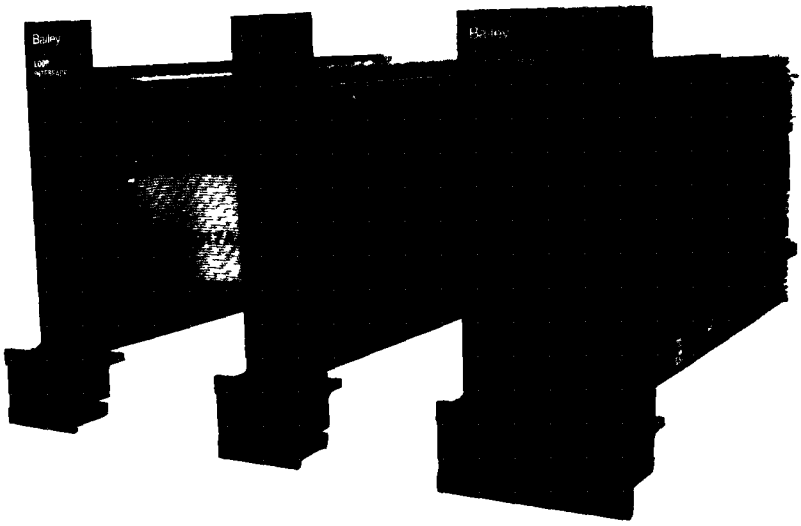
Bailey®
network 90®

Enhanced Computer Interface Unit Programmer's Reference Manual



A95/4

Product Instruction E93-905-9

Bailey Seamless, Real-Time Process Management Solutions

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Preface

The NCIU02/03/04 (CIU) provides interaction between a host computer and the NETWORK 90 System The CIU receives a command from the host computer, performs the desired action, then formats and returns a reply to the host There are over 60 CIU commands These commands permit data acquisition, process monitoring and control, system functions such as security, and time and configuration control.

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INTRODUCTION

The NETWORK 90 Computer Interface Unit (CIU) provides host computer access to a NETWORK 90 system This access enables the host, a process computer, a 5,000 Tag Operator Interface Unit (OIU), a Management Command System (MCS), or a dumb terminal, to perform

- Process monitoring and control
- System status monitoring
- Process Control Unit (PCU) configuration

The host links to the CIU via one or two RS 232-C serial ports, a Parallel Bus Slave module (IEEE 488 parallel cable), or to all three. The CIU interfaces to the communication loop of the NETWORK 90 system The host interacts with the CIU by issuing a command and receiving the CIU reply

CIU HARDWARE

The NCIU02/03 consists of three modules·

- Loop Interface Module (LIM)
- Bus Transfer Module (BTM)
- Loop Storage Module (LSM)

The NCIU04 consists of two modules

- Loop Interface Slave (LIS)
- Superloop Storage Module (SSM)

As an option, a Parallel Bus Slave (PBS) may be used for parallel communications between the CIU and a host The PBS is an IEEE-488 compatible General Purpose Interface Bus (GPIB) device

POINT CAPACITIES

This manual is intended to be a reference for the NCIU02, NCIU03, and NCIU04 The difference between the NCIU02 and NCIU03 is the Storage Module used The NCIU02 and NCIU03 are used on Plant Loop Systems, whereas the NCIU04 is only used on Superloop

CIU Model	Storage Module	Maximum Point Capacity
NCIU02	NLSM01	2 500
NCIU03	NLSM02	5,000
NCIU04	NSSM01	10 000

The NCIU02 and NCIU03 have a NCIU01 compatible mode, permitting them to run software written for the NCIU01 In this mode, the maximum point count for both models is 511

The NCIU04 has a NCIU02 compatible mode, allowing it to run software written for the NCIU02 or NCIU03

NCIU01 SOFTWARE WITH NCIU02/03 HARDWARE

Existing software that runs with the NCIU01 also runs with the NCIU02 and NCIU03 Selecting a special mode at the time of the CIU RESTART command, permits NCIU02/03 to look like a NCIU01 to the host computer When you select this option, you cannot use any of the NCIU02/03 features

NCIU02 SOFTWARE WITH NCIU04 HARDWARE

Likewise, existing software that runs with the NCIU02/03 also runs with the NCIU04 Selecting a special mode at the time of the CIU RESTART command, permits the NCIU04 to look like a NCIU02 to the host computer When you selectthis option, you cannot use any of the new NCIU04 features In addition, features specific to the NCIU01 are not supported on the NCIU04

USING THIS MANUAL

The text is arranged into sections by function

- Section 2 CIU commands. are arranged in order of command codes
- Sections 3 through 12 contain numerous referen ces to the commands l sted in Section 2 These sections are in the form of notes in the command and reply tables
- The Appendix includes command codes and a glos sary

RELATED DOCUMENTS

Refer to the following documents for additional information

Name	Part Number	Publication
Bus Interface Module	NBIM02	E93 908-1
Function Code Reference Manual	-	E93 900 20
Loop Interface Module	NLIM02	E93 908 1
Loop Interface Slave Module	NLIS01	E93 908 7
Loop Storage Module	NLSM01/02	E93 905 2
Parallel Bus Slave	NPBS01	E93 905 2
Superloop Storage Module	NSSM01	E93 908 7
Termination Units/ Modules	NTCL01/ NICL01 NTMF01/ NIMF01 NTPL01/ NIPL01	E93-911
Cables	NKLS01 NKLS02 NKPB01 NKTU01 10/ NKTM01 10	E93-911

SYSTEM OVERVIEW

PCU modules interface with the process and perform control functions Process control strategy for a specific installation is implemented by configuring an arrangement of function blocks within the system. Function blocks are described in the **Function Code Application Manual E93 900 20.** NETWORK 90 components transfer process values by an exception reporting procedure. A receiver wanting data from a sender initially requests an exception report route be established from the sender to the receiver. Thereafter, the sender initiates an exception report whenever a value changes significantly

CIU OVERVIEW

The primary function of the CIU is to allow the host to monitor and control the process The CIU gives the host access to station variables, block outputs, and module status These point types are listed in Table A-1 as they relate to host commands

Point types can be read by two methods

- The host can ask the CIU for exception reports and receive points only as often as the point value changes (Refer to Table A 1)

- The host can ask the CIU for lists or groups of point values This method returns the current values, even if the point value has not changed

The host can output station variables and station modes, to stations that are configured in NETWORK 90 modules The host can also generate analog, digital, Remote Control Memory (RCM), Remote Manual Set Constant (RMSC), and station exception reports Other NETWORK 90 modules accept these reports as if they originate from function blocks configured in the host

Parallel Bus Slave Operation
The Parallel Bus Slave Module (PBS) receives CIU commands from the host and transfers them to the Loop Storage Module (LSM) of the NCIU02/03, or Superloop Storage Module (SSM) of the NCIU04, over the expander bus When the command reply is formulated, the PBS receives the reply from the LSM over the expander bus and makes the reply available to the host The expander bus, an 8 bit wide parallel data path, is a standard feature of the NETWORK 90 Module Mounting Unit (MMU)

Use Of The CIU For Process Monitoring
CIU commands are shown in a simple process monitoring application in Figures 1 1 and 1 2 First, the host issues a *CIU RESTART* command to clear the CIU point table Then it establishes each point from which it will later obtain data Finally, the host issues one *CONNECT POINT LIST* command causing the system to report values of all established points to the CIU

Normal Data Acquisition
With the points established and connected, the application can enter its normal data acquisition mode. The host periodically asks the NCIU02/03 for exception reports for the established points with the *READ EXCEPTIONS* command The functionally similar command for the NCIU04 is *READ DATA EXCEPTIONS* The CIU replies with the values of the points for which the CIU has received exception reports Since all of the exceptions may not fit into one *READ EXCEPTIONS* (or *READ DATA EXCEPTIONS*) reply, the host may need to issue the command more than once After the host exhausts the outstanding CIU exceptions, it processes its application, or waits This continues until the host determines it is time to read exceptions again

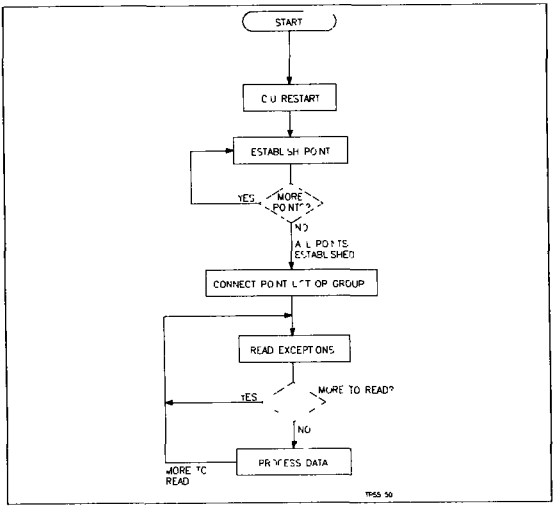

Figure 1 1 Simple Input Application NCIU02/03

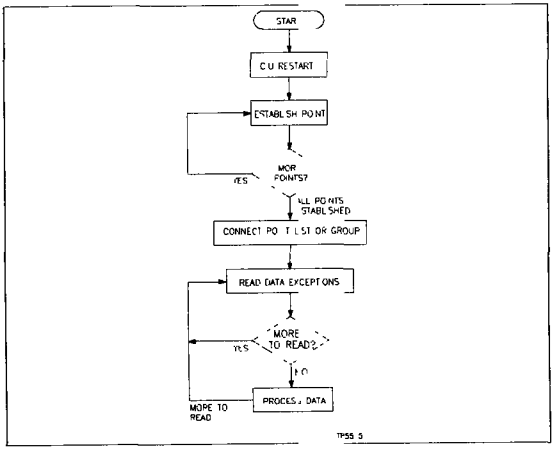

Figure 1-2. Simple Input Application NCIU04

Command Sequence

The overall flow of the host making full use of the CIU is shown in Figure 1 3 The host issues a *CIU RESTART* com mand before it can configure the PCUs Points are estab lished, and finally the host proceeds with process I/O

