Local Bridge Unmanaged

FEDERAL COMMUNICATIONS COMMISSION
AND
CANADIAN DEPARTMENT OF COMMUNICATIONS
RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par le ministère des Communications du Canada.

INSTRUCCIONES DE SEGURIDAD (Normas Oficiales Mexicanas Electrical Safety Statement)

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.

2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.

3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.

4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá a lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

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Contents

1. Specifications

System Requirements—IEEE 802.3 or Ethernet Version 2 Local Area Network

Standards—IEEE 802.3: 10BASE5, 10BASE2, and 10BASE-T

Compatibility—IEEE 802.3/Ethernet Version 2

Protocol—Protocol-independent (MAC-layer bridging)

Data Rate—10 Mbps

Filtering Rate—17,500 pps

Forwarding Rate—11,000 pps

Processor—68000

Internal Memory—512 KB RAM

Diagnostics—LEDs only

Indicators—(4) LEDs: Power, LAN 1, LAN 2, STP

Connectors—LB0202A: (2) AUI female, (2) BNC female, (1) DB9 console port; LB0210A: (2) AUI female, (2) RJ-45 female, (1) DB9 console port; LB0212A: (2) AUI female, (1) BNC female, (1) RJ-45 female, (1) DB9 console port

Power — 100-250 VAC, 50-60 Hz, 0.3-0.7 A

MTBF—30,200 hours

Maximum Altitude—10,000 ft. (3048 m)

Temperature—Operating: 35° to 90° F (2° to 32° C); Storage: -4° to 131° F (-20° to 55° C)

Humidity—20% to 80% noncondensing

Size — 2"H x 10"W x 10"D (5.1 x 25.4 x 25.4 cm)

Weight — 11 lb. (5 kg)

2. Quick Setup Guide

If you are an experienced user, follow these instructions to quickly setup your bridge.

1. Unpack the bridge and identify the connectors. All external connections to the bridge are provided by the connectors on the rear of the bridge.

2. Power on the bridge. Connect the DC power cord to the back of the bridge and plug the power supply into the AC wall outlet.

   Observe the LEDs as the bridge powers on. *With the LAN cables not connected,* the Power LED will go from red to green, and the two LAN LEDs will stay red.

3. Make the LAN connections. The bridge is equipped with two LAN interfaces per LAN port, depending on which model you have. The following models are available:

   • LB0202A—(2) AUI, (2) BNC

   • LB0210A—(2) AUI, (2) 10BT

   • LB0212A—(2) AUI, (1) BNC, (1) 10BT

   Connect the bridge to each of the LANs with the available LAN interface cable.

   The LEDs for the LANs will change to green.

3. Introduction

The Local Bridge Unmanaged easily divides networks experiencing traffic congestion into separate networks for increased LAN performance. By localizing LAN traffic, you get more available bandwidth for the LAN users on each LAN segment. Only the traffic that needs to be transmitted across segments is transmitted.

The Local Bridge Unmanaged is a plug-and-play bridge. It will operate as delivered, so no preconfiguration is necessary. Models are available with AUI and BNC connectors, AUI and 10BT connectors, or AUI, BNC, and 10BT connectors. These models include the following:

- **Local Bridge 10B2 Unmanaged** (LB0202A)—This model has (2) AUI connectors for connection to Thick Ethernet, and (2) BNC connectors for connection to Thin Ethernet.

- **Local Bridge 10BT Unmanaged** (LB0210A)—This model has (2) AUI connectors for connection to Thick Ethernet, and (2) 10BT connectors for connection to Unshielded Twisted-Pair 10BASE-T Ethernet.

- **Local Bridge 10BT/2 Unmanaged** (LB0212A)—This model has (2) AUI connectors for connection to Thick Ethernet, (1) BNC connector for connection to Thin Ethernet, and (1) 10BT connector for connection to Unshielded Twisted-Pair 10BASE-T Ethernet.

The Local Bridge Unmanaged is a dual-port Ethernet Media Access Control (MAC) level bridge that provides an efficient means of interconnecting IEEE 802.3 Local Area Networks supporting standard Ethernet (10BASE5), Thin Ethernet (10BASE2), and twisted-pair Ethernet (10BASE-T). With the support of these industry-standard LAN interface technologies, these Bridges will resolve the media conflicts that might otherwise keep you from consolidating these resources.

