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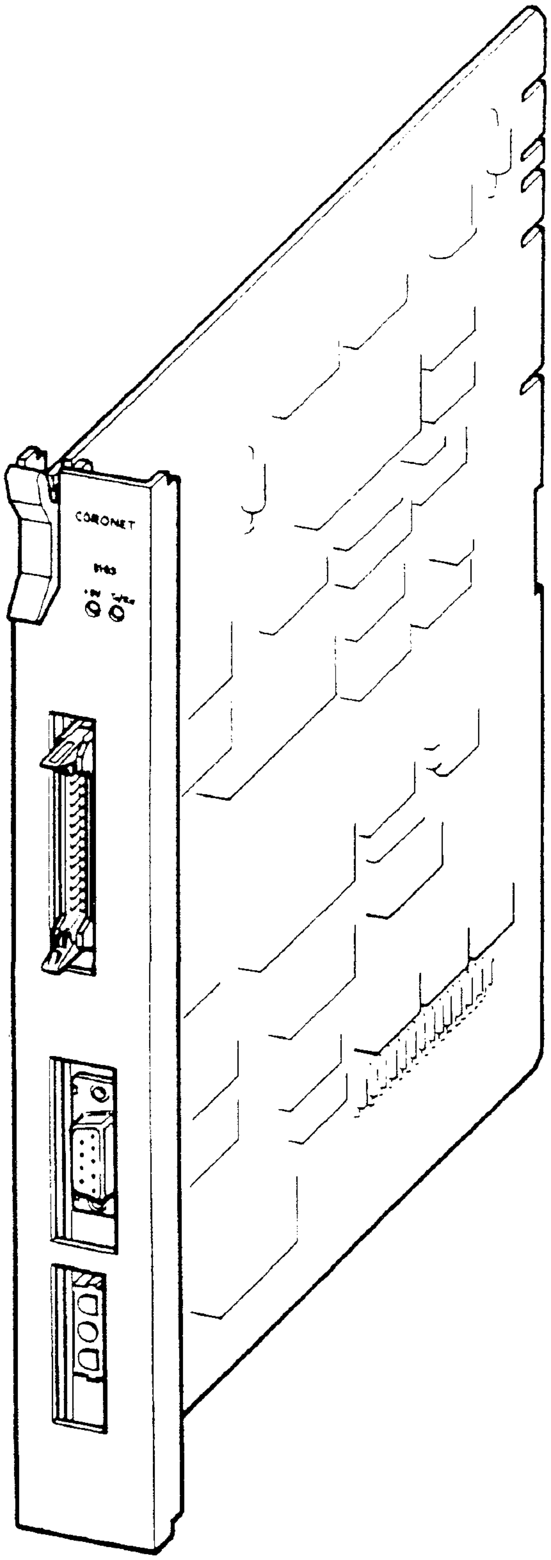
INDUSTRIAL CONTROLS

Coronet 50 Local Area Network Interface

8193



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1. INTRODUCTION

CORONET is a serial link based on the Local Area Network, or LAN, principle. That is, any unit can initiate communication with any other unit on the LAN.

This differs from the standard RS422 serial ports provided by the GEM 80 I/O processor where a 'master/slave' (control/tributary) protocol is used.

With CORONET, all the units on the network are 'masters' and have equal priority. In addition to this, the CORONET LAN can also service more units than is normally available to a GEM 80 Controller through a 20mA current loop, as provided by an 8924 termination unit. This is because CORONET is not subject to the voltage limitations needed to drive the 20mA current source. On a CORONET LAN, up to 32 units can be serviced with the facility of adding GATEWAY units to connect to remote LANs.

Each RS422 serial port provided by the GEM 80 I/O processor can be programmed for CORONET operation by setting the appropriate data in the P-table (see Table 4.2). A CORONET interface module, an 8193, is required to convert the RS422 serial port to RS485 working, the Industry standard for LAN.

The CORONET LAN is based on equipment provided by Compex S.A. of France.

2. 8193 CORONET 50 INTERFACE MODULE

The 8193 CORONET interface module is a single-width module which can be slotted into any location in a Verification I/O subrack. There is no mechanical coding of the module since it requires access only to the +5V, +15V and 0V supply rails on the backplane.

When the 8193 is used in a Basic I/O subrack, it must be inserted into the slot nearest to the Power Module.

2.1 Specification

Power consumption	:	1.5A @ 5V d.c.	
Temperature range	:	0 to 60° C operating	
Humidity	:	5 to 95% RH non condensing	
Dimensions	:	223 x 28 x 250mm (H) (W) (D)	
Data transmission	:	Network	: 50. kbaud
	:	GEM 80 to 8193	: 9.6 kbaud
Interface	:	GEM 80 to 8193	: RS422
	:	8193 to LAN	: RS485
	:	8193 to extra port	: RS422
Maximum length	:	4km with recommended RG108 cable	
Isolation	:	2kV	

Note... The maximum length of 4km between LAN terminators is with the recommended cable. If greater distances are required, gateways may be used to join sub-networks.