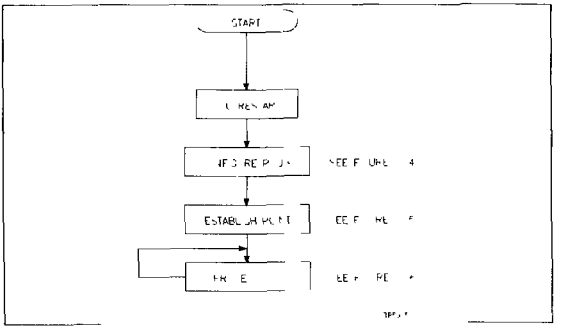

Figure 1 3 Total Application Overview

Host configuration of NETWORK 90 PCUs is a system op tion, since the OIU, MCS, EWS, and CTM may also be used for configuring PCUs PCU configuration does not use any space in the CIU point table Figure 1 4 describes CIU com mands available to configure PCUs Section 6 **PCU Con figuration** details PCU configuration via the CIU

Establishing Points

ESTABLISH POINT and *ESTABLISH REPORT* establish dif ferent types of points (see Figure 1 5)

NOTE: The CIU module number is always 2

When a point is established as an input to the host the point's module returns point specifications to the CIU These specifications contain information such as alarm parameters and engineering units The host need not read these specifica tions if the information is not needed The host cannot predict when specifications will arrive It must check for specifica tions as points are established and throughout the course of normal process I/O, until all needed specifications return Once a point is established, the command sequence shown in Figure 1 6 or 1 7 is available

DISESTABLISH POINT deletes an established point or report from the CIU internal point table

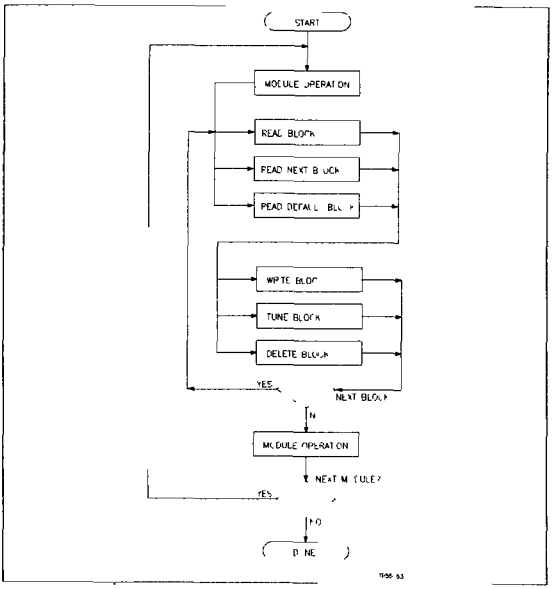

Figure 1 4 CIU Commands to Configure PCUs

Exception Reports for Established Input Points
CONNECT POINT LIST and *CONNECT POINT GROUP* cause the CIU to receive exception reports for established input points If several points are used by an infrequent application run, the host can reduce loop traffic It can disconnect these points after an application run and reconnect these points before another application run

The host can input point data by two different means First, reading exceptions allows the host to reduce point input to those points with changed values, or reports at expiration of the maximum reporting time interval Second, reading value and status lists or groups allows the host to specify which points to read The output of any block can be read without using any space in the CIU point table and without configuring the block to generate exception reports

If the host finds a module with bad status by one of the above input means, it can issue *READ PROBLEM REPORT* and *READ EXTENDED PROBLEM REPORT* to receive details of the module error

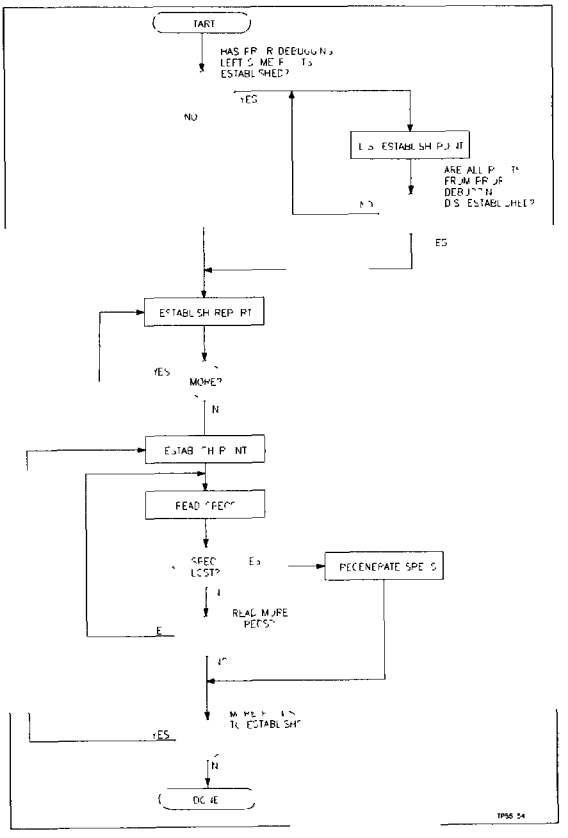

Figure 1 5 Commands Used to Establish Points

Host Outputs

Output Value. The host can use *OUTPUT VALUE/OUTPUT VALUE GROUP* to output the following point types

- Analog Report
- Digital Report
- RMSC Report
- Station Values written (SP, CO, RI)
- RCM Read

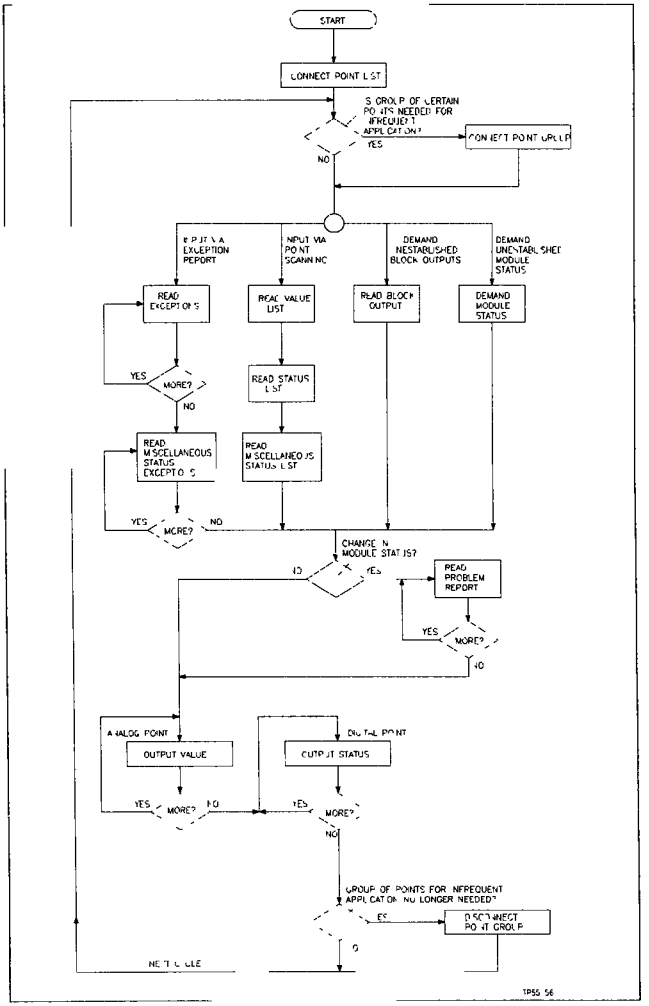

Figure 1 6 Process I/O Overview NCIU02/03

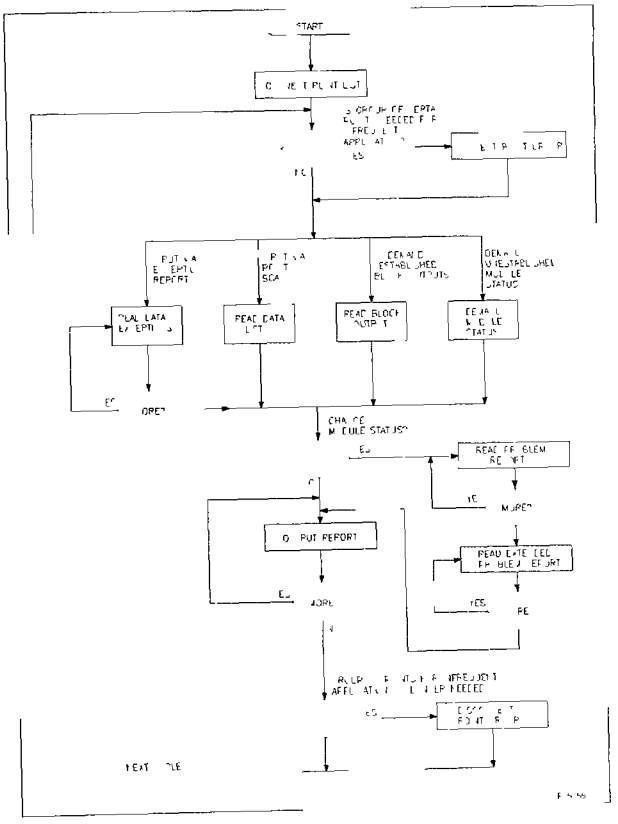

Figure 1 7 Process I/O Overview NCIU04

In addition to these, the NCIU04 uses *OUTPUT REPORT* to yield the point types

- Analog Report
- Digital Report
- RCM Report
- Station Report
- RMSC Report
- REAL(4) Analog Report

