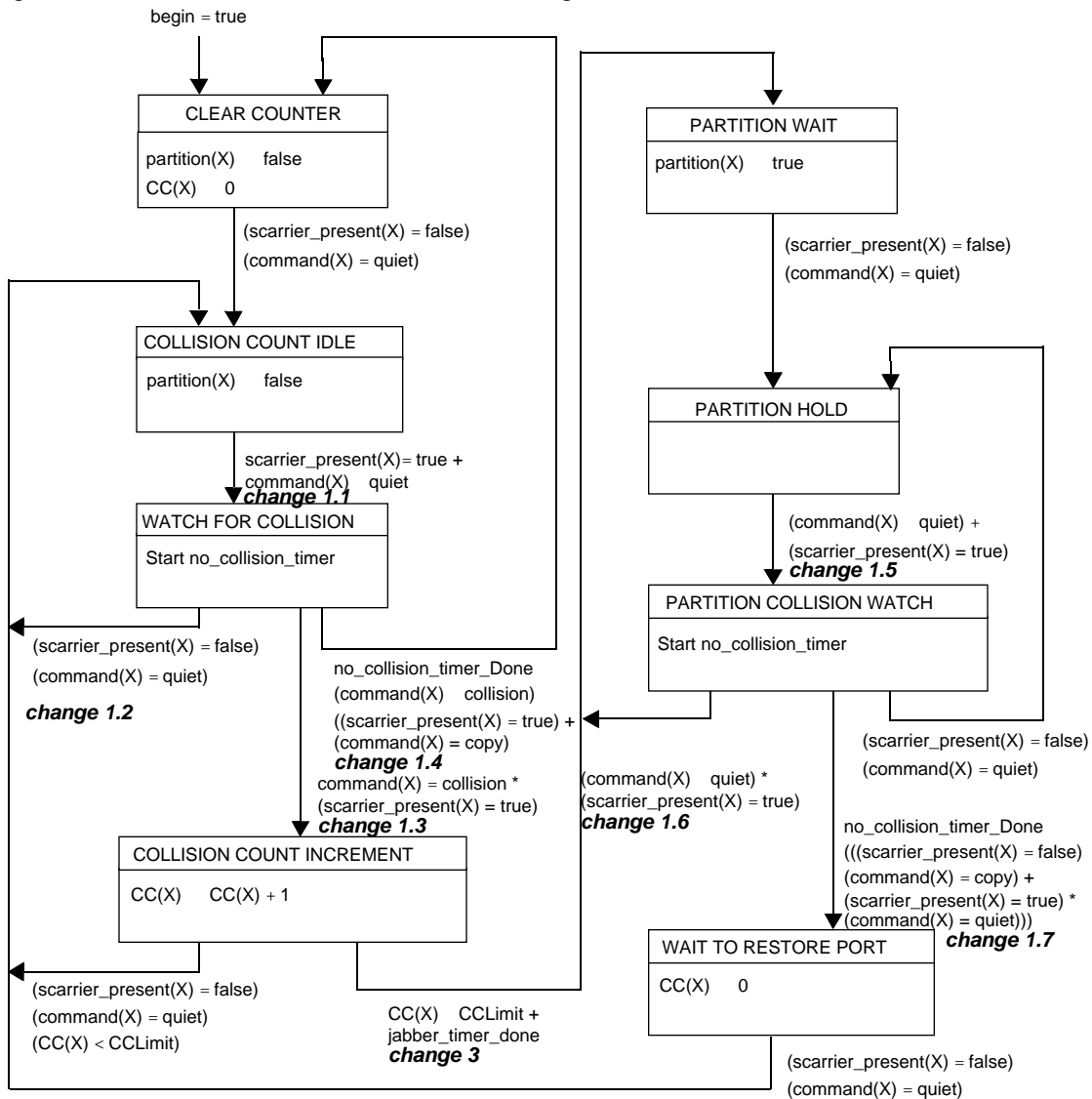
13 Each repeater PMA interface shall contain a self-interrupt capability as described in figure 27-8 to  
14 prevent a faulty segment's carrier activity from reaching the repeater unit and hence propagating  
15 through the network. The repeater PMA interface shall count consecutive collisions. The count  
16 shall be incremented each collision and shall be reset on a transmit or receive without incurring a  
17 collision on each transmission that suffers a collision and shall be reset on a suc-  
18 cessful transmission —. If this count exceeds the value CCLimit (see 27.3.2.1.1) the Partition  
21 condition shall be detected.