2.2 User Connections

There are three sockets mounted on the front panel of the 8193 module. These are a 26-way ribbon connector, a 9-way 'D'-type socket, and a 3-way AMP* connector (see Figure 2.1).

The 26-way ribbon connector is for connection to the 26-way serial link ribbon cable provided by the I/O processor. Although two RS422 serial ports are available on the ribbon cable, the 8193 may only interface with Port 1 (or Port 3 if a slave I/O processor is the source of the ribbon cable) see Table 2.1.

Table 2.1 - 26-way Serial Port Connection Details

PIN No.	SIGNAL
1	COMMON
3	Rx-
4	Rx+
7	Tx-
8	Tx+
9	COMMON

The 9-way 'D'-type socket is provided for the connection of a printer or other 'non-intelligent' equipment. Access to this equipment is restricted to any System Programmer or Programmer Emulator connected to the LAN. No other device can gain access to these peripherals on present versions of GEM 80 firmware. See Table 2.2.

Table 2.2 - 9-way Printer Port Connection Details

PIN No.	SIGNAL
1	COMMON
2	+5V
3	Tx-
4	Tx+
5	+15V
6	0V
7	Rx-
8	Rx+
9	COMMON

Connection to the LAN is via a 3-way AMP* connector. The cable consists of one twisted pair for the transmission channel and one screen conductor which must be connected to ground. In order to guarantee the network performances, cable type RG108 is recommended. See Section 8. Ordering Codes.

Table 2.3 - 3-way LAN Connection Details

PIN No.	SIGNAL
1	-Tx/Rx
2	SCREEN
3	+Tx/Rx

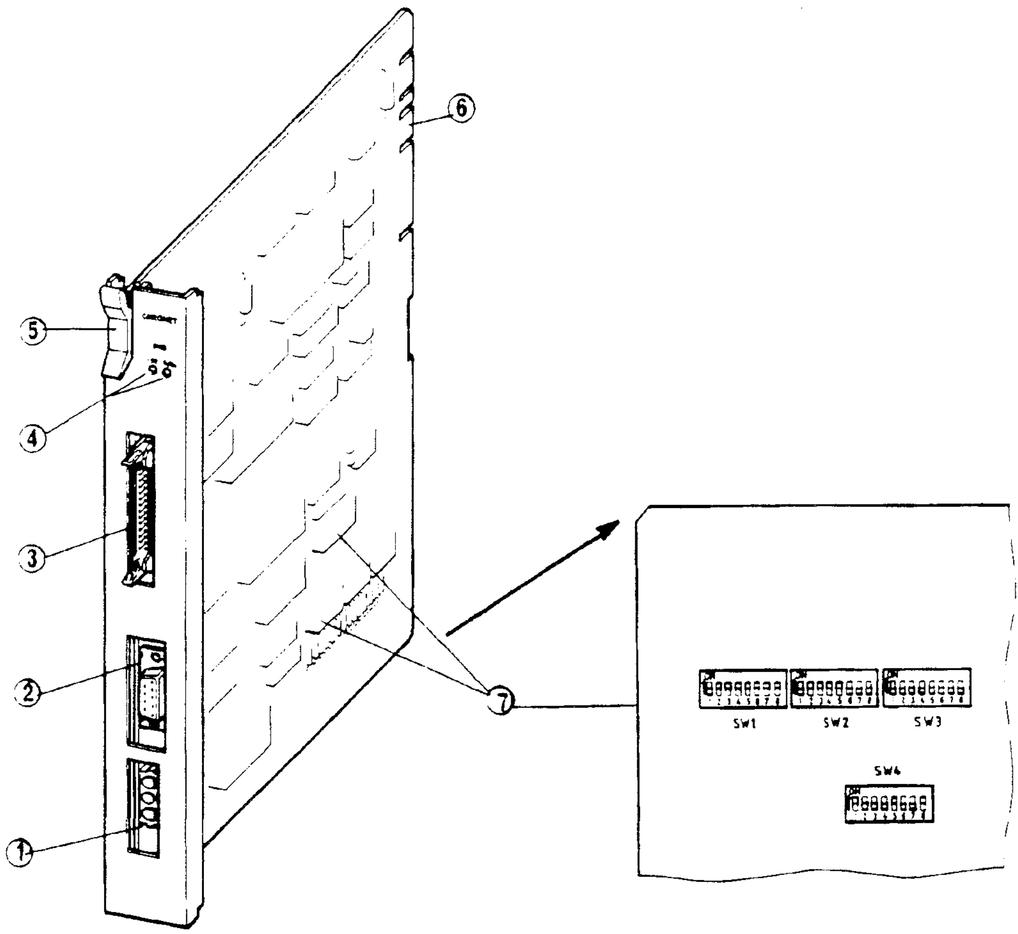
An isolated on-board regulator provides the power for the LAN, and the 8193 is also opto-isolated from the LAN at the output stage.