The Local Bridge Unmanaged also fits into environments that require more than one Bridge by using the IEEE 802.1D Spanning Tree Protocol.

Appendix A: Bridge Internals

Open the bridge case only for:

- Battery replacement.

- Changing the LAN connector(s) used to interface to the LAN(s).

CAUTION

Before you open the case, power-down the bridge by disconnecting the power cord. Although the low (5V) voltages used for powering the Bridge do not present a personal danger, severe damage can occur to the Bridge if components are short-circuited when you open the case.
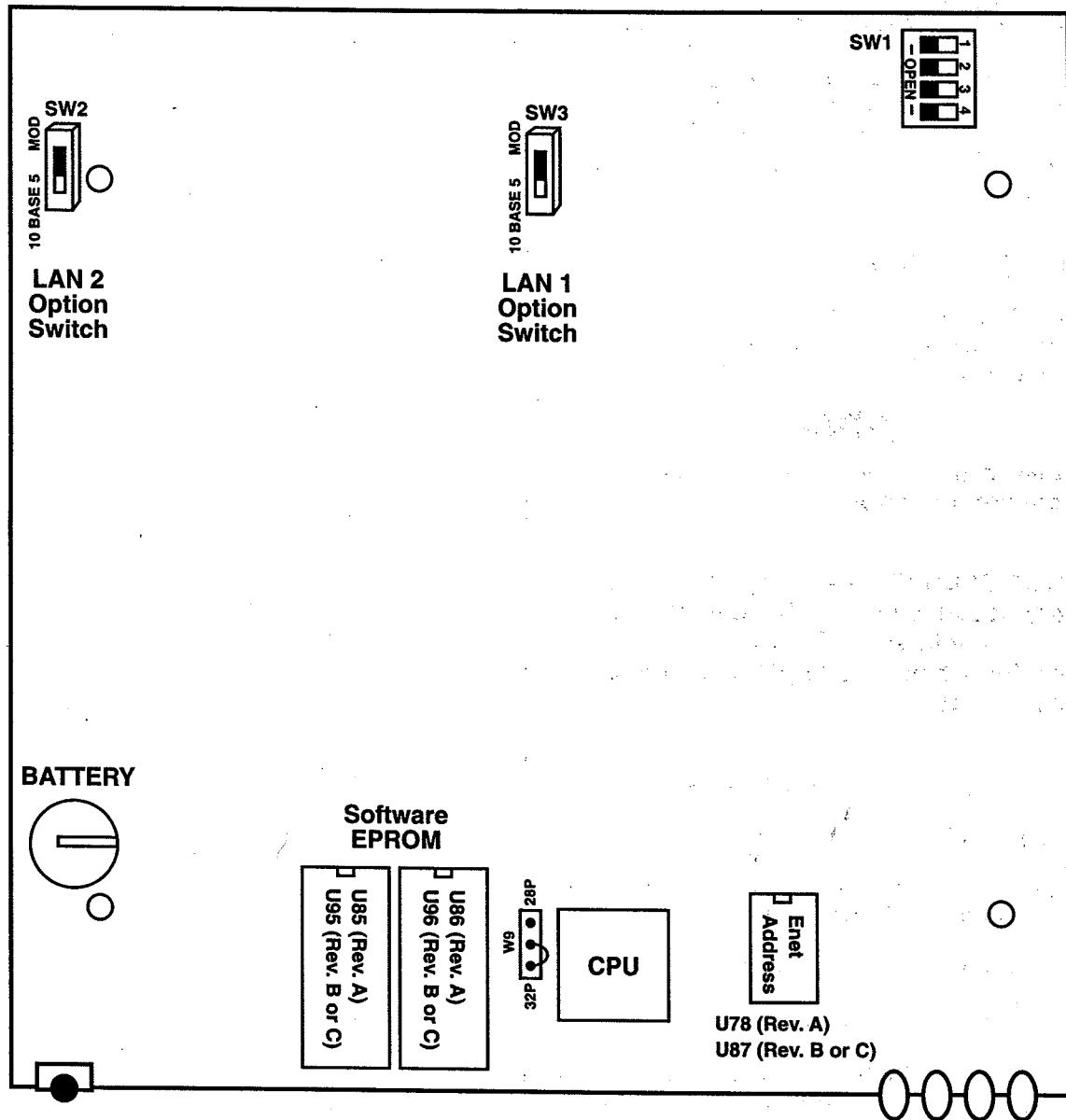
A.1 Opening the Case