Report Point types appear to other nodes as if they are configured in the CIU In this case PCUs, OIUs, and MCSs are configured to establish exception report routes to receive the values from the CIU With this approach, block number references within the PCUs, OIUs, and MCSs are set equal to corresponding point index numbers

Output Miscellaneous. The host can use *OUTPUT MISCELLANEOUS/OUTPUT MISCELLANEOUS GROUP* to output to an RCM Report point

INTRODUCTION

This section explains the CIU commands Each description begins with detail of the command and reply format The **Binary Character Number** column gives the layout of the command and reply The Data Type column shows whether the field type is code, byte, integer, or analog The binary format of each field type is defined in Section 3

Unique values for each command code are given in Table A-12 Command Summary Other field values may be given parameters V1, V2, . to be referred to in the specific command description. Two dots ( ) denote the range between the minimum and maximum values

The **Discussion** describes the purpose, prerequisites, and effects of the command The Discussion may also refer to other sections in this manual pertaining to the command

NETWORK 90 Effect describes the impact of using this command on other modules and loop traffic

CANCEL KEYED COMMAND

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	50
Key	2	byte	0 32

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

Discussion:

CANCEL KEYED COMMAND causes the CIU to ignore the reply to an outstanding CIU command, and not pass it on to the host computer The key field of this command must match the key provided in the command to be canceled If the Key Field of this command is 0, ALL outstanding commands are canceled

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected by this command

CIU CALLUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	41
Key	2	byte	0
Passbyte 1	3	byte	V1*
Passbyte 2	4	byte	V1*
Passbyte 3	5	byte	V1*
Passbyte 4	6	byte	V1*
Passbyte 5	7	byte	V1*
Passbyte 6	8	byte	V1*
Passbyte 7	9	byte	V1*
Passbyte 8	10	byte	V1*

*User configured passbytes where V1 0 255

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	(Table 9 1)

Discussion:

When the CIU password protect on mode is enabled using Option Settings (refer to Table A-19), *CIU CALLUP* must be issued with the correct passbytes to allow access to all other CIU commands This procedure provides protection when modems are used for remote computer/CIU communications

NOTE This command must be issued on each port to be used for communications The 8 passbytes are recorded in non volatile memory using the CIU write password feature, and supported by the onboard utilities

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected

CIU HANGUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	42
Key	2	byte	0

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	(Table 9 1)

NOTE This command should be issued on each port original ly enabled by *CIU CALLUP* before communication channel usage is rel nquished

Discussion:

Use *CIU HANGUP* to disable access to all other CIU com mands With this command, the host gives up access to the communication channel when the CIU password protection mode is enabled by SW5 (refer to Table A 19). This com mand provides protection when modems are used for remote host/CIU communications

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected

CIU ONLINE/OFFLINE

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	44
Key	2	byte	0
Mode	3	byte	0 1*

*V1 = 0 causes CIU to de energize from the loop (secondary)
V1 = 1 causes CIU to energize onto the loop (primary)

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	(Table 9 1)

Discussion:

CIU ONLINE/OFFLINE allows the host to cause the CIU to become secondary or primary, without issuing *CIU RESTART*

Network 90 Effect:

The CIU energizes or de energizes a relay that redirects loop communication through the LIS (LIM with NCIU02/03) for loop communications In the energized state the CIU is operating in the primary mode This causes the CIU to establish and connect points that had been configured while the CIU was in the secondary mode This also causes reception of exception reports to start In the de energized state the CIU is operating in the secondary mode which stops exception reporting (Other PCUs will mark the CIU as being off line)

CIU RESTART

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	19
Key	2	byte	0
Watchdog	3	byte	V1[1]
Options	4	byte	V2[2]
Reply Delay	5	byte	V3[3]
Interrupt Frequency/ Additional Options	6	byte	V4[4]

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	
CIU's Node No	2	byte	
CIU's Ring No *	3	byte	

* In a NCIU02/03 this byte is Spare

NOTES

1 Watchdog
- 0 no watchdog timer
- > 0 time out period = 2.5 seconds * Watchdog

2 NCIU04 Options 128 + T + S + W + P + C
NCIU02/03 Options = Z + T + S + X + P + C
where
- Z 64 if incoming commands are separated from incoming exception reports
- T 32 if CIU is able to time synchronize NETWORK 90
- S 16 if exception report screening is enabled
- W 8 if the Work Flag value is to be returned as the next two bytes following the Reply Code of every reply. This does not clear the Work Flag. Refer to the READ WORK FLAG command
- X 4 if X ON/X OFF protocol is to be supported
- P 2 if CIU is primary (on line)
- C 1 if the host can put stations into Computer mode

3 Delay time Reply Delay * 1/100 seconds

4 NCIU02/03 time in seconds of parallel port work flag interrupt interval
NCIU04 Additional Options B + W + T
where
- B = 4 if Bad Quality Alarm Management is to be implemented in the READ DATA EXCEPTIONS, READ DATA GROUP and READ DATA LIST commands
- W 2 if Wall Clock Offset is to be added to Time Stamp (refer to T below)
- T 1 if Time Stamp is to be returned with Status/Value in reply (refer to READ DATA EXCEPTIONS command)

Discussion:

CIU RESTART clears the CIU point table and gives the CIU its executive control parameters. This command affects whether the CIU is primary or secondary To allow for redundant CIUs, a CIU can be either of the following·

- Primary CIU sends and receives loop messages to/from other nodes on the loop
- Secondary CIU - does not send or receive mes sages but is bypassed by the loop. Thus, there can be a backup CIU with the same loop address as long as only one CIU is primary.

The watchdog allows the CIU to detect a loss of communica tion (the host goes off line) with the computer A loss of communication can result from either a host or CIU failure The watchdog is expressed in units of 2 5 seconds When ever the watchdog interval lapses after a host command, the CIU considers the host off line When the CIU finds the host off-line, the CIU becomes secondary

When the CIU is powered up or hardware is reset, it is secondary It becomes primary when it accepts a *CIU RES TART* with the primary option, or when it is commanded to become primary with *CIU ONLINE* This is available as an option so that the host can force a primary CIU to become secondary

If the command separation option (NOTE 2) is selected, RCM switch commands are returned by *READ COMMAND EX CEPTIONS* If not selected, then RCM commands are returned by *READ MISCELLANEOUS STATUS EXCEPTIONS*, for NCIU02/03, and NCIU04 when in NCIU02/ 03 mode The NCIU04 always separates commands from status excep tions when operating in NCIU04 mode

The NCIU04 option allows the host to select whether or not to maintain total software compatibility with NCIU02 The NCIU04 option enables the use of new commands, and larger command and reply sizes Choosing NCIU04 in the options field, automatically selects command separation and X ON/X OFF protocol support Byte 6 contains the NCIU04's additional options The NCIU02/03 requires that the host wait 5 seconds after issuing a *RESTART* command, before issu ing any other command The actual restart operation does not begin until after the CIU has replied to the host The NCIU04 completes all restart activity before replying to the host, the host should not have to delay after receiving the reply from the NCIU04

The host can enable exception report screening This op tion screens incoming exception reports issued as a result of maximum reporting times expiring The CIU avoids report ing exception report data that has not changed once it has been sent to the host

The host's ability to change a station from local to computer level is an option which the host can forego This allows a measure of protection against some cases of faulty host operation

Reply delay slows the CIU response After sending a com mand, this allows the host time to get ready for a reply The delay is the time between the termination code (time out between bytes) of the command and the beginning of the reply If CIU processing takes more time than the re quested delay, the delay does not further slow the reply The delay only insures a minimum delay period

After a hardware reset, *CIU RESTART* must be the first command given, unless password protection is enabled In this case, the proper password must be supplied in the *CIU CALLUP* command, before the *RESTART* command is is sued

NETWORK 90 Effect:

If the CIU is restarted as primary, other NETWORK 90 com ponents which expect reports re establish routes The CIU starts sending and receiving loop messages

In the case of redundant CIUs, if the CIU is restarted as primary before the former primary CIU times out to secon dary, the CIUs destroy each other's messages Once the former primary CIU times out, the new primary CIU com pletes its transmission normally The host does nothing to clear the temporary transmission conflict If the CIU is re started in the secondary mode it has no effect on the NET WORK 90 Loop

CONNECT POINT GROUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	37
Key	2	byte	0
Index (pt 1)*	3 4	integer	1 .10,000 Note 1
Index (pt 2)*	5 6	integer	1 10,000 Note 1
	7 .102		

*For NCIU02 Value 1 2 500
For NCIU03, Value 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTE
1 A maximum of 50 indices can be connected per group If the command code and key are the only fields issued the CIU connects the last group of indices that are downloaded *CONNECT POINT GROUP* and *DISCONNECT POINT GROUP* have a common group definition

Discussion:

CONNECT POINT GROUP connects routes which have been established These routes must be connected for the CIU to receive the point's value from its module Module status points and points written by the host need not be connected