RG108 cable is polarized as shown in Table 2.3. However, this cable has no colour coding to differentiate between the two cores of the twisted pair. The same polarity must be maintained along the whole length of the LAN and connection of devices on the LAN.

*AMP is a trademark of AMP International.

2.3 8193 Front Panel Indication

Two LEDs are provided on the front panel of the 8193 module (see Figure 2.1). A green LED is illuminated when the +5V supply is applied and maintained, and a yellow LED is illuminated when the 8193 is communicating on the LAN.



1. Twisted pair LAN connection
2. 9-way D-type for connection to 'non-intelligent' equipment, i.e. printers
3. 26-way ribbon for connection to 'intelligent' equipment, i.e. GEM 80
4. Indication of +5V supply and Tx/Rx
5. Ejection handle
6. Edge connector for supply and electrical interlock
7. 8-bit dual-in-line switch packs (magnified and rotated through 180 degrees for clarity)

Figure 2.1 - 8193 CORONET 50 Interface Module

3. CONFIGURING A CORONET PORT

3.1 Setting the Device Numbers

Up to 32 units may be connected onto a CORONET LAN. These units may all be 8193 modules, or they may include other equipment provided by Compex S.A. Since each 8193 module provides one 'intelligent' interface and one 'non-intelligent' (printer/VDU) interface, this gives a maximum of 64 devices. Each of these devices must be allocated a unique device number which can then be used as an address when transmitting or receiving messages on the LAN.

Device numbers must be in the range 0 to 63 for a single network. However, it is possible to extend the network by the use of gateway devices. These devices have numbers 0, 64, 128 and 192 reserved for them. So a gateway device with number 0 allocated will give a single network with device numbers in the range 1 to 62, whereas a gateway device with the number 64 allocated will extend the network to include device numbers in the range 65 to 126.

Note... When the networks are extended using gateway devices, the maximum number of interfaces that can be accommodated on each sub-network will be 31 since the gateway itself occupies one address.

Device numbers are set as binary numbers using SW1, an 8-bit dual-in-line switch mounted on the 8193 module. See Table 3.1.

Table 3.1 - Setting the Device Number on the 8193

SWITCH PACK	SWITCH No.	FUNCTION
SW1	7 and 8	Address of network 0-3
	6 5 4 3 2 1	Address of device 0-63

Care should be exercised when setting the switches on the Switch Packs. The switches are set OFF for a '1'. Figure 3.1 shows Switch Pack SW1 with the device address set to 001101 (decimal 13), and network address set to 00 (decimal 0).

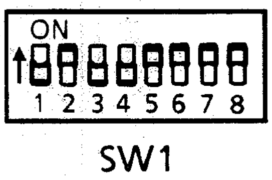


Figure 3.1 Switchpack Arrangement.

The device number of any 'non-intelligent' device is then automatically the device number of the 'intelligent' device (to which it is indirectly attached), plus one.

Figure 3.2 shows an example of a CORONET LAN where all the features are available (not typical).