Follow these steps:

1. Unplug the Bridge and remove the power cord.

2. Turn the Bridge over and place it on a cushioned surface.

3. Remove the four Phillips-head screws that fasten the case together.

4. Hold the two halves of the case together and turn the bridge right-side up.

5. Gently lift off the top half of the case.

A.2 Identifying the Internal Components

Once you remove the top of the Bridge, you'll see the PCB (printed circuit board) and its components. Before you open the shielding, notice how the flaps overlap to the outside. This folding method allows the shielding to contact more surface area and provides the most effective shielding. The shielding is "hinged;" when you lift it, it slides against the inner flaps. The major components of concern are shown in **Fig. A-1**.

Fig. A-1. The Internal Components of the Bridge.

A.3 Changing the LAN Connector Scheme

The switch for each LAN is labeled MOD and 10BASE5. MOD represents the choice of connector option 10BASE-T or 10BASE2, depending on the installed connector scheme.

If, for example, you have been using 10BASE5 and have changed your wiring scheme to 10BASE–T, simply slide the appropriate switch (SW2 and/or SW3) from the 10BASE5 position to the MOD position.

A.4 Changing the Battery

The battery has a lifetime of approximately 5 years. Schedule replacement at some time less than this to ensure consistent performance.

CAUTION
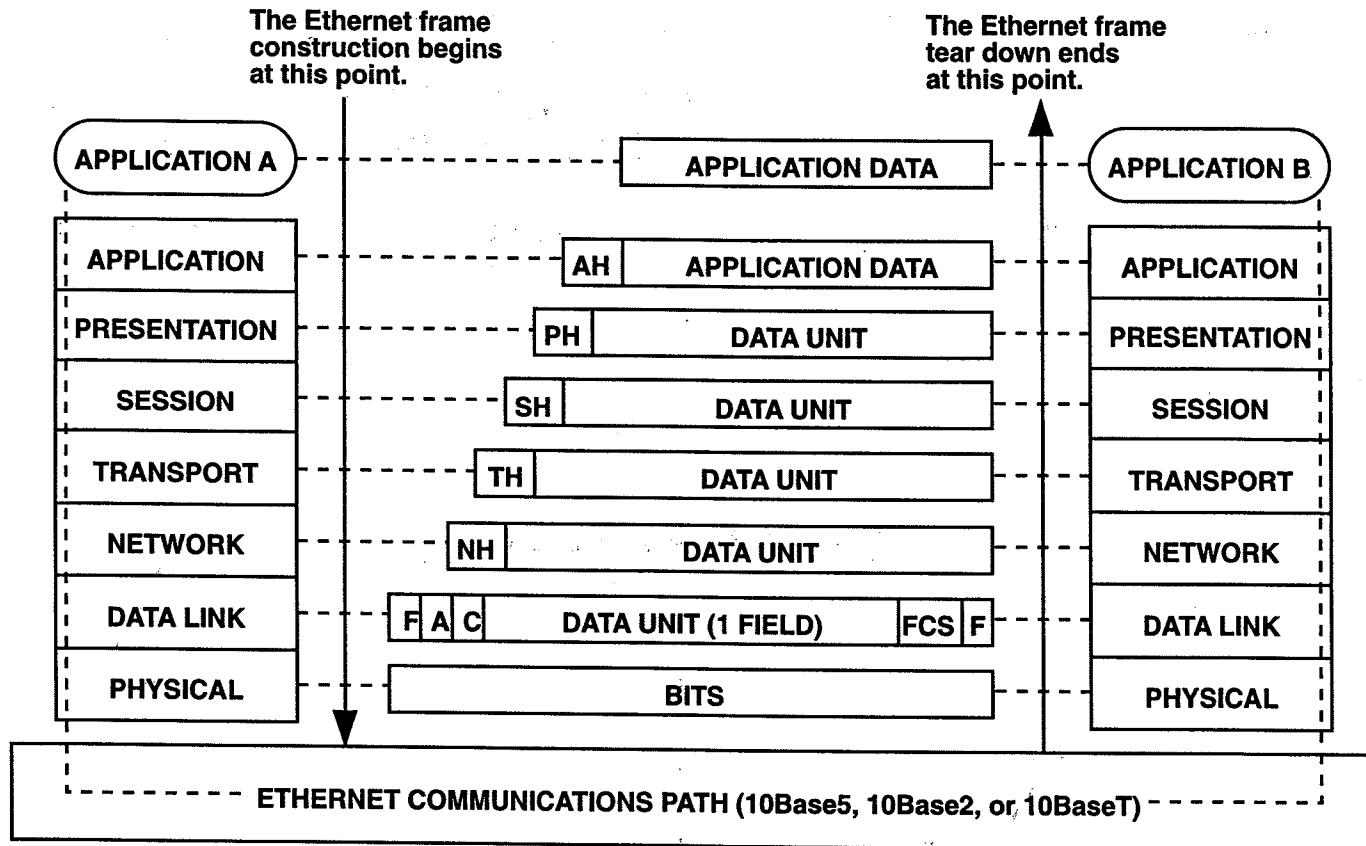
Removing the battery will destroy the current configuration.

