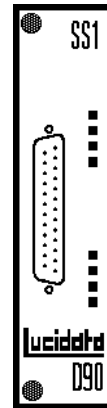


D90-IH3 MODULE

**For synchronous
connection of
IBM 3270C
cluster controllers**



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Introduction

Like all Lucidata Diplomat data communications products, the D90-IH3 module has been designed to be easy to use in most normal applications whilst retaining a large degree of flexibility.

It is Lucidata's policy to try and find out as much about the intended application of its products before shipment so that the unit can be pre-configured at the factory for easy installation. In this case you may skip many sections of this manual. If the application changes with time then you will need to refer to those sections to reconfigure the unit.

In the event of difficulty, please contact Lucidata's technical support staff who will be able to guide you through the process.

The configuration switches are not normally changed once a unit is installed and it is outside the scope of this manual to describe the behaviour of the module for every combination of switches in all circumstances.

Description

The D90-IH3 module runs on an SS1 hardware module which is fitted with a single synchronous port. The SS1 module provides a synchronous interface into the D90 system for all frame transmission protocols. This module would normally be connected directly to a synchronous modem, line driver or Terminal Interface.

Within the module there is an EPROM which contains the program (Firmware) for emulating a Host computer operating the IBM 3270BSC poll and select communications protocol. The firmware also contains the various communication parameter defaults (speed, parity etc) which are set when the module is powered up. These defaults can only be changed by installing new firmware or by means of a Diplomat Network Monitor (DNM) if one is present in the same rack. The defaults for these parameters will be found in the *Customer System Summary* section of this manual which is specific to each customer.

The functional characteristics are controlled by certain parameters which can be changed by means of the Configuration Byte described later in this section.

A D90-IH3 module will normally be communicating with other D90 modules such as the D90-LAN module. These modules may be in the same rack or in a remote rack linked by LAN or X.25 modules.

Data Communications

Each IH3 module is fitted with a single synchronous port. This port is fitted with a D25 male connector, configured as DTE. The signalling levels are RS232. The use of screened cable with the outer conductor grounded to the connector shell is recommended when making connections to the SS1 module in order to guarantee immunity to external electromagnetic interference. Ensure that the cables are securely fixed to the screwlock pillars.

The port is normally connected to a synchronous modem or line driver. If it is connected directly to the cluster controller, it will require the use of a cross-over cable. The following table gives the pinouts.

PIN NO.		
1	Protective Ground	
2	TXD	Transmitted Data - SS1 transmits data on this pin
3	TXD	Received Data - SSA receives data on this pin
4	RTS	Request to Send - controlled by SS1
5	CTS	Clear to Send - enables SS1 transmitter
6	DSR	Data Set Ready
7	SG	Signal Ground
8	DCD	Data Carrier Detect - sensed by SS1
9		Internally connected to +12V via 1K Ω
10		Internally connected to -12V via 10 Ω
11		Not Used
12		Not Used
13		Protective Ground
14		Not Used
15		Transmit Clock In
16		Not Used
17		Received Clock In
18		Not Used
19		Internally connected to -12V via 10K Ω
20	DTR	Data Terminal Ready - set high or low by configuration setting
21		Not Used
22	RI	Ring Indicator
23		Not Used
24		External Transmit Clock, speed obtained from selected TX clock*
25		Not Used

**Note: If it is required that the IH3 provide the clock signal, a jumper should be fitted to the DTE side of link L4 on the PCB. The IH3 should also be configured for an internal Transmit Clock at the required speed and have Pin 24 clock enabled.*

LED Indicators

There are 8 LEDs on the front panel of the D90-IH3 module. The indicators are Red(R), Yellow(Y) and Green(G) and have the following meanings when illuminated.