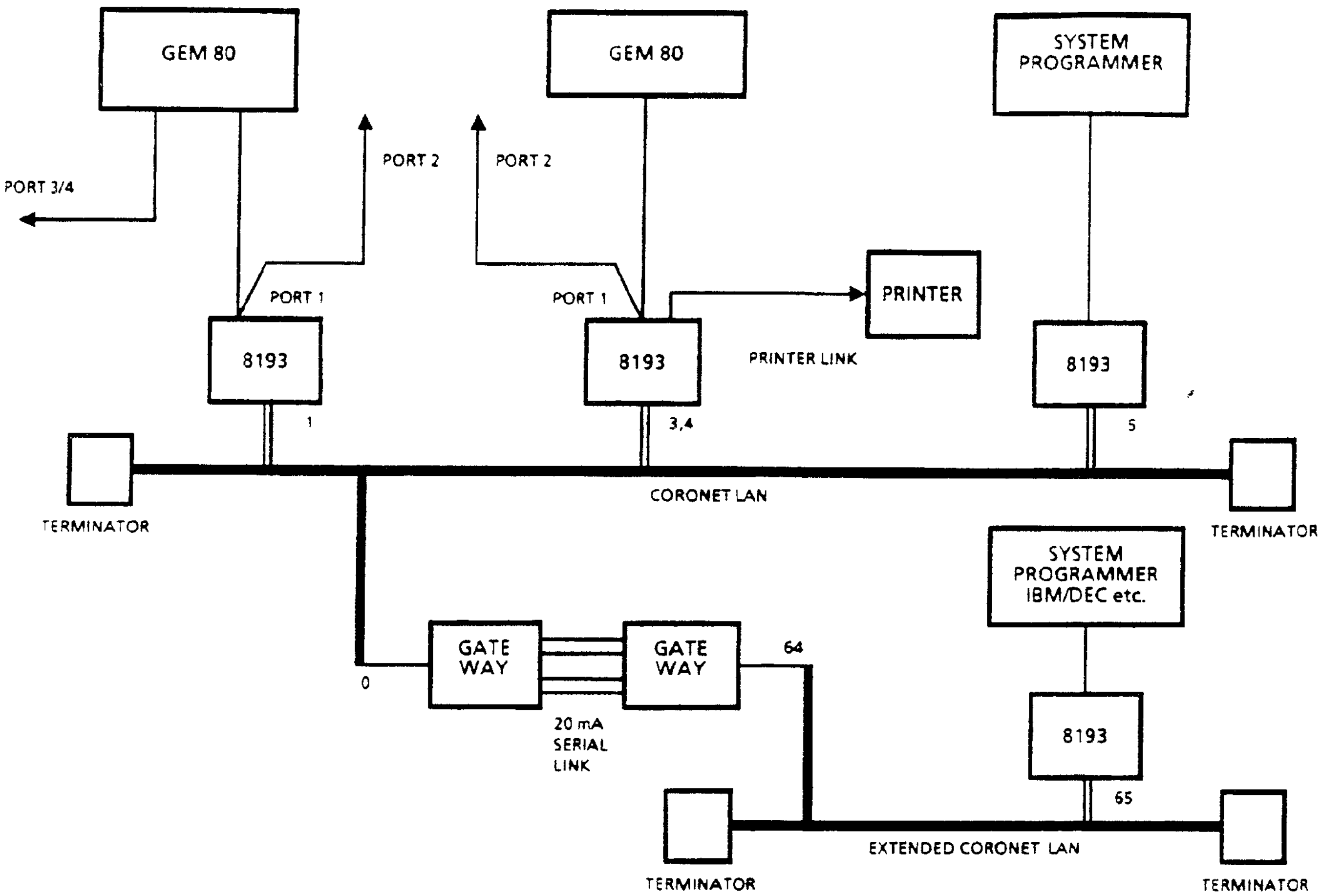


Figure 3.2 CORONET Local Area Network.

3.2 Data Table Configuration

J-, K-, P-, I- and F-tables are used to configure and operate a CORONET port in a similar manner as for a standard serial port, these are shown in Table 3.2 for serial Ports 1 and 3.

Note... Port 3 is only configured when a Slave I.O Processor is fitted on the GEM 80/300 or GEM 80/700.

Table 3.2 - Data Tables Used by CORONET

DATA TABLE	FUNCTION	ADDRESS		
		GEM 80/140	GEM 80/300 & 700	
		Port 1	Port 1	Port 3
J	Received Data	J0 - J255	J0 - J255	J512 - J767
K	Transmitted Data	K0 - K255	K0 - K255	K512 - K767
P	Configuration Data (See Table 3.3)	P3 - P14	P3 - P14	P27 - P38
I	Channel Control (See Table 3.4)	I0 - I8	I0 - I8	I18 - I26
	Receive/Transmit Address for Each Link	I51 - I58	I51 - I58	I67 - I74
F	Diagnostic Link Statistics (See Table 3.5)	F111 - F126	F173 - F188	F205 - F220
	Message Success or Fail for Each Link	F250 - F265	F350 - F365	F382 -F397

3.3 P-table Configuration

Before any message transfer can take place, the Pre-set Data Tables in the participating controllers have to be configured. After configuration the controller must be re-compiled. The P-table function for Port 1 is shown below, the corresponding locations in P-table for Port 3 (if applicable), starts at P27.

The data pre-set by the user program in P-table defines the mode operation of the CORONET port for all message transmissions.

Table 3.3 P-table Configuration Data.

Table Location	Content	Remarks
P3	Holds the signalling rate for transmission to the 8193 Module	This location must always be set to 9600 for CORONET (or -9600 for extended time-out).
P4	Defines the mode of operation	Set to 4 for CORONET.
P5	Defines whether the port is to be free running or under user control. 0 = free running mode X = user control mode	X is any non-zero value. CORONET operates only in the user control mode. Set P5 to any non-zero value.
P6		Not Used
P7 to P14 (See below).	Defines the maximum quantity of words that can be transmitted or received.	Do not exceed 128 for any one channel or 256 for all channels on any one port.
P7		Channel 0
P8		Channel 1
P9	Bits 0 - 7 = Max. Quantity of transmitted words (in Hex).	Channel 2
P10		Channel 3
P11	Bits 0 - 15 = Max. Quantity of received words (in Hex).	Channel 4
P12		Channel 5
P13		Channel 6
P14		Channel 7

3.4 I-table Data.

Individual message transmissions may vary in the length of the message or in the destination.