DO NOT OPERATE the Bridge without a battery because even in the discharged state it completes an important circuit. Leave the old battery in place until you get a new one.

Follow these steps to change the battery:

1. Get a new 2430 lithium battery.

2. Remove the power from the bridge and open the case. Refer to **Section A.1**.

3. Before you touch the PCB, touch a desk or something metal so that static discharge won't harm the electronic circuits.

4. Carefully lift the PCB out of the case. You will have to guide the front and rear panels out of their slots as you raise the PCB.

5. Carefully lift the center tab, which secures the battery. Note the position of the old battery, and then remove it.

6. Install the new battery in the same position as the old battery.

7. Reinstall the PCB in the reverse order of removal.

8. Close the case and power-up the Bridge.
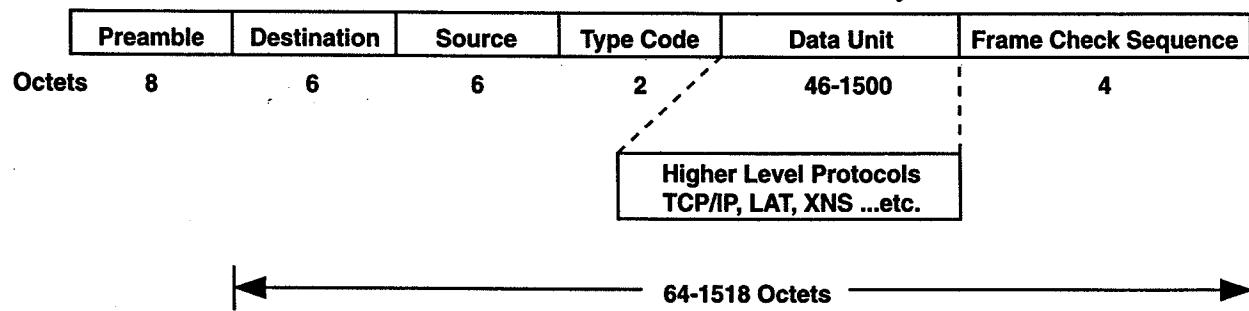
Appendix B: Ethernet Frames

The Ethernet frame
construction begins
at this point.

The Ethernet frame
tear down ends
at this point.

| APPLICATION A | | APPLICATION DATA | | APPLICATION B |

APPLICATION	AH	APPLICATION DATA	APPLICATION
PRESENTATION	PH	DATA UNIT	PRESENTATION
SESSION	SH	DATA UNIT	SESSION
TRANSPORT	TH	DATA UNIT	TRANSPORT
NETWORK	NH	DATA UNIT	NETWORK
DATA LINK	F A C	DATA UNIT (1 FIELD) FCS F	DATA LINK
PHYSICAL		BITS	PHYSICAL

ETHERNET COMMUNICATIONS PATH (10Base5, 10Base2, or 10BaseT)

F   = Framing
A   = Address
C   = Control
FCS = Frame Check Sequence
NH   = Network Header
TH   = Transport Header
SH   = Session Header
PH   = Presentation Header
AH   = Application Header

Fig. B-1. Ethernet Frame Transmission from Application A to Application B.

Preamble	Destination	Source	Type Code	Data Unit	Frame Check Sequence
Octets 8	6	6	2	46-1500	4

Higher Level Protocols
TCP/IP, LAT, XNS ...etc.

◄──────────────────── 64-1518 Octets ────────────────────►

Fig. B-2. Ethernet Frame Format.