The host connects points after establishing them and leaves them connected If the host has several input points established which it uses only for an infrequent application, it can use *DISCONNECT POINT LIST* or *DISCONNECT POINT GROUP* on these points after the application uses them The host can connect them again the next time the application runs Disconnecting the points removes unneeded point traffic from the loop

If any input point from a station is connected, then all points of that station are connected

NETWORK 90 Effect:

The CIU sends messages to SBMs or BIMs to connect the exception report routes This causes the SBMs or BIMs to begin sending exception reports

CONNECT POINT LIST

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	4
Key	2	byte	0
First index*	3 4	integer	1 10,000
Last Index*	5 6	integer	1 .10,000

*For NCIU02 Value 1 2 500
For NCIU03 Value 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

Discussion:

CONNECT POINT LIST connects established input routes These routes must be connected for the host to receive the point's value from its module Module status points and points written by the host do not need to be connected

In a typical application, the host connects points after es tablishing them and simply leaves them connected As an alternative, if the host has several input points established which it uses only for an infrequent application, it can dis connect them with *DISCONNECT POINT LIST* or *DISCON NECT POINT GROUP* after the application uses them It can connect them again the next time the application runs Dis connecting the points removes unneeded point traffic from the loop

If any input point from a station is connected, then all points of that station are connected

NETWORK 90 Effect:

The CIU sends messages to SBMs or BIMs to connect the exception report routes This causes the SBMs or BIMs to begin sending exception reports

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	70
Key	2	byte	0
Integer Format	3..4	integer	Note 1
Real Format	5..6	integer	Note 2
Affected Commands	7	bytes	Note 3

Reply:

Field	Binary Char. No	Data Type	Value
Reply Code	1	byte	

NOTES

1 Integer Formats
- 0 = no format conversion
- 4 = Integer 1
- 5 = Integer-2
- 6 = Integer 4

2 Real Formats
- 0 = no format conversion
- 1 = REAL(2) (BCC0 REAL(2))
- 2 = REAL(3) (BCCo REAL(3))
- 3 = REAL(4) (IEEE Single Format)
- 8 = REAL(8) (IEEE Double Format)

3 The list of Affected Commands may include only the following
- 20 = READ BLOCK OUTPUT
- 48 - TREND DATA POLL

If no Affected Commands are specified all of the above commands will be affected

Discussion:

This command defines the formats in which data is to be returned to the host for the specified commands Integer data will be returned in the format specified by the Integer Format field or in the original format if the field is set to zero Real data will be returned in the format specified by the Real Format field or in the original format if the field is set to zero **User defined** data will always be returned as received This command may be issued as often as desired or not at all Refer to Table A 13 for data format report types

DEFINE SYSTEM NODES

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	61
Key	2	byte	0
Node Address 1	3	byte	1 255
Node Type	4	byte	Note 1
Node Address 2	5	byte	1 255
Node Type	6	byte	Note 1
Node Address 3	7	byte	1 255
Node Type	8	byte	Note 1
.	9 .126		

Reply:

Field	Binary Char. No	Data Type	Value
Reply Code	1	byte	(Table 9 1)

NOTES
1 Node Type Values
- 1 OIU (LIM/PIM)
- 8 PCU (LIM/BIM)
- 10 CIU01
- 16 CIU02/03
- 16 MCS (LSM02)
- 16 OIU (LSM02)

2 This is a variable length command A minimum of 1 and a maximum of 62 PCUs may be supplied

3 This command is unavailable with the NCIL04 however its use does not cause an error

Discussion:

DEFINE SYSTEM NODES is used to inform the CIU of all other nodes (PCUs, OIUs, MCSs, and CIUs) on the NET WORK 90 plant loop The system node list must be com plete if the trending features of the NETWORK 90 system are to operate properly The particular CIU that receives this command need not be in the list

NETWORK 90 EFFECT:

The remainder of the NETWORK 90 system is unaffected by this command

DELETE BLOCK

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	18
Key	2	byte	0 32 Note 1
Ring*	3	byte	1 250
Node*	4	byte	1 250
Module	5 6	integer	0 31
Block	7 8	integer	0 65535

*For NCIU02/03 Ring and Node are replaced by

PCU	3 4	integer	1 63

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	Note 2

NOTES
1 Refer to Key Field in Section 3

2 Reply codes < 100 refer to Table 9 1
Reply codes ≥ 100 refer to Table A-2

Discussion:

DELETE BLOCK removes the block from the module The module must be in configure mode for this command to function

This command does not use the CIU point table

NETWORK 90 Effect:

The CIU sends a *DELETE BLOCK* message to the module and expects a reply

DEMAND MODULE STATUS

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	27
Key	2	byte	0 32 Note 1
Ring*	3	byte	1 250
Node*	4	byte	1 250
Module	5 6	integer	0 31

*For NCIU02/03 Ring and Node is replaced by

PCU	3 4	integer	1 63

Reply:

Field	Binary Char. No	Data Type	Value
Reply code	1	byte	Note 2
Status**	2 17	bytes	Note 3

**For NCIU02/03, Binary Char No 2 6

NOTES
1 Refer to Key Field in Section 3

2 Reply codes < 100, refer to Table 9 1
Reply codes > 100 refer to Table A 2

3 For modules that have Extended Module Status 16 bytes of status are returned (refer to Table A 8)

Discussion:

DEMAND MODULE STATUS allows the host to read the status of any module, even if the module's status is not established in the point list

The reply is delayed until the module responds to the CIU

NETWORK 90 Effect:

The CIU sends a read module status message to the module and expects a reply

DEQUEUE

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	25
Key	2	byte	0 32 Note 1

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	Note 2
Dequeued reply*	2 1505	bytes	Note 1

*For NCIU02/03 Binary Char No 2 500

NOTES
1 Refer to Key Field in Section 3

2 Reply codes < 100 refer to Table 9 1
Reply codes ≥ 100 refer to Table A-2

Discussion:

DEQUEUE returns the reply queued by the previous command which had a nonzero key If the reply is not yet ready, the reply code is 1 Refer to **Key Field** in Section 3.

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected

DISCONNECT POINT GROUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	36
Key	2	byte	0
Index (pt 1)*	3 4	integer	1 10,000 Note 1
Index (pt 2)*	5 6	integer	1 10,000 Note 1
	7...102		

*For NCIU02 Index (pt 1 and 2) range 1 2 500
For NCIU03, Index range 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTE
1 A maximum of 50 indices can be disconnected per group If the command code and key are the only fields issued, the CIU disconnects the last group of indices downloaded *DISCONNECT POINT GROUP* and *CONNECT POINT GROUP* have a common group definition

Discussion:

Points are disconnected to keep unneeded traffic off the loop *CONNECT POINT LIST* and *CONNECT POINT GROUP* are used initially to start exception reporting Disconnected points do, however, continue to send exception reports which indicate changes of alarm state

NETWORK 90 Effect:

The CIU disconnects the exception report routes in the PCUs This stops the SBMs (BIMs with NCIU02/03) from sending the point's exception reports to the CIU The CIU disconnects the route of a station exception report only if all input points from that station are disconnected

DISCONNECT POINT LIST

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	5
Key	2	byte	0
First index*	3..4	integer	1 10,000
Last index*	5 6	integer	1 10,000

*For NCIU02, Value 1 2 500
For NCIU03 Value 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

Discussion:

DISCONNECT POINT LIST disconnects points to keep un needed traffic off the loop. *CONNECT POINT LIST/CONNECT POINT GROUP* is used originally to start exception reporting However, disconnected points continue to send exception reports indicating changes of alarm state

NETWORK 90 Effect:

The CIU disconnects the exception report routes in the PCUs. This stops the SBMs or BIMs from sending the point's exception reports to the CIU The CIU disconnects the route of a station exception report only if all of the input points from that station are disconnected

DISESTABLISH POINT

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	23
Key	2	byte	0
Index*	3 4	integer	1 10,000

*For NCIU02, Value 1 2,500
For NCIU03 Value 1 5,000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

Discussion:

DISESTABLISH POINT removes a point from the CIU point table This point can be re established by another establish command This command allows the process computer programmer to change the CIU point table without restart ing the CIU This feature is useful in debugging application programs, as points can be deleted from, or added to, the point table without affecting an existing application program

This command will not delete routes established by other modules Before a point of a different type is established with the same index number, all modules must disestablish their routes from the point

Re establishing points as different types may make some point table space unusable (refer to Section 11)

NETWORK 90 Effect:

Disestablishing

- Station variables written by the host has no effect on the NETWORK 90 system
- Points read by the host cause the CIU to dises tablish the associated exception report routes
- An output report point to which other modules have established routes causes the CIU to send bad quality exception reports with unassigned type to the modules
- An output report point to which no modules have established routes has no effect on the NET WORK 90 system

ENVIRONMENT

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	69
Key	2	byte	0

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	
Module Type	2	byte	Note 1
Module Mode	3	byte	Note 2
Firmware Rev	4 5	ASCII	Note 3
Restarted	6	byte	Note 4
Online	7	byte	Note 5
Node	8	byte	
Ring	9	byte	

NOTES

1 Module Types
- 1 CIU01
- 2 CIU02
- 3 CIU03
- 4 = CIU04

2 Module Modes
- 1 CIU01 mode
- 2 CIU02 mode
- 4 CIU04 mode

3 The Firmware Revision consists of two ASCII characters that identify the revision of the CIU s firmware For example AO is revision A 0

4 Restarted
- 0 CIU has not been restarted
- 1 CIU has been restarted

5 On ine
- 0 CIU is offline
- 1 CIU is online

DISCUSSION.