The I-table is used for this purpose. I0 to I18 and I51 to I58 are used for Port 1; Port 3, if applicable, starts at I19 and I67.

Table 3.4 I-table Message Control Data.

Table Location	Content	Remarks
I0	Contains the SEND and RECEIVE flags to initiate transmission and acknowledge reception.	If Channel 2 is to transmit data, Bit 2 in I0 must be set in the user program. When the data is actually transmitted, Bit 2 will be re-set. If Channel 2 was awaiting data, Bit 10 in I0 will be set automatically when data is actually received. Bit 10 in I0 shall be re-set in the user program once the data is accessed. To prevent data being over written or lost, no message can be transmitted or received until the relevant flags are set in I0.
I1 - I8 (See Below)	Defines the actual quantity of words to be transmitted or received.	This is in the range 0 - 127 but should not exceed the maximum set in P7 (See table 3.3).
I1 I2 I3 I4 I5 I6 I7 I8	Bits 0 to 7 = Actual quantity of words to be transmitted (in Hex). Bits 8 to 15 = Actual quantity of words to be received (in Hex).	Channel 0 Channel 1 Channel 2 Channel 3 Channel 4 Channel 5 Channel 6 Channel 7
I51 - I58 (See below)	Contains two device numbers	The device number for the port is fixed on the 8193 Module. The device number for the channel depends on which unit on the network is being transmitted to.
I51 I52 I53 I54 I55 I56 I57 I58	Bits 0 to 7 = Device Channel Number (Destination) Bits 8 - 15 = Device Port Number (Sender)	Channel 0 Channel 1 Channel 2 Channel 3 Channel 4 Channel 5 Channel 6 Channel 7

The data located in the I-tables can be changed at any time by the user program.
For example. Although there are only eight channels available on Port 1, by altering the device numbers for each channel in I51 to I58, all the units on a CORONET LAN can be sent messages. Obviously, as only one unit can be transmitted to at any one time, the device number will have to be altered after each transmission.

Note... The device number of the sender, in this case Port 1, is used for two purposes:

First, it is the address of Port 1, and so must be used by other units when defining a channel to Port 1;

Second, it is included as part of any message that is transmitted from Port 1 (on any channel).

The latter is required so that any unit on a CORONET LAN which receives a message is also made aware of who sent it. This is necessary with CORONET because there is no overall controller overseeing the network.

3.5 J and K Tables

The data to be transmitted on the network is located in the K-table, while any data received will be located in the J-table. This is the same as for standard serial links.

It is essential that the same quantities of locations in the J- and K-tables are made available to the user program as are specified in P-table locations P7 to P14. Failure to do this will lead to data being lost whenever a maximum length message is transmitted.

3.6 F-table Fault Location Data.

Any faults that occur are recorded in the F-table. Table 3.5 shows the meaning of the status bits contained in the relevant locations. The example shown in Table 3.5 is for Port 1 of a GEM 80/300 or GEM 80/700 Series Controller. See Table 3.2 for relevant F-table locations for GEM 80/140 and Port 3 of the GEM 80/300 and /700.

The meanings of the fault codes are listed in Table 3.6.

The fault data located in the F-table is overwritten as each message is transmitted or received. It may also be overwritten by the user program as required.

All this information is repeated for Port 3 if applicable in the relevant data tables as shown in Table 3.2.

Table 3.5 - Message Status Bits. (GEM 80/300)

Table Location	Content	Remarks
F350 - F357 (See below)	Contains the status bits for TRANSMITTED messages	F350 - F357 contain the status bits for Port 1 F382 - F389 contain the status bits for Port 3 (if applicable).
F350 F351 F352 F353 F354 F355 F356 F357	Bits 0 - 7 = Address (device number) of last message transmitted. Bits 8 - 11 = The fault status code (See Table 3.6) Bits 12 - 13 = Not Used Bit 14 = Fault Flag. Set ON if a message has failed to get through Bit 15 = Message received flag. Set ON if message has got through.	Channel 0 Channel 1 Channel 2 Channel 3 Channel 4 Channel 5 Channel 6 Channel 7
F358 - F365 (See below)	Contains the status bits for RECEIVED messages.	F358 - F365 contain the status bits for Port 1 F390 - F397 contain the status bits for Port 3 (if applicable).
F358 F359 F360 F361 F362 F363 F364 F365	Bits 0 - 7 = Source (device number) of last message received. Bits 8 - 11 = The fault status code (See Table 3.6) Bits 12 - 13 = Not Used Bit 14 = Fault flag. Set ON if a message has failed to be received correctly Bit 15 = message received flag. Set ON if the message has been received correctly	Channel 0 Channel 1 Channel 2 Channel 3 Channel 4 Channel 5 Channel 6 Channel 7