LEVEL 2 ETHERNET

0	01	02	03	04	05	06	07	08	09	10	11	12	13
ETHERNET DESTINATION ADDRESS						ETHERNET SOURCE ADDRESS						TYPE CODE	

INTERNET PROTOCOL

14	15	16	17	18	19	20	21	22	23	24	25
VER.	IHL	Type of Service	TOTAL LENGTH		IDENTIFICATION		Flags	FRAGMENT OFFSET	TIME TO LIVE	Protocol	HEADER CHECKSUM

26	27	28	29	30	31	32	33
SOURCE ADDRESS				DESTINATION ADDRESS			

TRANSPORT CONTROL PROTOCOL

34	35	36	37	38	39	40	41	42	43	44	45
SOURCE PORT			DESTINATION PORT		SEQUENCE NUMBER			ACKNOWLEDGEMENT NUMBER			

46	47	48	49	50	51	52	53	54	55	56	57
Data Offset	Reserved	UAPRSF RCSSYI GKHTNN	WINDOW		CHECKSUM		URGENT POINTER		DATA FIELD		

58	59	60	61	62	63	64......	W	X	Y	Z
DATA FIELD NEXT 500 OCTETS							ETHERNET CHECKSUM			

Fig. B-3. Octet Locations on a TCP/IP Frame.

LEVEL 2 ETHERNET

0	01	02	03	04	05	06	07	08	09	10	11	12	13
ETHERNET DESTINATION ADDRESS						ETHERNET SOURCE ADDRESS						TYPE CODE	

NOVELL IPX HEADER

14	15	16	17	18	19	20	21	22	23
Checksum		LENGTH		Transport Control	PACKET TYPE	DESTINATION NETWORK			

24	25	26	27	28	29	30	31	32	33	34	35
DESTINATION HOST						DESTINATION SOCKET		SOURCE NETWORK			

36	37	38	39	40	41	42	43
SOURCE HOST						SOURCE SOCKET	

NOVELL SPX HEADER

44	45	46	47	48	49	50	51	52	53	54	55
Connection Control	Datastream Type	SOURCE CONNECTION ID		DESTINATION CONNECTION ID		SEQUENCE NUMBER		ACKNOWLEDGE NUMBER		ALLOCATION NUMBER	