23 **27.7.4.8 Partition function**

Item	Feature	Subclause	Status	Support	Value/Comment
PA1	Partition function implementa- tion	27.3.1.6	M		Self-interrupt of data reception
PA2	Consecutive collision count for entry into partition state	27.3.1.6	M		Consecutive collision in excess of CCLimit
PA3	Consecutive collision counter incrementing	27.3.1.6	M		Count incremented <u>on a colli- sion on each transmission that suffers a collision.</u>
PA4	Consecutive collision counter reset	27.3.1.6	M		Count reset on <u>a transmit or receive without incurring a col- lision successful collision.</u>
PA5	Messages sent to repeater unit in Partition state	27.3.1.6	M		Inhibited sending messages to repeater unit
PA6	Messages sent from repeater unit in Partition state	27.3.1.6	M		Continue sending output mes- sages
PA7	Monitoring activity on PMA interface in Partition state	27.3.1.6	M		Continue monitoring activity at PMA interface
PA8	Reset of Partition state	27.3.1.6	M		Power-up reset or Detecting activity for greater than dura- tion no_collision_timer with- out a collision

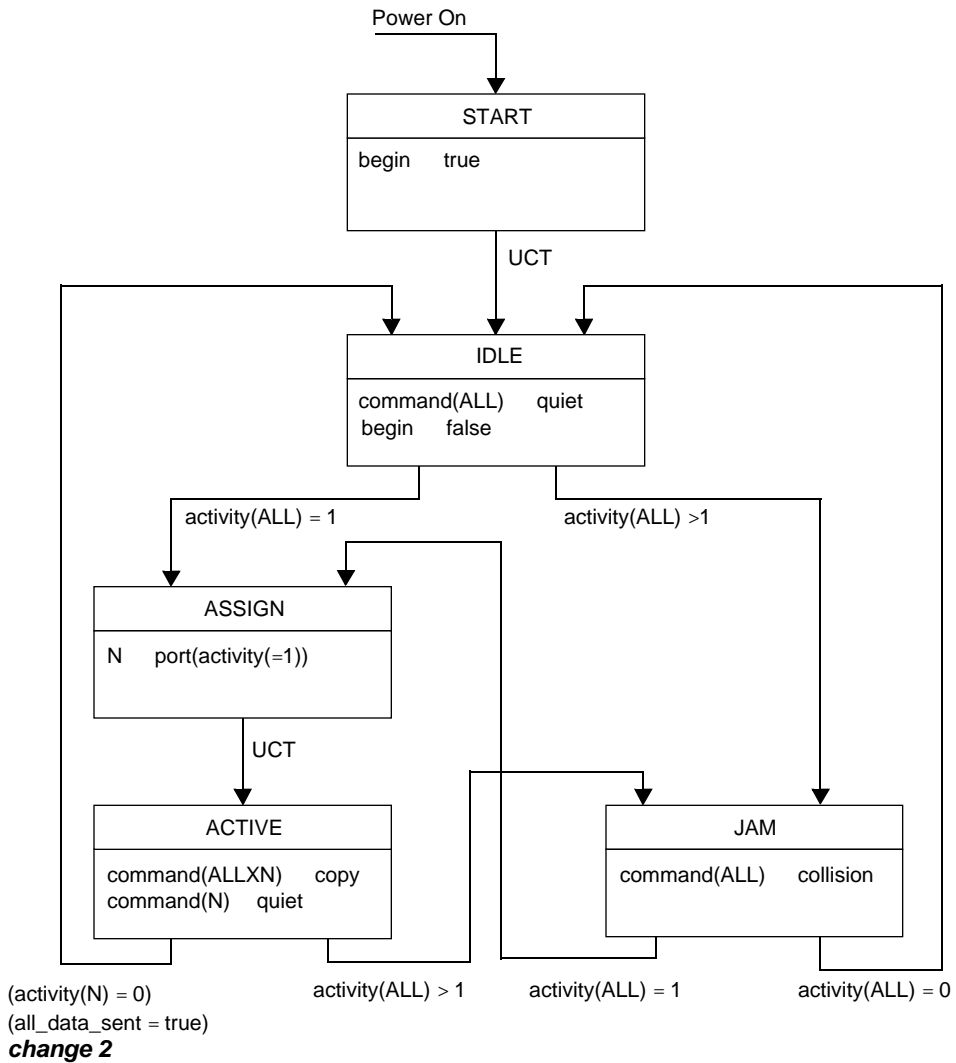
**CHANGED FIGURES**

Change sources indicated in ***bold italics*** below change.



**Figure 27-8—Partition state diagram for port X (AS REVISED BY THESE CHANGES)**

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**Figure 27-2—Repeater core state diagram (AS REVISED BY THESE CHANGES)**