Table 3.6 CORONET Fault Status Codes

Fault Code (Hex)	Status for Transmitted Messages
0	Successful transfer (No errors)
1	Local time-out - no acknowledgement from local 8193 interface module.
2	Remote time-out - no acknowledgement from remote end 8193.
3	Transmission failed.
4	Remote hardware failure - does not respond to any messages.
5	Corruption on link to local 8193
7	Corruption on message as received at the remote end.
8	Message too long - insufficient J/K-table locations allocated for that particular channel.
A	Configuration error (a zero length message, for example).
	Status for Messages received
0	Successful transfer (no errors).
3	Transmission failed.
5	Corruption on link to local 8193
8	Message too long - insufficient J/K-table locations allocated for that particular channel.
9	Data errors or no channel allocated.
A	Configuration error (a zero length message, for example).

4. OPERATION

4.1 Introduction

Any unit on the CORONET LAN may initiate a transmission at any time. This is achieved by the user program setting up the required data tables and then setting the send bit ON in I0 for the channel required. The 8193 CORONET interface module will transmit the message on the network as soon as the network goes idle. The 8193 monitors the network for this purpose and to check that any message it sends is not corrupted by a message sent simultaneously by another 8193.

If such a collision of data does occur, the 8193 ceases the transmission and tries again after a random time delay.

Once the message transmission is completed, the send bit in I0 is set OFF by the I/O processor. However, a completed message transmission does not guarantee successful reception. The reasons for this are listed in Table 3.6. In addition to these are the possible errors caused by incorrect programming. It should always be remembered that units on a CORONET LAN can only accept data from one another if they are programmed to do so. This also includes acknowledgements from a unit to say that it has received a message sent to it successfully. When adding a GEM 80 controller to a CORONET LAN as an additional unit, the section in the user program which operates the network cannot be written in isolation. It must include information on the network parameters used by the units already on the network.

4.2 Setting Up the CORONET LAN in the P-table

Consider a CORONET LAN used by three GEM 80 controllers. The controllers are a GEM 80/301, GEM 80/734 and a GEM 80/142. It is required that all the controllers exchange messages.
First, the quantity of data tables to be exchanged is defined:

GEM 80/301 - GEM 80/734 100 tables max.
GEM 80/301 - GEM 80/142 50 tables max.
GEM 80/734 - GEM 80/142 10 tables max.

The serial port, channels and the device number to be used are also defined:

GEM 80/301 -

Port 1, Channel 0 for GEM 80/734
Port 1, Channel 1 for GEM 80/142
8193 Device Number 1

GEM 80/734 -

Port 3, Channel 0 for GEM 80/301
Port 3, Channel 1 for GEM 80/142
8193 Device Number 3

GEM 80/142 -

Port 1, Channel 0 for GEM 80/301
Port 1, Channel 1 for GEM 80/734
8193 Device Number 5

Note...The device numbers increase in steps of two to allow for the option of connecting a printer or VDU to the 8193. The relevant data tables can now be configured as described in Section 3:

GEM 80/301 (Port 1)

P3 = 9600	-	Baud rate
P4 = 4	-	CORONET port
P5 = -1	-	User-control mode
P7 = @6464	-	100 tables transmitted and 100 tables received. (@64 is 100 in hexadecimal)
P8 = @3232	-	50 tables transmitted and 50 tables received. (@32 is 50 in hexadecimal)

GEM 80/734 (Port 3)

P27 = 9600	-	Baud rate
P28 = 4	-	CORONET port
P29 = 1	-	User control mode
P31 = @6464	-	100 tables as above
P32 = @0A0A	-	10 tables transmitted and 10 tables received. (@0A is 10 in hexadecimal)

GEM 80/142 (Port 1)

P3 = 9600	-	Baud rate
P4 = 4	-	CORONET port
P5 = 1	-	User control mode
P7 = @3232	-	50 tables as above
P8 = @0A0A	-	10 tables as above

4.3 Using I-, J-, K- and F-tables

4.3.1 Setting Up

Actual communication can now begin. For example, the GEM 80/301 wishes to send a message to the GEM 80/734. The parameters of the message are as follows:

Port 1, Channel 0 = Device Number 3

Quantity of Data Tables to be sent
= 63 K-table locations

Quantity of Data Tables to be received
= 42 J-table locations

The message the GEM 80/301 intends to send to the GEM 80/734 will be 63 words long. The GEM 80/301 expects a reply to its message, and the reply will be 42 words long.

The relevant I-table locations can now be configured for the GEM 80/301:

I1 = @2A3F	-	63 tables to be transmitted, 42 tables to be received. (@3F is 63 in Hex. @2A is 42 in Hex).
I51 = @0103	-	The device number or address of the destination, 03, and the sender, 01. In Hex.