This command returns the CIU environmental data This data identifies the CIU module type and operating mode (the CIU02/03 may be operated in a CIU01 compatible mode and the CIu04 may be operated in a CIU02 compatible mode)

ESTABLISH AND CONNECT POINT

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	49
Key	2	byte	0
Index*	3 4	integer	1 10,000
Point Type	5	byte	Table A-1 Note 1
Ring**	6	byte	1 250
Node**	7	byte	1 250
Module	8 9	integer	0 31 Note 3
Block	10 11	integer	0 65535 Note 4
Auto Disconnect	12	byte	0 1 Note 2

*For NCIU02 Index range 1 2 500
For NCIU03 Index range 1 5 000
**For NCIU02/03 Ring and Node are replaced by

PCU	6 7	integer	1 63

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTES

1 This command is only valid for those point types which require both an establish and a connect point command These include the following point types

Type	Meaning	Type	Meaning
1	Process Variable Read	7	Digital Read
2	Set Point Read	15	RCM Read
3	Control Output Read	17	Station Read
4	Ratio Index Read	19	RMSC Read
5	Analog Read	21	REAL(4) Analog Read
6	Station Status		(NCIU04 only)

Other point types will require either *ESTABLISH POINT* or *ESTABLISH REPORT*

2 If this option (field) is set to 1 the index is disconnected immediately after the first exception report is received No further exception reports are received until the host issues *CONNECT POINT LIST* or *CONNECT POINT GROUP* command that includes this index or until the alarm state of the point changes If this option is set to 0 the index remains connected and continues to receive exception reports until it is disconnected with *DISCONNECT POINT LIST* or *DISCONNECT POINT GROUP*

3 For point Types 14 and 23 the value range is 0 to 31

4 For Point Types 14 and 23 Block must be 0 Block 0 is illegal for all other Point Types

Discussion:

ESTABLISH and *CONNECT POINT* enters a
CIU point table, and establishes and connects a
index receives exception reports. This comma
same effect as issuing *ESTABLISH POINT* and
POINT for the index. For further discussion, refe
TABLISH POINT and *CONNECT POINT LIST*

NETWORK 90 Effect:

If the CIU is primary, a route is established to the SBM
(BIM with NCIU02/03) of the remote PCU. Exception report
ing begins, and the point's specifications are sent by the
remote PCU. If auto-disconnect was selected, the point is
disconnected after the first exception report is received, but
the route remains established

ESTABLISH POINT

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	1
Key	2	byte	0
Index*	3 4	integer	1 10,000
Point Type	5	byte	Note 1
Ring Note 2	6	byte	1 250
Node Note 2	7	byte	1 250
Module	8 9	integer	0 31 Note 3
Block	10 11	integer	0 65535 Note 4

* For NCIU02 Value 1 2 500
For NCIU03 Value 1 5 000

Reply:

Field	Binary Char. No	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTES

1 Point Types for this command are given in Table A 1 of the Appendix

2 For NCIU02/03 the Ring and Node Fields are replaced by PCU as follows

PCU	6 7	integer	1 63

3 For Point Types 14 and 23 the value range is 0 to 31

4 For point types 14 and 23 Block must be 0 Block 0 is illegal for all other point types

Discussion:

ESTABLISH POINT enters a point in the CIU point table and establishes exception report receiving routes The command assigns the point a unique index in the point table The command provides all the information about the point which the CIU needs to handle the loop

The host issues one command for each point entered into the point table. This command may establish any of the following point types which are read, except where noted, by the host.

Host Command	Point Type
Station Process Variable (PV)	1
Station Set Point (SP)	2
Station Control Output (CO)	3
Station ratio index	4
Analog blocks	5
Station status	6
Digital blocks	7
Station SP (written by the host)	8
Station CO (written by the host)	9
Station ratio index (written by the host)	10
Station mode (written by the host)	11
Module status	14
Remote Control Memory (RCM)	15
Single Index Station points (read and written by the host)	17
Remote Manual Set Constant (RMSC) points	19
REAL(4) Analog blocks*	21
Extended Module Status*	23

*Used only with the NCIU04

ESTABLISH REPORT establishes other point types. A station variable is read as one point and written as a different point

Points must refer to unique items For example, PCU A, Module B, Block C, Station Set Point must not be established at more than one point.

The CIU status is automatically established as index 0.

NETWORK 90 Effect:

ESTABLISH POINT effect on the NETWORK 90 system varies depending on whether the point is a station variable read by the host, written by the host, or a non-station block read by the host

Establishing a station variable to be read by the host causes the CIU to enter the station route in its own routing table The CIU then attempts to establish the route with the Super loop Bus Module (SBM) in an NCIU04, or Bus Interface Module (BIM) in the NCIU02/03, in the station's PCU Once the route is established and the station is executing, the station's SBM, or BIM sends exception report specifications

to the CIU. Exception reports without an alarm state change will not be sent to the CIU until the host issues *CONNECT POINT LIST*, or *CONNECT POINT GROUP* which includes this point.

Establishing a station variable to be written by the host has no effect on the rest of the NETWORK 90 system Exception report routing is not done by the CIU for these points

Establishing a non station block to be read by the host causes the CIU to establish a route for the block's exception reports Once the block's module is executing and the exception report route is established, the SBM, or BIM of the block's PCU sends exception report specifications to the CIU Exception reports are not sent to the host until it issues *CONNECT POINT LIST*, or *CONNECT POINT GROUP*.

ESTABLISH REPORT

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	2
Key	2	byte	0
Index *	3..4	integer	1..10,000
Point Type	5	byte	V1 Note 1
Field A	6	byte	Note 2
Field B	7 9	analog	
Field C	10 12	analog	
Field D	13 .15	analog	
Field E	16 18	analog	Notes 2 & 3
Field F	19 21	analog	
Field G	22 24	analog	
Field H	25	byte	

*For NCIU02, Value 1 2 500
For NCIU03 Value 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	(Table 9 1)

NOTES

1 V1 can have any of the following five values defined in Table A 1

V1 = 12 if establishing Analog Report
V1 = 13 if establishing Digital Report
V1 = 16 if establishing RCM Report
V1 = 18 if establishing Station Report
V1 = 20 if establishing RMSC Report
V1 = 22, if establishing REAL(4) Analog Report
(For NCIU04 only)

2 Information for fields A through E depends on the point type according to Table 2-1

3 Fields B through H may be omitted for Digital and RCM reports Fields F through H may be omitted for report types other than Station Report

For REAL(4) Analog Report the Binary Character Numbers for Fields B through H are as follows

B	7 10	F	23 26
C	11 14	G	27 30
D	15 18	H	31
E	19 22		

Table 2 1 Report Types for Fields A Through E

Field	Analog Report (Table A-3)	Digital Report (Table A-4)	RCM Report (Table A 17)	Station Report (Table A 3)	RMSC Report (Table A 3)	REAL(4) Analog Report (Table A 3)
A	Eng Unit	Alarm Spec	Type Code	Eng Unit	Eng Unit	Eng Unit
B	Zero	0 0 (N/A)	0 0 (N/A)	High Alarm	Low Limit	Zero
C	Span	0 0 (N/A)	0 0 (N/A)	Low Alarm	Limit Span	Span
D	High Alarm	0 0 (N/A)	0 0 (N/A)	Dev Alarm	High Limit	High Alarm
E	Low Alarm	0 0 (N/A)	0 0 (N/A)	PV & SP Span	Low Limit	Low Alarm
F	0 0 (N/A)	0 0 (N/A)	0 0 (N/A)	PV Zero	0 0 (N/A)	0 0 (N/A)
G	0 0 (N/A)	0 0 (N/A)	0 0 (N/A)	SP Zero	0 0 (N/A)	0 0 (N/A)
H	0 (N/A)	0 (N/A)	0 (N/A)	Stn Type (Table A 18)	0 0 (N/A)	0 0 (N/A)

Discussion:

ESTABLISH REPORT enters the report point inthe CIU table This command also supplies report specifications to remote destinations expecting exception reports from this point. The point appears as a block to the other modules in the NET WORK 90 system (index number block number). **Analog and Digital Output Reporting** in Section 4 discusses out put reporting

NETWORK 90 Effect:

This command causes the CIU to immediately send point specification messages to modules which have already estab lished routes As other modules establish routes, the CIU responds by sending the point specifications

MODULE OPERATION

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	12
Key	2	byte	0 32 Note 1
Operation	3	byte	1..4
Ring*	4	byte	1 250
Node*	5	byte	1 250
Module	6 7	integer	0..31

*For NCIU02/03 Ring and Node are replaced by

PCU	4 5	integer	1 63

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	No e 2

NOTES
1 Refer to Key Field in Section 3

2 Reply codes < 100 refer to Table 9-1
Reply codes > 100, refer to Table A-2

Discussion:

MODULE OPERATION resets the module or puts it into con figure or execute mode. Refer to Section 6 **PCU Con figuration** This command does not use the CIU point table

OUTPUT MISCELLANEOUS

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	45
Key	2	byte	0
Index*	3 4	integer	1 10,000
Status	5 9	bytes	Note 2
	10 352		Note 2

*For NCIU02, Index range 1 2 500
For NCIU03 Index range 1 5,000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9-1)

NOTES
1 RCM Report Status is described in Table A 15

2 For point types refer to Table A 1

Discussion:

OUTPUT MISCELLANEOUS outputs a RCM report The point must have been established as a RCM report with *ESTAB LISH REPORT*

NETWORK 90 Effect:

The CIU sends one exception report to each module which has an established and connected route to the point

OUTPUT MISCELLANEOUS GROUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	3
Key	2	byte	0
Index *	3 4	integer	1 10,000
Status	5 9	byte	Note 1

*For NCIU02 Value 1 2,500
For NCIU03 Value 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTES
1 RCM report status is described in Table A 15
2 A maximum of 50 indices can be output per group

Discussion:

OUTPUT MISCELLANEOUS GROUP sends a maximum group of 50 RCM reports The point must have been established as an RCM Report (Point Type 16) with *ESTABLISH REPORT*

NETWORK 90 Effect:

The CIU sends one exception report, for each index in the group, to each module with an established and connected route to that index

OUTPUT REPORT*

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	67
Key	2	byte	0
Point Type (pt 1)	3	byte	Note 1
Index (pt 1)	4 5	integer	1 10,000
Status/Value (pt 1)	6	Note 2	
Point Type (pt 2)		byte	Note 1
Index (pt 2)		integer	1 10,000
Status/Value (pt 2)		Note 2	
.		.	
	1505		

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	

*This command is only available with the NCIU04

NOTES
1 Table A 2 defines the Point Types accepted by this command

2 The format of the Status/Value field depends on the Point Type field The Status/Value fields are defined in Table A 32 of the Appendix

Discussion:

This command sends exception reports The points must have been established with *ESTABLISH REPORT*

Similar commands are *OUTPUT VALUE, OUTPUT VALUE GROUP, OUTPUT STATUS, OUTPUT STATUS CROUP, OUT PUT MISCELLANEOUS STATUS, OUTPUT MISCEL LANEOUS STATUS GROUP,* and *OUTPUT STATION REPORT*

OUTPUT STATION GROUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	57
Key	2	byte	0
Index 1*	3 4	integer	1 10,000
Variable Code 1	5	byte	Note 1
Value 1	6 8	analog	
Index 2	9 10	integer	1 10,000*
	11 302		

*For NCIU02 Index range 1 2500
For NCIU03 Index range 1 5000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTE
1 Variable Code 1 Set Point
2 Ratio Index
3 Control Output

Discussion:

OUTPUT STATION GROUP sets a maximum group of 50 station variables The indices must have been established as Single Index Station Read (type 17) points with ESTAB LISH POINT

OUTPUT VALUE and *OUTPUT STATUS* are similar *OUT PUT VALUE* and *OUTPUT VALUE GROUP* send analog or digital exception reports for points established with *ESTAB-LISH REPORT OUTPUT VALUE* and *OUTPUT VALUE GROUP* also set station variables (point types 8, 9, and 10) established with *ESTABLISH POINT OUTPUT STATUS* may be used to set station mode or to output a report of a digi tal point The progress of a write to a station read point may be checked with *READ MISCELLANEOUS STATUS LIST* or *READ MISCELLANEOUS STATUS GROUP* (refer to **Station Control** in Section 4). *OUTPUT REPORT* can also be used to output station values

NETWORK 90 Effect:

The CIU sends a set station variable command for each sta tion variable in the group Each station affected sends a loop exception report back to the CIU if the CIU had connected a route to that station

OUTPUT STATION REPORT

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	59
Key	2	byte	0
Index*	3 4	integer	1 10,000
Field A	5	byte	Note 1
Field B	6 8	analog	Note 1
Field C	9 11	analog	Note 1
Field D	12 14	analog	Note 1
Field E	15 .17	analog	Note 1
Field F	18	byte	Note 1

* For NCIU02 Index range 1 2 500
For NCIU03 Index range 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	(Table 9 1)

NOTE
1 The information in fields A to F is the specification data for the station report arranged as follows

Field	Description
A	Station Quality Status (Table A 5)
B	PV Value
C	SP Value
D	CO Value
E	RI Value
F	Station Mode Status (Table A 7)

Discussion:

OUTPUT STATION REPORT is used to set station values for a Station Report point type The given values are used to generate exception reports This point must have been established as a Station Report point with *ESTABLISH STATION REPORT* *OUTPUT REPORT* is a similar command that can also be used to output station reports

NETWORK 90 Effect:

The CIU sends one exception report to each module which has an established and connected route to the given index.

OUTPUT STATION VALUE

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	56
Key	2	byte	0
Index*	3..4	integer	1 10,000
Variable Code	5	byte	Note
Value	6 8	analog	

*For NCIU02 Index range 1 2 500
For NCIU03 Index range 1 5,000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9-1)

NOTES
1 Variable Code
1 Set Point
2 Ratio Index
3 Control Output

Discussion:

OUTPUT STATION VALUE sets a station variable for a Single Index Station Read (Type 17) point. The station must have been established with the *ESTABLISH POINT*

OUTPUT VALUE and *OUTPUT STATUS* are similar *OUT PUT VALUE* and *OUTPUT VALUE GROUP* send analog or digital exception reports for points established with *ESTAB LISH REPORT OUTPUT VALUE* and *OUTPUT VALUE GROUP* also set station variables (point types 8, 9, and 10) established with *ESTABLISH POINT OUTPUT STATUS* may be used to set station mode or to output a report of a digi tal point The progress of a write to a station read point may be checked with *READ MISCELLANEOUS STATUS LIST* or *READ MISCELLANEOUS STATUS GROUP* (refer to Station Control in Section 4) *OUTPUT REPORT* can also be used to output station values

NETWORK 90 Effect:

The CIU sends a set station variable command to each module associated with the indicated index Each module sends a loop exception report, back to the CIU, for each index that had been connected

OUTPUT STATUS

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	11
Key	2	byte	0
Index*	3 4	integer	1 10,000
Status	5	byte	Note 1

*For NCIU02/03 Value 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTES
1 Refer to Table A 10 for Dig ta Report point status Table A 11 for Station Mode and Index Station Read status

Refer to Table A 16 for Remote Switch (RCM) status Table A 28 for Device Driver (FC 123) command status Multistate Device Driver (FC 129) command status is described in Table A 29 Remote Motor Control status is described in Table A 31

Device Driver Multistate Device Driver and Remote Motor Con trol function blocks are accessed through the RCM read point type

Discussion:

Use *OUTPUT STATUS* to output a digital point report, to set station mode, to set or reset an RCM function block, or to command a Device Driver Digital Report points must have been established with *ESTABLISH REPORT* Station Mode, Single Index Station Read, and RCM points must have been established with *ESTABLISH POINT* The host cannot change a station to host level, unless *CIU RESTART* is is sued with the station control option enabled

With the NCIU04, *OUTPUT REPORT* is a similar command that combines most of the capabilities of *OUTPUT STATUS, OUTPUT VALUE,* and *OUTPUT STATION REPORT*

NETWORK 90 Effect:

To set a station mode, the CIU sends a set mode message *To set or reset an RCM function block the CIU sends a* remote switch command To output a report, the CIU sends one exception report to each module that has established and connected a route to the point

OUTPUT STATUS GROUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	47
Key	2	byte	0
Index*	3 4	integer	1 10,000
Status	5	byte	Note 1
	6 152		Note 2

*For NCIU02 Index range 1 2 500
For NCIU03, Index range 1 5,000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTES

1 Refer to Table A 6 for Digital Report point status Table A 11 for Station Mode and Single Index Station Read status, Table A 16 for Remote Switch (RCM) status Table A-28 for Device Driver (FC 123) command status, Table A 29 for Multistate Device Driver (FC 129) command status Table A-31 for Remote Motor Control command status (Device Driver Multistate Device Driver and Remote Motor Control function blocks are accessed through the RCM read point type)

2 A maximum of 50 indices can be output per group

Discussion:

OUTPUT STATUS GROUP sends a maximum group of 50 digital exception reports, and/or set station modes, and/or remote switch commands Use *OUTPUT STATUS GROUP* to output a digital point report, to set station mode, to set or reset an RCM function block, or to command a Device Driver Digital Report points must have been established with *ES TABLISH REPORT* Station Mode, Single Index Station Read, and RCM points must have been established with *ESTAB LISH POINT* The host cannot change a station to host level unless *CIU RESTART* is issued with the station control op tion enabled

NETWORK 90 Effect:

To set a station mode, the CIU sends a set mode message To set or reset an RCM function block, the CIU sends a remote switch command To output a report, the CIU sends one exception report, for each point within the group, to each module that has an established and connected route

OUTPUT VALUE

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	10
Key	2	byte	0
Index*	3 4	integer	1 10,000
Status	5	byte	Note 1
Value	6 8	analog	

*For NCIU02, Value 1 2 500
For NCIU03, Value 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTES
1 The Digital Point Report Status is described in Table A 6
The Analog Report Status is described in Table A 5

2 For point types refer to Table A 1

Discussion:

OUTPUT VALUE sends an analog or digital exception report, or sets a station variable or Remote Manual Set Constant (RMSC) The point must have been established as an output using *ESTABLISH REPORT*, except for station variables (SP, CO, and ratio) which are established with *ESTABLISH POINT* If this command is used for a digital report, the value field must be given but is not used

With a NCIU04, *OUTPUT REPORT* is a similar command that combines most of the capabilities of *OUTPUT VALUE*, *OUTPUT STATUS*, and *OUTPUT STATION REPORT*

NETWORK 90 Effect:

The CIU sends one exception report to each module which has established and connected a route to the given point. The CIU sends a message to the station, or remote RMSC point commanding it, to assume the given value

OUTPUT VALUE GROUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	40
Key	2	byte	0
Index (pt 1)	3 4	integer	1 10,000* Note 1
Status (pt 1)	5	byte	
Value (pt 1)	6 8	analog	
..	9 302		Note 2