1 **Old Figures**

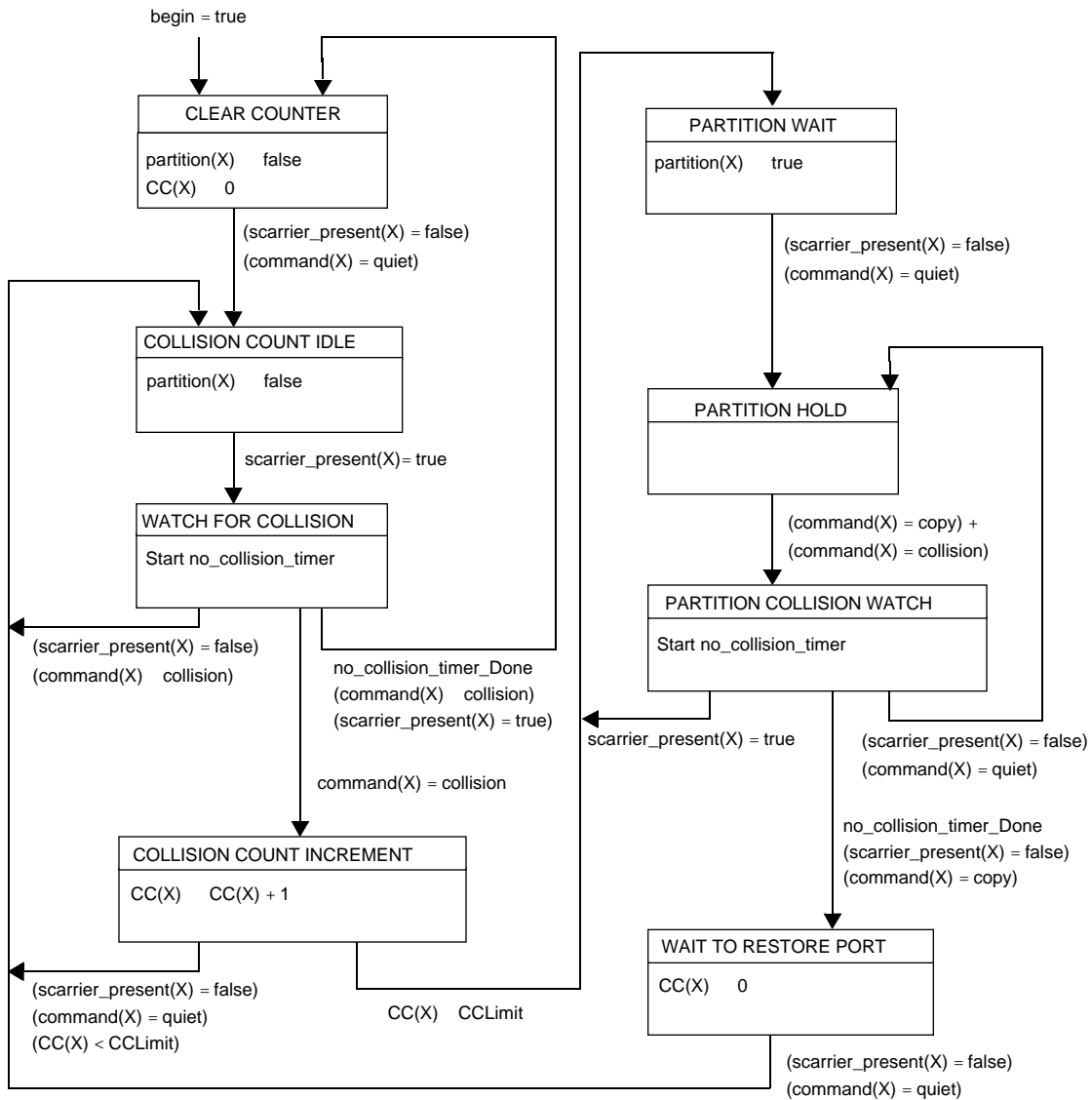
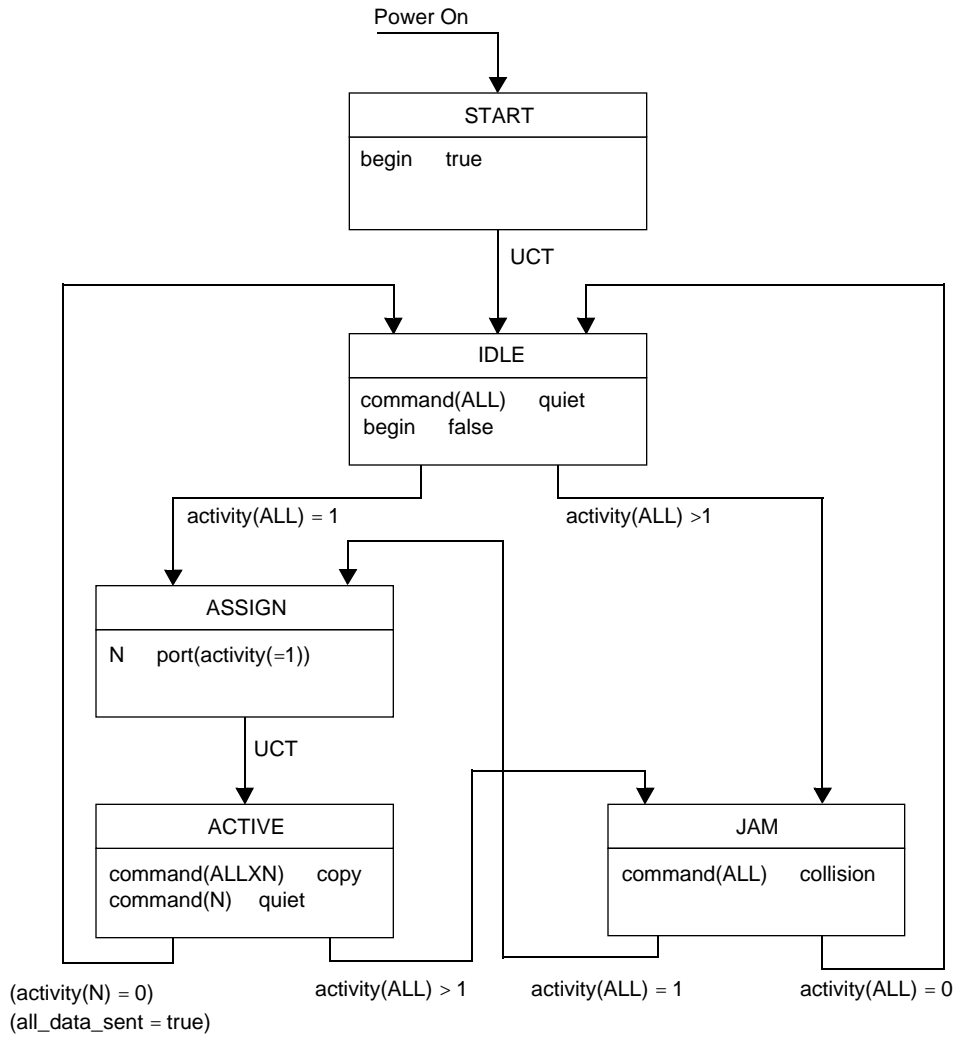


Figure 27-8—Partition state diagram for port X (AS CURRENTLY PUBLISHED)

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**Figure 27-2—Repeater core state diagram (AS CURRENTLY PUBLISHED)**