- (R) RTS Request To Send asserted (SS1)
- (R) CTS Clear To Send asserted (Modem)
- (R) DCD Data Carrier Detect (Modem)
- (Y) Address Match

- (R) Error on last I/O
- (R) External Clock Enabled (SS1)
- (R) DTR Enabled (SS1)
- (G) Dialogue with another module

Configuration

The IH3 module contains a Configuration Byte of "silicon switches". These are used to control the low level behaviour of the module. The switches are listed in ascending order below, together with a description of their function.

Note: The Configuration Byte can only be changed using a DNM module. It is displayed so that reading the bits from left to right on the screen correspond to reading the tables below from top to bottom. By convention, the bits are numbered 1-8 from left to right so switch A2(1) denotes Controlled DCD.

Reserved	0	Reserved
Controlled DCD	1 0	Constant DCD
EBCDIC	1 0	ASCII
Reserved	0	Reserved
Reserved	0	Reserved
Reserved	0	Reserved
Report Exceptions	1 0	Do Not Report Exceptions
Block Data to ETX	1 0	Any Size Block

Controlled DCD

The synchronous data channel can be set to operate with a constant carrier or with a controlled carrier. With constant carrier, the line is turned round and a reply sent 40ms after a valid receive. With controlled carrier, the IH3 module will wait for the modem to drop the carrier before raising the RTS. The reply starts when CTS is raised by the modem. If transmission does not complete within 10 seconds, the IH3 module will time out.

EBCDIC/ASCII

This switch selects the communication code used by the IH3. It is normally set to EBCDIC (1).

Report Exceptions	If bit 6 is set to 1, any exception condition detected anywhere in the module will cause a message to be sent to the DNM module controlling the rack. The exceptions are usually abnormal signal transitions on the synchronous interface. This option is not relevant if there is no DNM.
Block Size	When forwarding data received over the D90 bus out to a Cluster Controller, the data block can be sent as it stands or can be accumulated with other data blocks until a data block is received which is terminated with an ETX character. Setting bit 8 to a 1 forces waiting for a block with an ETX. If a properly terminated block is not received within 5 seconds, the accumulated data blocks are discarded.
Initialisation	<p>On power-up the IH3 firmware delays for about ten seconds to allow time for any Diplomat Network Monitor (DNM) module to finish configuring the rack. If no DNM is present then the IH3 module will use its own EPROM based Poll Address Tables and a default Cluster Controller Address equal to its slot number on the rack. By this means it is possible to have simple operation with automatic defaults and no DNM.</p> <p>During this delay the IH3 module will have received details of all other modules on the rack and also sent its own particulars to anyone who asked.</p> <p>After the initial delay the IH3 will decide the Slot Address of the nearest Server Module on the rack that offers the service it requires (eg. TCP) In this regard a Server Module to the left of the IH3 module is always nearer than any Server Module to the right even if it is physically closer.</p> <p>The IH3 module then starts to issue General Polls to the Cluster Controller to discover the current status of the terminals attached to the controller. As each active terminal is detected the IH3 module updates its Connection Table and sends a Connect message to the nearest Server Module on the rack. The IH3 module constructs a Network Address, for identification purposes within the D90 rack, for each terminal by using the bottom 5 bits of the cluster address * 256 plus the bottom 5 bits of the terminal (poll) address. Any data blocks arriving at the IH3 over the D90 bus will contain a Source and Destination Network Address and the IH3 uses the Destination Address to generate the appropriate Select and Data message necessary to deliver the data to the intended terminal. Similarly data arriving from the terminal is sent to the Server Module with a Source Address identifying the origin.</p>

Operation

Once initialised the IH3 module constantly issues General Polls to the Controller every one second while nothing else is happening. The firmware fully implements the IBM3270 BSC protocol and handles all re-transmissions, queries and RVIs.

In the event of the IH3 being unable to deliver data to the Server Module a message is generated and sent to the terminal in question as follows:

‘EL APPLICATION BUS-ERROR’

As new connections are reported by way of status messages the IH3 updates its Connection Table and sends Connect messages to the Server Module. Similarly when the status messages indicate a disconnection the Connection Table is updated and the Server Module sends a Disconnect message.