*For NCIU02, Index (pt 1) range 1 2 500
For NCIU03 Index (pt 1) range 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)

NOTES
1 The Digital Report point status is described in Table A-6
The Analog Report status is described in Table A-5

2 A maximum of 50 indices can be output per group

Discussion:

OUTPUT VALUE GROUP sends a maximum group of 50 analog, digital, or RMSC exception reports or commands that set station variables or RMSC values The points must have been established as outputs using *ESTABLISH REPORT* except for station variables (Point Types 8 through 10) which must have been established with *ESTABLISH POINT* If this command is used for digital reports, the value field must be given but is not used

NETWORK 90 Effect:

The CIU sends one exception report to each module which has an established and connected route for each point in the group The CIU sends commands to stations or remote RMSC points commanding them to assume the given values

QUICK RESPONSE XR

Command:

Field	Binary Char. No	Data Type	Value
Command Code	1	code	62
Key	2	byte	0
Action	3	byte	0 or 1
Index (pt 1)	4 5	integer	1 10,000
Index (pt 2)	6 7	integer	1 .10,000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	

NOTES

1 This command is not implemented by the CIU04 However, it will still be accepted by the CIU04 to maintain compatibility with the CIU02/03

2 This command will increase Plant Loop traffic not Superloop traffic

READ BLOCK

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	13
Key	2	byte	0 32 Note 1
Ring*	3	byte	1 250
Node*	4	byte	1 250
Module	5..6	integer	0 31
Block	7..8	integer	0 65535

*For NCIU02/03 Ring and Node are replaced by

PCU	3 4	integer	1 63

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	Note 2
Block Data	2 .112	bytes	Note 1

NOTES
1 Refer to Section 6 PCU Configuration

2 Reply codes < 100, refer to Table 9 1
Reply codes ≥ 100, refer to Table A 2

Discussion:

READ BLOCK reads a block configured in a NETWORK 90 Module Refer to Section 6 - **PCU Configuration** Note that block configuration can only be read while the module is in configure or execute mode

This command does not use the CIU point table.

NETWORK 90 Effect:

The CIU sends a Read Block message to the module and expects a reply

READ BLOCK OUTPUT

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	20
Key	2	byte	0 32 Note 1
Ring*	3	byte	1 250
Node*	4	byte	1 250
Module	5 6	integer	0 31
Block	7 8	integer	0 65535

*For NCIU02/03, Ring and Node are replaced by

PCU	3 4	integer	1 63

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	Note 2
Report Type	2	byte	(Table A 13)
Report	3	byte	Note 3

NOTES
1 Refer to Key Field in Section 3

2 Reply codes < 100 refer to Table 9 1
Reply codes > 100 refer to Table A 2

3 The Report format depends on the Report Type Refer to Table A 35

Discussion:

READ BLOCK OUTPUT allows the host to read the output of any block in a module, even though the block does not generate exception reports The block does not need to be established in the CIU point table This command is not recommended for normal process I/O It does not conform to the exception reporting scheme and is inefficient for the host

The reply is delayed until the module responds to the CIU

NETWORK 90 Effect:

The CIU sends a Read Block Output message to the module and expects a reply

READ COMMAND EXCEPTIONS

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	58
Key	2	byte	0
No to Return	3	byte	V1 0 214 Note 1

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	(Table 9 1)
No returned	2	byte	V2 0 214 Note 2
Index 1	3 4	integer	
Command Code 1	5	byte	Note 3
Status 1	6	byte	Note 4
Value 1	7 9	analog	Note 5
Index 2	10 11 < 1500*	integer	

*For NC U02/03 the maximum is 499

NOTES

1 This command can read up to 214 (71 with NCIU02/03) points where 0 < V1 < 214 (71 with NCIU02/03)

2 Refer to Fixed or Variable Length in Section 3

3 Command code is encoded as follows
- 0 Station State command
- 1 Station Set Point command
- 2 Station Ratio Index command
- 3 Station Control Output command
- 4 RCM command
- 5 RMSC command

4 Interpret the status field according to the Command Code as follows (CC)
- 0 Commanded station mode (Table A 11)
- 1 3 Source level of command
  - 0 Console 1 Host
- 4 RCM command (Table A 16)
- 5 Not used

5 From the Command Code interpret the value field as follows (CC)
- 0 Not used
- 1 3 Station parameter commanded value
- 4 Not used
- 5 RMSC commanded value

Discussion:

READ COMMANDS EXCEPTIONS returns commands received by Station Report and Remote Manual Set Constant (RMSC) report points. In addition, if enabled in *CIU RESTART*, commands received by Remote Control Memory report points are read using this command rather than by using *READ EXCEPTIONS*. These points must have been established using *ESTABLISH REPORT*

If the number of commands the CIU has to report exceeds the maximum reply size, the maximum is returned The host can issue another *READ COMMAND EXCEPTIONS* to get the remaining commands

If the CIU has received more than one command for a particular station variable since the previous *READ STATION COMMANDS*, the reply contains the latest value The host receives no indication of the earlier value

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected

READ DATA EXCEPTIONS*

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	63
Key	2	byte	0
Maximum Reports	3	byte	Note 1

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	
No. Returned	2	byte	
Point Type (rpt 1)	3	byte	Note 2
Time Stamp (rpt 1)	--	time stamp	Note 3
Index (rpt 1)		integer	
Status/Value (rpt 1)		Note 4	
Point Type (rpt 2)		byte	
Time Stamp (rpt 2)		time stamp	
Index (rpt 2)		integer	
Status/Value (rpt 2)		Note 4	
.	.	:	
:		:	
	1505		

*This command is only available for the NCIU04

NOTES

1 The NCIU04 returns reports until
- Case 1 the *Maximum Reports* limit is reached
- Case 2 the reply buffer is filled, or
- Case 3 there are no more reports to return

If the Maximum Reports limit is specified as 0, reports are returned until either case 2 or 3 occurs

2 Point types returned by this command are defined in Table A 1 If Bad Quality Alarm Management is enabled in the *RESTART* command the Point Type field will contain a zero (0) if the point has a bad quality status due to failure of its module or node The Status/Value field is defined in Table A 34 of the Appendix

3 The Time Stamp is a six byte value representing the absolute NETWORK 90 system time in milliseconds The Time Stamp is returned only if option T is specified in the Additional Options byte of RESTART The Time Stamp can be adjusted for the Wall Clock Offset by specifying the W option in the Additional Options byte

4 The format of the Status/Value field is dependent on the Point Type field The Status/Value fields are defined in Table A 32 of the appendix

Discussion:

This command returns the current status/value of points for which the CIU has received an exception report In order to receive exception reports for a point, the point must have been established with *ESTABLISH POINT*, and connected with either *CONNECT POINT LIST* or *CONNECT POINT GROUP* Exception reports are also received if the point was established and connected with *ESTABLISH AND CONNECT POINT*

Similar commands are *READ EXCEPTIONS, READ MISCELLANEOUS STATUS EXCEPTIONS*, and *READ STATION EXCEPTIONS* However, *READ DATA EXCEPTIONS* returns the Status/Value data without **dummy** fields (to pad each report to the same length) It also returns the Point Type and optionally the Time Stamp (the time that exception occurred)

Please note that the order in which the reports are returned is not necessarily in the same sequence that they occurred The Time Stamp is the only means to determine the sequence of events

NETWORK 90 EFFECT:

The remainder of the NETWORK 90 system is unaffected by this command

READ DATA GROUP*

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	65
Key	2	byte	0
Index (pt 1)	3 4	integer	1..10,000
Index (pt 2)	5 6	integer	1 10,000
	7 102		

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	
Point Type (pt 1)	2	byte	Note 1
Time Stamp (pt 1)	--	time stamp	Note 2
Status/Value (pt 1)	-	Note 3	
Point Type (pt 2)		byte	
Time Stamp (pt 2)		time stamp	
Status/Value (pt 2)	--	Note 3	
	1505		

*This command is only available w th the NCIU04

NOTES

1 Point types returned by this command are defined in Table A 1 If Bad Quality Alarm Management is enabled in the *RESTART* command the Point Type field will contain a zero (0) if the point has a bad quality status due to failure of its module or node The Status/Value field is defined in Table A 34 of the Appendix

2 The Time Stamp is a six byte value representing the absolute NETWORK 90 system time in milliseconds The Time Stamp is returned only if option T is specified in (cont)the Additional Options byte of *RESTART* The Time Stamp can be adjusted for the Wall Clock Offset by specifying the W option in the Additional Options byte

3 The format of the Status/Value field is dependent on the Point Type field The Status/Value fields are defined in Table A-32 of the appendix

Discussion:

This command returns the status/value of up to 50 points in the requested group of indices Each point in the group must have been established with *ESTABLISH POINT* and connected with *CONNECT POINT LIST* or *CONNECT POINT GROUP* The point may also have been established and connected with *ESTABLISH AND CONNECT*

Similar commands are *READ VALUE GROUP*, *READ MISCELLANEOUS STATUS GROUP*, and *READ STATION GROUP* However, *READ DATA GROUP* returns the Status/Value data without **dummy** fields (to pad each report to the same length) It also returns the Point Type and optionally the Time Stamp (the time that exception occurred)

NETWORK 90 EFFECT:

The remainder of the NETWORK 90 system is unaffected by this command

READ DATA LIST*

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	64
Key	2	byte	0
First Index	3 4	integer	1 10,000
Last Index	5 6	integer	Note 1