When the required data has been loaded into K0 to K62, bit 0 in I0 can be set ON. This is the send bit for Port 1, Channel 0. Figure 4.1 shows the configuration in ladder diagram form.

```
|                                                                   |
+---<AND>---------------------------------------------<OUT>---+
|    @2A3F                                                  I1      |
|                                                                   |
|                                                                   |
+---<AND>---------------------------------------------<OUT>---+
|    @0103                                                  I51     |
|                                                                   |
|             LOCATE             MOVE                               |
+---<AND>---SPEC.----VALUE----SPEC.----VALUE----<OUT>---+
|     0        S20      G149      T20       63        G200      |
|                                 +--<  >                           |
|             LOCATE              |                                 |
+---<AND>---SPEC.----VALUE-+                                 |
|     0        S20       K0                                         |
|                                                                   |
+---<AND>---------------------------------------------<OUT>---+
|     @1                                                    I0      |
```

Figure 4.1 Configuration Data

4.3.2 Operation

Table location I0 is monitored frequently, and when a send bit is found to be ON (set to 1), the relevant K-table locations are sent to the local 8193. The 8193 has a buffer which allows it to queue up to four messages up to a maximum of 256 bytes. When it senses that the network is free, the 8193 can transmit all the messages in the queue. However, it is not possible to transmit messages for the same destination, since the send bit in I0 must be cleared for that channel once the first message is transmitted.

Any subsequent messages in the queue for the same destination will be held up until the send bit in I0 is set again, and the network again becomes free.

Once the message is transmitted by the 8193, the send bit in I0 is re-set OFF (set to 0). This indicates to the user program that the channel is free for further messages, or that an expected reply may soon arrive. The I/O Processor will also indicate whether the transmission has been successful or not. This information can be obtained from the F-table, in this case F350 (or F250 on 140 series). See Table 3.6.

For a successful message transmission, there must also be a similar configuration of the I-table at the destination, in this case the GEM 80/734, which uses Port 3, Channel 0:

I19 = @3F2A - 42 tables to be transmitted, 63 tables to be received. Both in Hex.

I67 = @0103 - The device number of the destination 03, and the sender, 01. Both in Hex.

The 8193 transmitting the message will try and identify a remote 8193 carrying the required device number. When this occurs, the message is transmitted. As can be seen in this example, the required quantity of J-table locations must be allocated at the receiving end - in this case 63 - with the correct sender's device number. Failure to do this will result in a fault code being raised in F350 of the GEM 80/301. However, it is possible for a unit to accept messages from any sender provided that enough J-table locations are available. This is achieved by setting a 'global' source address 00. In this example, if the device number 01 was not located in the I-table of any other controller on the network, and if the GEM 80/734 had I67 = @0003 instead of @0103 as shown previously, the message will still have been transmitted successfully.

Once a message is received by the GEM 80/734, the receive bit, bit 8 in I18, is set ON to indicate that a message has been received and that the data is available in J512 to J575. (If the global address of 00 has been used, this will be overwritten in I67 with the actual sender's device number). Once the J-table has been accessed and the GEM 80/734 is ready to transmit or receive other messages, the receive bit, bit 8 in I18, must be re-set OFF by the user program.

Having transmitted a message to the GEM 80/734, the GEM 80/301 now expects a reply. The data in I51 is altered by the user program to reflect this:

I51 = @0301 - The device number of the destination, 01, and the sender, 03. Both in Hex.

The GEM 80/301 now awaits the arrival of the message from the GEM 80/734.

The GEM 80/734 now sets up its reply. It intends to transmit the reply from Port 3, Channel 0. I67 is altered by the user program:

I67 = @0301 - The device number of the destination, 01, and the sender, 03. Both in Hex.

The data to be transmitted is moved into the K-table - in this case 42 locations as are specified by I19. The send bit, bit 0 in I18 is then set ON by the user program and the reply is transmitted.

With the reply successfully transmitted, bit 0 in I18 of the GEM 80/734 will be re-set OFF by the 8193.

The GEM 80/301 will be notified of the successful arrival of the reply from the GEM 80/734 by bit 8 in IO, the receive bit, being set ON by the 8193. The user program may now access the data available in J0 to J41. Once the J-table has been accessed and the GEM 80/301 is ready to transmit or receive other messages, the receive bit, bit 8 in IO, must be re-set OFF by the user program.

The successful exchange of messages on the network relies on the user program for each controller being written in collaboration. In all cases, the transmission of messages and their acknowledgement must be part of the user program.

5. TIMEOUTS AND RE-TRIES

5.1 Introduction

Timeouts fall under three main headings:

LOCAL
REMOTE
NETWORK

5.2 Local Timeouts

The serial link between the GEM 80 controller and the local 8193 CORONET interface module has a timeout set to 250ms. If there is no response from the 8193 after this time a timeout fault is flagged.

