Appendix ET

Notes On The Ethernet Thin And Thick Base Band Local Networks (802.3 10BASE2 And 802.3 10BASE5)

General Information

Ethernet local networks are optimized for high–speed data exchange between information processing equipment situated within a medium–sized geographical area.

Ethernet networks use base band technology on every physical means of transmission. The base band signals are modulated on a carrier signal but keep their original unmodulated form. When they are transmitted, they are situated at the base of the channel pass–band. Digital signals and transmission technology are used.

Coaxial, double–wrapped and fibre optic cables can be used as a means of transmission.

Ethernet network types are thick (802.3 10BASE5) and thin (802.3 10BASE2).

The transmit functions of the signal on the channel are carried out by the following physical components:

- ***LAN (Local Area Network) Adaptor***
  The LAN adaptor supplies the interface between the network elements (computers, equipment...) and the transmit cable.
  This adaptor can generally have a BNC network port or an AUI network port (Fig. ET–1).
  The BNC port is used for the direct connection of Ethernet Thin networks.
  The AUI port is used for the connection of a derivation cable coming from a Transceiver connected to the Ethernet Thick network.

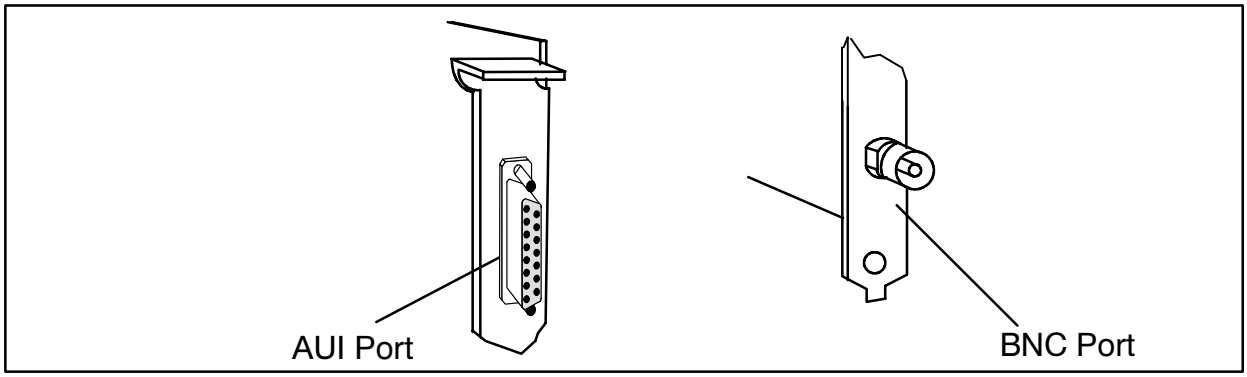

Fig. ET–1 *LAN adaptor network ports*

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- ***Transceiver***
  the transceiver is a piece of external equipment used for connecting the Ethernet Thick coaxial transmit cable to a multi–wire derivation cable terminating at a AUI network port on the LAN adaptor (see Fig. ET–2). There are also transceivers for connections with Ethernet Thin cable pairs and fibre optic cables.

