SUBJECT: Need for Partial MAC Frame Check Sequence Checking
TO: IEEE 802.0
FROM: IEEE 802 2

Numerous efforts in IEEE 802 are aimed at supporting Multimedia applications in a LAN environment. One of those activities is the development of a new LLC type known as LLC Type 4 (LLC4). The current Functional Requirements for LLC4 provides for data transfer mechanisms similar to the existing LLC1 and LLC2 capabilities but with enhancements for features such as multiple connections between LSAP pairs. That is, LLC4 provides a non reliable sequenced delivery service similar to LLC1 (where no attempt is made to recover lost data but the MAC FCS guards against bit errors in data that is delivered) as well as a reliable, sequenced delivery service similar to LLC2 (where LLC procedures are available to ensure against data loss and the MAC FCS also guards against bit errors in the delivered data).

In considering the Multimedia environment, it appears to us that certain types of information flows are able to tolerate bit errors in the "payload" but are not able to tolerate the delay in re-transmission to "get it all right". This is similar to LLC1 operation but with the ability to deliver **data to the LLC** user that has bit errors in it. It would appear that real-time voice is an example of such a case and still-image video might be yet another case. Recognition of this has resulted in a partial FCS check in packet-based systems carrying voice according to ITU-T Rec. G.764. Given the desire to support such information flows in LANs, it appears that a way to accomplish this is to provide MAC FCS checking only over part of the frame. It would appear that current MAC FCS checking over the entire frame would not be consistent with the **goals expressed above.**

To provide a partial MAC FCS checking capability, it is believed that a change will be needed in the MAC service definition along with changes to the MAC protocols themselves if they wish to support this feature. We would envision that it is necessary to guard against bit errors in the MAC sublayer, especially for the DA and SA to ensure delivery to the proper destination. Therefore, in going forward with a partial FCS checking feature, we would suggest **that the** entire MAC protocol control information (PCI) be protected. This is a variable number of octets, depending on the MAC. In addition, we would also envision a certain number of octets of LLC4 PCI be protected. The rest of the LLC4 PDU that carries user data constitutes the payload **mentioned above** as tolerant of bit errors.

At this time, therefore. we would envision a change to the MAC service definition in which, on a per M-UNITDATA request invocation, a parameter can be passed by LLC to MAC to indicate **whether the FCS** for this transmission should be calculated and verified over the **entire user** data in the M-UNITDATA request (i.e., the entire LLC4 PDU) or only a part of it. In the case of partial coverage, minimal support for a fixed number of LLC octets would be required. If it is also desirable to extend this coverage to cover a higher layer's PCI, then the number of octets would have to be variable (i.e., it would have to depend on the higher-layer protocol and how many octets are critical to it). In either case, partial FCS checking would have to be able to pass "valid" frames (a frame whose first "x" octets were valid but with a bit error in later octets) through bridges.

IEEE 802.2 would like to work with you to determine how best to support Multimedia in LANs and how to provide a "partial FCS coverage" feature. We would envision that a target to aim for would be a contribution to the ISO/IEC JTC1/SC6 meeting in March 1995 (which immediately follows the March 1995 IEEE 802 meeting).