NOVELL DATA FIELD AND ETHERNET CHECKSUM

56	57	58	59	60	61	62......	W	X	Y	Z
DATA FIELD .... 534 OCTETS OF DATA							ETHERNET CHECKSUM			

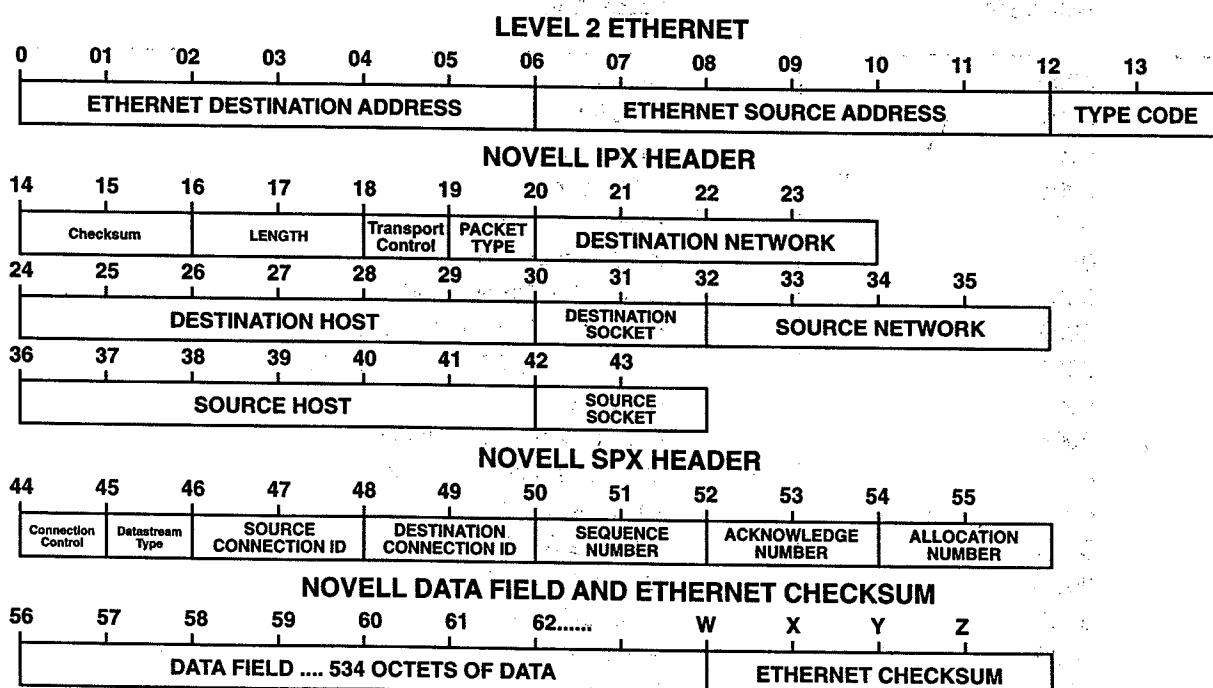**Fig. B-4. Octet Locations on a Novell® NetWare® Frame.**
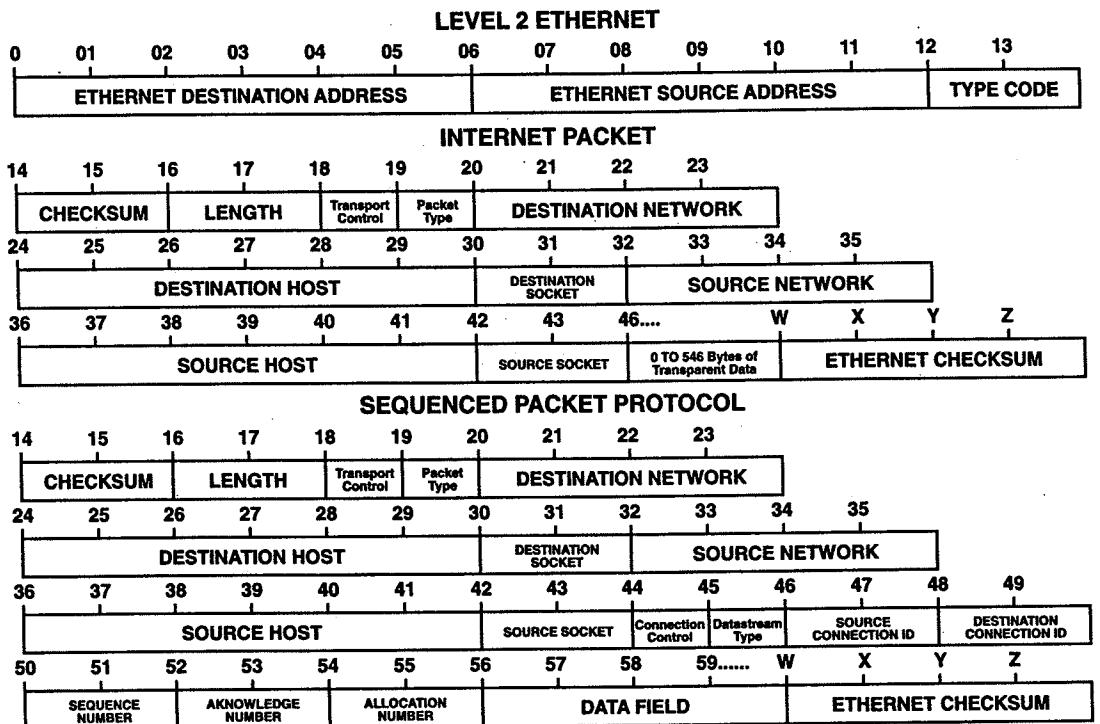
Fig. B-5. Octet Locations on a XNS Frame.

Table B-1. Ethernet Type Codes.

Type Code	Description
0800	DOD IP
0801	X.75 Internet
0804	Chaosnet
0805	X.25 Level 3
0806	ARP
0807	XNS Compatibility
6001	DEC MOP Dump/Load
6002	DEC MOP Remote Console
6003	DEC DECNET Phase IV Route
6004	DEC LAT
6005	DEC Diagnostic Protocol
6006	DEC Customer Protocol
6007	DEC LAVC, SCA
8035	Reverse ARP
803D	DEC Ethernet Encryption
803F	DEC LAN Traffic Monitor
809B	AppleTalk
80D5	IBM® SNA Service on Ether
80F3	AppleTalk AARP (Kinetics)
8137-8138	Novell, Inc.
814C	SNMP