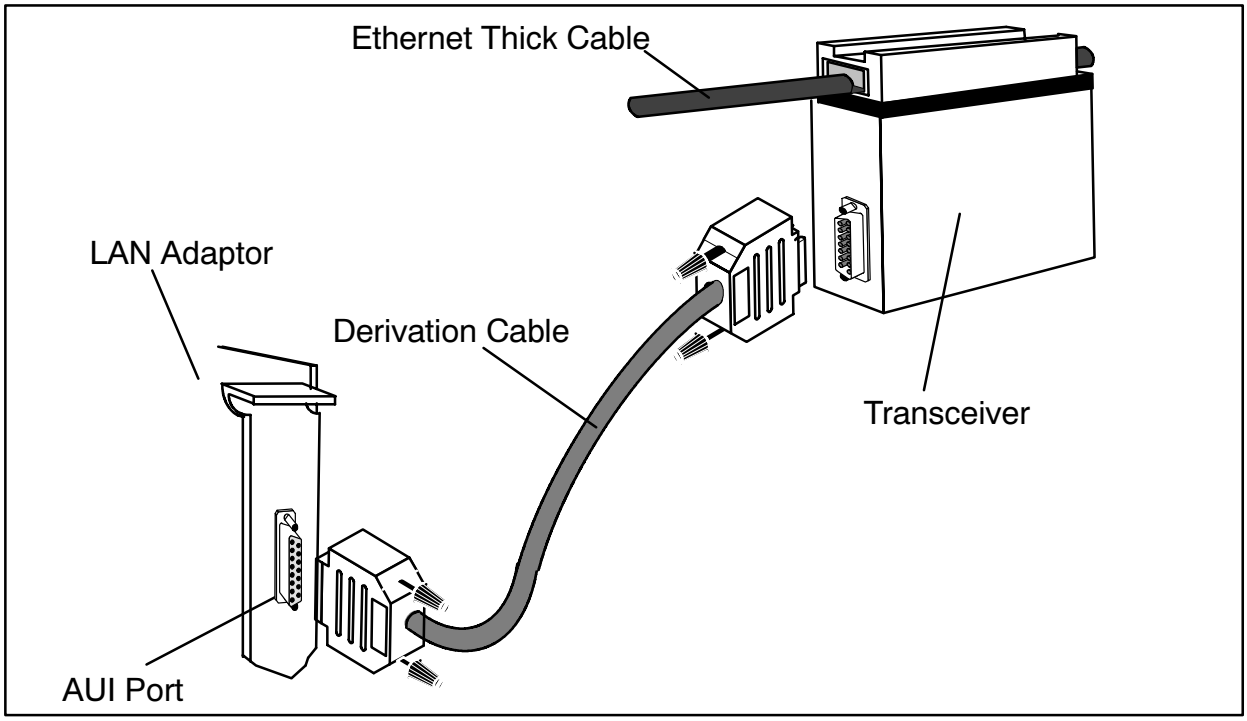

Fig. ET–2 *Transceiver*

- ***Repeaters***
  repeaters are pieces of external equipment used for connecting segments of Ethernet cables together, synchronizing and re–transmitting data signals. Repeaters can be of the single–port or multi–port type and are available for both coaxial and fibre optic cables.

Ethernet Thin Network (802.3 10BASE2)

RG58 A/U or RG58 C/U coaxial cables are used as a means of transmission for Ethernet Thin Networks (802.3 10BASE2).

The end of the cable towards the network element is linked using a BNC ”T” connector

The free and of the connector on the last network element is closed by a terminator plug with a 50 Ohm nominal impedance (see Fig. ET–3).

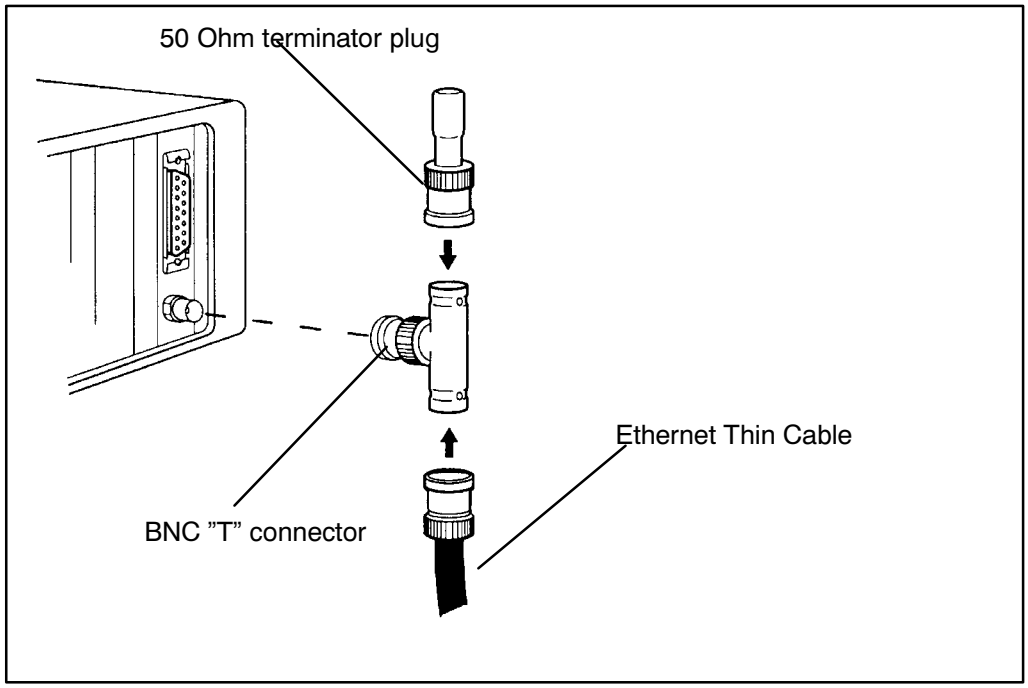

Fig. ET–3 *Connection of a ”T” connector for an Ethernet Thin network with a terminator plug*

The reference for the network dimension is the ”segment”, which is defined as the length of the cable between two repeaters.

The characteristics of an Ethernet Thin network are shown in table 1.

Ethernet Thick Network (802.3 10BASE5)

A 50 Ohm coaxial ”TRUNK” cable with tin–plated conductors, which is marked at 2.5 meter intervals, is used as a means of transmission for Ethernet Thick (802.3 10BASE5) networks.

A continuous piece of coaxial cable up to 500m in length is defined as a ”segment”. An Ethernet Thick network is usually composed of a main segment from which secondary segments derive by means of repeaters (see Fig. ET–4).