When a timeout occurs, the GEM 80 controller will re-transmit the message up to three times. If there is still no response, the GEM 80 resets the serial link and the send bit in the I-table, and the failed message transmission is flagged as such in the F-table. See Table 5.1 for preferred settings.

Table 5.1 - Setting the Local Timeout on the 8193

SWITCH PACK	SWITCH No.				TIMEOUT (ms)	
SW2	5	4	3	2	TRANSMIT	RECEIVE
	-	-	ON	ON	240	-
	ON	ON	-	-	-	40

Table 5.2 shows the switch settings on SW2 which are used to introduce a delay between successive blocks of outgoing data.

Note... Switch Number 8 on SW2 must be set to the OFF position in order to enable the action of Switch Numbers 6 and 7.

Table 5.2 -Transmission Delay between Blocks

SWITCH PACK	SWITCH No.		DELAY (ms)
SW2	6	7	
	ON	ON	100
	OFF	ON	200
	ON	OFF	400
	OFF	OFF	800

5.3 Remote Timeouts

A remote timeout occurs when the 8193 module at the receiving end fails to respond to the local 8193 attempting to transmit a message. The timeout occurs after a period of 17 seconds has elapsed. After this period the GEM 80 controller is alerted by the local 8193, the serial link and the send bit in the I-table are reset, and the failed message transmission is flagged as such in the F-table.

5.4 Network Timeouts

If there is no activity on the entire network for more than a period of 50 seconds, each GEM 80 controller will reset its serial link as a precaution.

5.5 ACK and NAK

The 8193 CORONET interface modules operate a protocol with each other, and with any attached GEM 80 controller, which is invisible to the user.

ACK is a response from the 8193 to signify that a message has been received successfully. NAK is the response when a corrupted message is received.

The absence of a ACK or NAK response from a local or remote 8193 will result in a timeout fault and a flag being raised in the F-table.

These responses are invisible to the user and are provided here merely to indicate how the time-outs are detected and the fault tables updated. Further responses and protocols can be found in the Serial Communications Manual (Document No. T457).

6. PRINTERS AND PROGRAMMERS

The 8193 CORONET interface module has the facility for attaching a printer or VDU to the CORONET LAN. This second port has its own distinct device number and is isolated from the local controller, although it is accessible on the LAN. However, access to such printers on the LAN is only permitted by the use of system programmers or Programmer Emulators. See Table 3.1 for details in setting the device numbers. Switchpack SW3 provided to set the source number or address for these 'non-intelligent' devices is not used. The device number for 'non-intelligent' devices is set automatically as described in Section 3.

Switchpack SW4 selects the data rate for the GEM 80 serial link and the secondary device (printer or VDU). Table 6.1 shows the Switch Number settings for a data rate of 9600.

Table 6.1 - Setting the Baud Rate on the 8193

SWITCH PACK	SWITCH NO.				DATA RATE (BIT/s)
SW4	4	3	2	1	GEM 80 SERIAL LINK
	8	7	6	5	PRINTER PORT
	OFF	OFF	OFF	ON	9600

System programmers can be attached to the CORONET LAN in the same manner as a GEM 80 controller. This allows the facility of remote programming of any GEM 80 on the LAN. This is achieved by downloading programs or program changes, to the relevant GEM 80 controller.

Each system programmer can also access any printer on the CORONET LAN. Message transfers occur in a similar manner as that between controllers. However, because the printer itself cannot initiate any message transfers, or identify the origin of any messages received, it must first be 'reserved' by any programmer that wishes to print out data.

Reserving the printer prevents the output of garbled information due to the random arrival of messages from other programmers. While the printer is reserved by one programmer, any other programmer that wishes to print out data will have to wait.

Once a programmer has completed its job of printing out, it must 'release' the printer. This now allows any other programmer to reserve the printer for its own use.

7. ADDITIONAL INFORMATION

7.1 Related Documents

Serial Communications Manual (Document Number T457).

System Programmer Technical Manual (Document Number T298).

GEM 80 Glossary of Terminology (Document Number T290).

CORONET Interface Module 8193 (Document Number T543).

If you require further information or wish to discuss an application in detail, do not hesitate to contact our GEM 80 representative.

8. ORDERING CODES

CORONET Interface Module (including AMP 3-pin connector)		8193-4001
CORONET Interface Module (for spares only)		8193-4002
Terminators (includes 1 plug per terminator)	110V a.c.(2 off)	8898-4053
	220V a.c.(2 off)	8898-4054
'Tee' connector (includes 3 plugs)		8898-4052
RG108 (order per metre).		56623/108

CEGELEC
INDUSTRIAL CONTROLS

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Note: The Company's policy is one of continuous development. Products supplied may differ from those described herein.

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