The Econet-X25 Gateway

Introduction

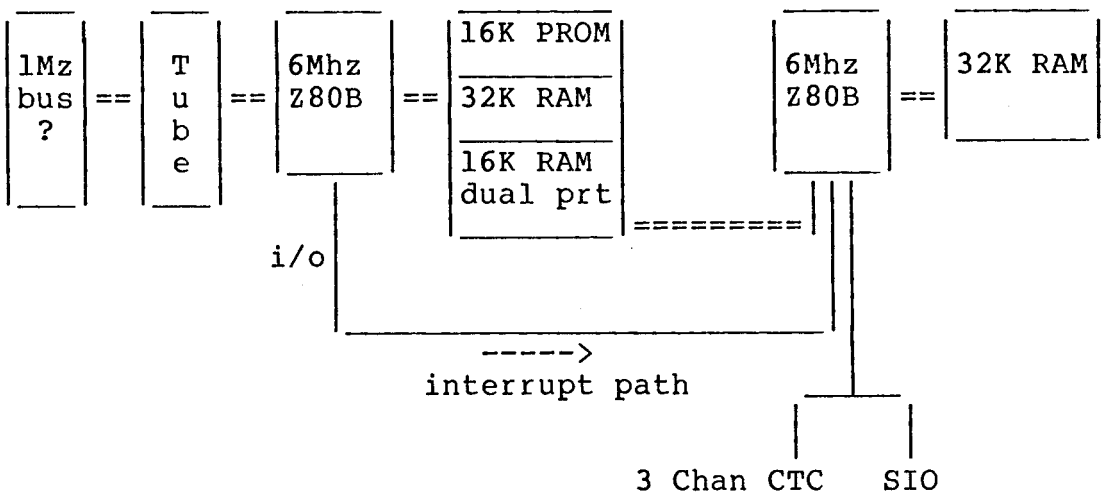
The Econet-X25 gateway (hereafter referred to as the gateway) is a specific item of hardware connected between an Econet and X25 packet switching network with appropriate software for supporting calls between the two networks. This will give Econet users remote terminal access to host computers attached to the X25 network, and provide the necessary link between the two types of networks for file transfer. Any other applications requiring connections between the two networks should be able to use the gateway. The gateway will equally well connect to a host computer with an X25 connection as to an X25 network.

Use of the Gateway

It is not envisaged that the initial gateway hardware will perform any other task than providing a gateway between Econet and X25 networks. In other words, no application can run in the gateway, with the exception of any configuration, monitoring and control utilities that may be found desirable. This does not preclude a re-engineering of the gateway to provide a self-contained BBC micro with X25 access. It is not likely that more than one call will be in progress at any one time between the gateway and an Econet user, but there is no specific ban on this.

Hardware

This is almost finalised, and looks like consisting of a BBC 6502 micro connected via a Tube interface to a new board with Z80 and SIO chips. The micro will not have a keyboard, and any operator control will have to come from the Econet. However, a video output may well be useful for monitoring and debugging. The new board has two distinct 6Mhz Z80 processors, one for driving the X25 and the other driving the Tube. The Tube interface may be driven over the 1Mhz bus rather than the dedicated Tube port. The two processors will communicate via shared memory (16K of dual ported RAM) and an interrupt path will exist to the X25 Z80 from the other one. The X25 Z80 will have 32K (RAM?) for code+local data, and the Tube Z80 will have 16K PROM and 32K RAM for its own use.



The gateway will support a single HDLC line over a V24 interface operating at speeds up to 19.2Kb.

Software

The essential items of software that comprise the Econet-X25 gateway are:

(a) a network service module, by which the Econet is accessed,
(b) an X25 module, by which the X25 line is accessed, and
(c) a gateway module which interfaces to (a) and (b)

The network service module runs in the gateway 6502 BBC machine just as it does in a standard 6502 machine. The X25 module runs in a dedicated Z80 processor on the new board, as does the gateway module. The interface to the network service from the gateway is via OSWORD calls over the Tube, which means that no specific gateway software is required in the 6502.