The network elements are usually linked to the secondary segments but they can also be directly connected to the main segment.

The Ethernet Thick network connections are carried out via the Transceivers, which can be linked to the segments at a minimum distance of 2.5m (indicated by the marks on the cable).

The multi–wire derivation cables which terminate at the AUI ports start at the transceivers.

The maximum length of the derivation cables is 50 meters.

A terminator plug with a nominal 50 Ohm impedance must be fitted to the ends of each cable segment.

The characteristics of an Ethernet Thick network are shown in Fig. ET–1.

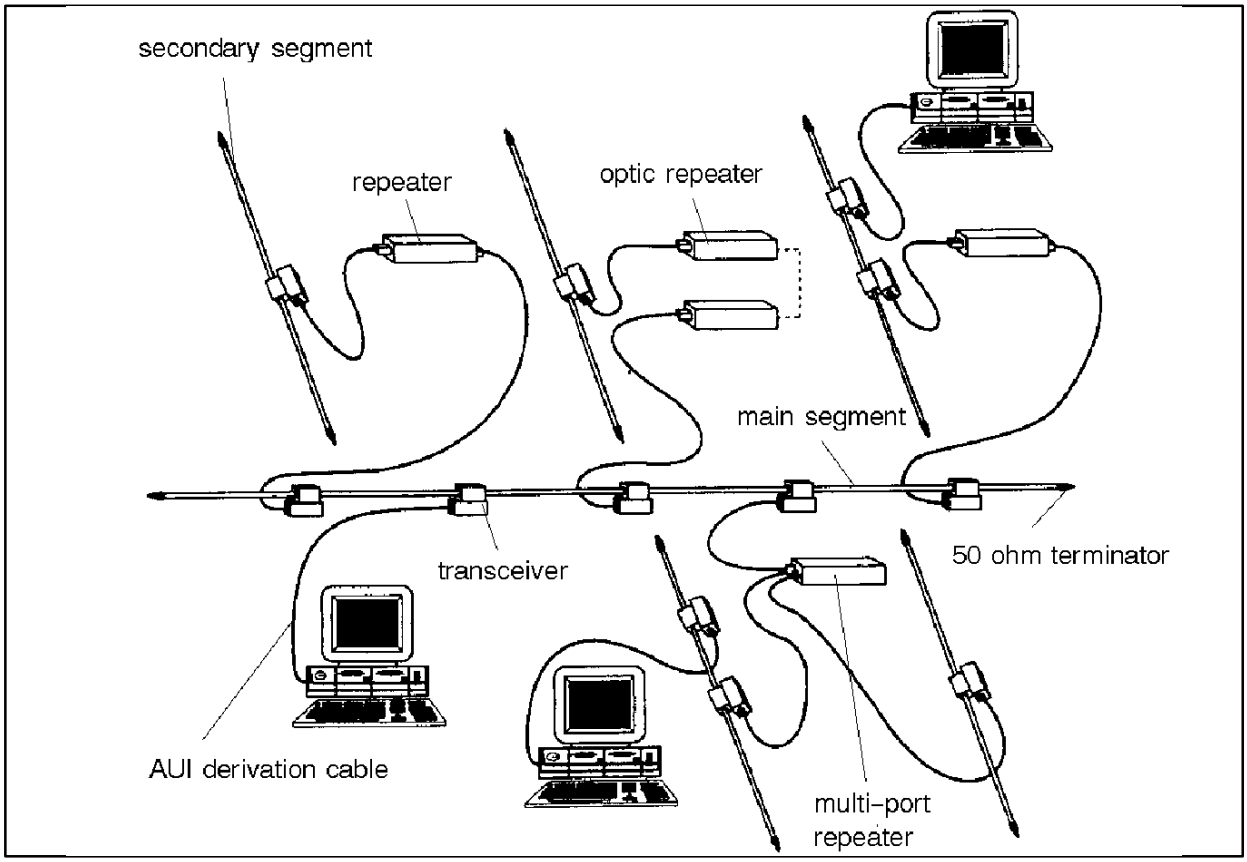

Fig. ET–4 *Example of an Ethernet Thick network*

Characteristics Of Ethernet Networks

	Ethernet Thin		Ethernet Thick
	Standard	**Extended**	
Maximum length of the cable segments	185 m	300 m*	500 m
Maximum number of segments per line	5	3	3 (+ 2 links with reapeter)
Length of the network with repeaters	925 m	900 m	2500 m
Transceiver connection per segment	30	100	100
Network port on the LAN adaptor	BNC Port		AUI Port
Type of cable	RG58 A/U or C/U coaxial cable		”Trunk” coaxial cable
Minimum space between nodes	0,5 m		2,5 m
Maximum number of network elements	1024		1024

NOTE (*) All of the Networks Elements must guarantee operations up to 300 meters

Tab. ET–1 *Characteristics of Ethernet Thick and Thin networks*

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