At least 16 simultaneous connections will be supported by the gateway. In order to establish a connection, it will be necessary to access the new network service interface within a BBC micro attached to the Econet. It is possible to both initiate and receive calls at this interface. The network service interface at the user is replicated within the gateway. The gateway provides sufficient protocol and address mapping to relay incoming X25 calls across the Econet, and incoming Econet calls across the X25 network.

Network Service Module

This is designed to support an ISO network service over the Econet and other communications links. It is accessed via OSWORD calls, with the user encouraged to poll the network service for incoming items rather than use events. It will support 29 simultaneous calls over the Econet.

X25 Module

This is a self-contained module designed by Symicron and designated STS (Symicron Telematics Software) ported onto the Acorn purpose-built gateway board. The interface is well documented and the software proven. The X25 facilities and limitations are:

Window sizes negotiable to 7
Maximum data packet size fixed at 128
Closed User Group requests passed transparently
Reverse charge requests passed transparently
Extended formats supported
Fast Select supported (incoming and outgoing)
Call statistics from the network passed transparently

It is possible that a maximum data packet size of 256 can be permitted in the future if space allows. It is certainly the intention to establish a buffer size sufficient for a fast select call request packet with 128 bytes of user data. Currently Symicron estimates the program code to reside in 24K bytes, with as much RAM as necessary to support 16 simultaneous calls. 1K bytes per call is likely to be adequate with a packet size of 128 bytes.

Gateway Module

This is the module that routes on calls from either network (Econet or X25) to the other. One major task is to map primitives received from one interface into appropriate primitives to the other. The other task is to make appropriate protocol changes when required.

Gateway conversions

The gateway is presented with two interfaces: one to the network service (found in the 6502) and one to the X25 module (found in the Z80 board). These are not dissimilar, but have some definite differences which prevent simple relaying. Likely known uses of the gateway are:

(a) Simple X25 calls

Here the gateway is almost an end-point of the X25 network and a remote X25 user attempts to access a BBC micro or server on the Econet using a simple X25 subaddress (0 to 99) to distinguish the Econet subscriber/application. The gateway will need a look-up table to do this extremely simple mapping. The network service can mirror most of the requests from the X25 user and vice-versa. Calls made from the Econet to X25 are more easily handled since the network service called address may easily include the X25 called address.

This use of the gateway is likely to be valuable when

testing the gateway, and for interworking with existing X25 applications on host computers which do not use a transport service.

(b) Yellow Book Transport Service calls (YBTS)

Here the gateway behaves as a transport service relay between two networks. The major difficulty is involved in sorting out addressing across the networks. The transport service addresses used over the X25 network are "horizontal addresses" while the transport service addresses used over the econet are mapped directly into network service addresses.

The gateway will be used in this mode when any remote X25 subscriber wishes to communicate with any econet user. There are none of the addressing restrictions of (a) applicable to destination addressing. Equally, this is a very flexible way for Econet users to set up calls through the gateway to X25 or beyond into other networks. In particular, a terminal user on the Econet with a PAD TS29 interface can call up TS29 hosts through the gateway. Applications such as file transfer, job transfer and mail which are built to use the YBTS will be able to operate equally well over the Econet and X25 network together as they can over the Econet on its own.

(c) Econet PAD to X25 host.

The specific protocol for terminal access over X25 is X29, and the Network Service must be used in the best way to support an equivalent protocol. In practice this is not particularly difficult.

The gateway will be used in this mode when an Econet user with the PAD PROM wishes to call up a remote X25 host which does not support the YBTS (and many do not, particularly in the commercial environment).

Management

The management of the gateway will be accomplished via an X29 internal interface which in the first place will only be accessible from the Econet. It is recognised that making this facility available to a PAD user across the X25 network could facilitate support in the field.

The configuration tables required by this unit (X25 parameters, title to address translations) etc. will be held on file across the Econet