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	
Point Type (pt 1)	2	byte	Note 2
Time Stamp (pt 1)		time stamp	Note 3
Status/Value		Note 4	
Point Type (pt 2)	-	byte	
Time Stamp (pt 2)		time stamp	
Status/Value (pt 2)		Note 4	
	1505		

*This command is only available with the NCIU04

NOTES

1 First Index < Last Index < 10 000 The range of indices that can be specified depends on the point types of the indices and the size of the reply buffer

2 Point types returned by this command are defined in Table A 1 If Bad Quality Alarm Management is enabled in the *RESTART* command the Point Type field will contain a zero (0) if the point has a bad quality status due to failure of its module or node The Status/Value field is defined in Table A 34 of the Appendix

3 The Time Stamp is a six byte value representing the absolute NETWORK 90 system time in milliseconds The Time Stamp is returned only if option 'T' is specified in the Additional Options byte of *RESTART* The Time Stamp can be adjusted for the Wall Clock Offset by specifying the 'W' option in the Additional Options byte

4 The format of the Status/Value field is dependent on the Point Type field The Status Va ue fields are defined in Table A 32 of the appendix

Discussion:

This command returns the status/value of points in the requested list Each point in the list must have been established with *ESTABLISH POINT* and connected with *CONNECT POINT GROUP* or *CONNECT POINT LIST* The point may also have been established and connected with *ESTABLISH AND CONNECT*

Similar commands are *READ VALUE LIST, READ MISCELLANEOUS STATUS LIST,* and *READ STATION LIST* However, *READ DATA LIST* returns the Status/Value data without **dummy** fields (to pad each report to the same length) It also returns the Point Type and optionally the Time Stamp (the time that exception occurred)

NETWORK 90 EFFECT:

The remainder of the NETWORK 90 system is unaffected by this command

READ DATA SPECS*

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	66
Key	2	byte	0
No. Requested	3	byte	Note 1

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	
No Requested	2	byte	
Point Type (pnt 1)	3	byte	
Index (pnt 1)		integer	
Specs (pnt 1)		Note 2	
Point Type (pnt 2)	--	byte	
Index (pnt 2)		integer	
Specs (pnt 2)	--	Note 2	
	.	.	
	1505		

*This command is only available with the NCIU04

NOTES
1 The NCIU04 returns specifications until
Case 1 the Number Requested limit is reached
Case 2 the reply buffer is filled or,
Case 3 there are no more specifications to return

If the Number Requested limit is specified as 0 specifications are returned until case 2 or 3 occurs

2 The format of the SPECS field is dependent on the Point Type field The SPECS fields are defined in Table A-33 of the appendix

Discussion:

READ DATA SPECS provides the host with point specification information The point's module returns this information after the CIU establishes an exception report route This command is optional. If the host never uses it, it does not degrade the operation of the CIU

Specifications are reported for station variables PV and SP, and for single station points Thev do not apply to station status or the other station variables

Specifications arrive unpred ctably. *ESTABLISH POINT* causes the point's module to send specifications to the CIU If the module is not executing at the time, it sends the specifications when it does execute The module also sends specifications whenever they change

The CIU saves a limited number of specifications To avoid losing any, the host should read specifications after estab lishing each input point. If all the required specifications have not been read after establishing all points, the host should periodically read specifications during its ongoing I/O processing

Specifications are lost because the host used CIU memory to established points, or because specification information from NETWORK 90 modules has filled the CIU memory When the CIU loses a specification, it discards all outstand ing specifications, but notes which points have lost them The CIU replies to the next *READ DATA SPECS* with a NAK, indicating specifications have been discarded The host can determine points with lost specifications by reading the CIU problem report

READ DATA SPECS has a bit in the Work Flag which can be read with *READ WORKFLAG* The bit can also be read by selecting the *RESTART* option that returns the Work Flag for each reply The RS Work Flag bit is set if *READ DATA SPECS* needs to be issued

Similar commands are *READ EXCEPTION REPORT SPECS* and *READ STATION SPECS* *READ DATA SPECS* returns specifications for all the point types covered by these two commands However, the specifications return without **dummy** fields (to pad each point's specifications to the same length)

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected

READ DEFAULT BLOCK

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	15
Key	2	byte	0 .32 Note 1
Ring*	3	byte	1 250
Node*	4	byte	1 .250
Module	5..6	integer	0 31
Block	7. 8	integer	0. 65535
Function code	9 10	integer	0. 255

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	Note 2
Block	2 110	bytes	Note 3

*For NCIU02/03 Ring and Node are replaced by

PCU	3 4	integer	1 63

NOTES
1 Refer to Key Field in Section 3

2 Reply codes < 100 refer to Table 9-1
Reply codes > 100, refer to Table A-2

3 Refer to Section 6 PCU Configuration

Discussion

READ DEFAULT BLOCK returns the block specification and default parameter values for the given block and correspond ing function code Block number and function code are check ed for compatibility Refer to Section 6 **PCU Configuration** The module must be in the configure mode. This command does not use the CIU point table

NETWORK 90 Effect:

The CIU sends a *Read Default Block* message to the module and expects a reply.

READ EXCEPTION REPORT SPECS

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	24
Key	2	byte	0
No to return *	3	byte	V1 0 100 Note 1

Reply:

Field	Binary Char. No	Data Type	Value
Reply code	1	byte	(Table 9 1)
No Returned*	2	byte	V2 0 100 Note 1
Index (spec 1)**	3 4	integer	1 10,000
Field A (spec 1)	5	byte	Note 2
Field B (spec 1)	6 8	analog	Note 2
Field C (spec 1)	9 11	analog	Note 2
Field D (spec 1)	12 14	analog	Note 2
Field E (spec 1)	15 17	analog	Note 2
Index (spec 2)**	18 19	integer	1 10,000
	20 1502***		

* For NCIU02/03, V1 V2 0 33
** For NCIU02 Value 1 2 500
For NCIU03 Value 1 5 000
*** For NCIU02/03 Binary Char No 20 497

NOTES
1 V1 zero requests variable length reply Refer to Fixed or Variable Length Replies in Section 3

2 Information in fields A through E depends upon the point type according to the Table 2 2

Discussion:

READ EXCEPTION REPORT SPECS provides the host with point specification information The point's module returns this information after the CIU establishes an exception report route This command is optional If the host never uses it, it does not degrade the operation of the CIU

Specifications are reported for station variables PV and SP They do not apply to station status or the other station variables

Specifications arrive unpredictably *ESTABLISH POINT* causes the point's module to send specifications to the CIU If the module is not executing at the time, it sends the

Table 2 2 Report Specification Types for Fields A-E

Field	PV	SP	Analog	Digital	RCM	RMSC
A	E U	E U	E U	Alarm Spec	Switch type (Table A-16)	E U
B	Zero	Zero	Zero	0 0	0 0	Low Limit
C	Span	Span	Span	0 0	0 0	H Lim L Lim
D	High Alarm	Dev Alarm	High Alarm	0 0	0 0	High Limit
E	Low Alarm	0 0 Alarm	Low Alarm	0 0	0 0	Low Limit

Where.
E U. = Engineering Units (refer to Table A-3)
Alarm Spec - Digital alarm specifications (refer to Table A 4)

specifications when it does execute The module also sends specifications whenever they change

The CIU saves a limited number of specifications To avoid losing specifications, the host should read specifications after establishing each input point If all the required specifications have not been read after establishing all points, the host should periodically read specifications during its ongoing I/O processing

Specifications are lost either because the host used CIU memory to established points, or because specification information from NETWORK 90 modules has filled the CIU memory When the CIU loses a specification, it discards all outstanding specifications, but notes which points have lost them The CIU replies to the next *READ EXCEPTION REPORT SPECS* with a NAK, indicating specifications have been discarded The host can determine points with lost specifications by reading the CIU problem report

Specifications for Single Index Station Read points can be read with *READ STATION SPECS* Both *READ SPECS* and *READ STATION SPECS* share a common bit in the work flag. The RS work flag bit is set if either *READ SPECS* or *READ STATION SPECS* needs to be issued Specifications may also be read using the *READ DATA SPECS* command

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected

READ EXCEPTIONS

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	8
Key	2	byte	0
No of reports	3	byte	V1 0 250 Note 1

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)
No Returned	2	byte	V2 1..250 Note 1
Index (pt 1)*	3 4	integer	1 10,000
Status (pt 1)	5	byte	Note 2
Value (pt 1)	6 8	analog	Note 3
Index (pt 2)*	9 10	integer	1 10,000
	11 1502**		

* For NCIU02, Value 1 2,500
For NCIU03, Value 1 5,000
** For NCIU02/03 Binary Char No 11 494

NOTES
1 V1 0 requests variable length reply (refer to the Fixed or Variable Length Replies paragraph in the Section 3) For NCIU02/03, V1 0 82

2 Each analog exception (including station PV, SP CO and ratio) returns a status as described in Table A 6 followed by the point value

Each digital exception returns a status as shown in Table A 7 followed by a dummy value field of zero

In NCIU02/03 mode an RCM report may be returned only if the option to separate incoming commands from incoming exceptions, is selected in the *RESTART* command In NCIU04 mode *READ EXCEPTIONS* does not return RCM reports

Each RCM report (Point Type 16) returns a status as described in Table A 15 followed by a dummy value field of zero when an OIU MCS or another CIU has issued a set or reset command

Each RMSC read returns a status as described in Table A 5 followed by the point value

3 REAL(4) Analog values are returned in REAL(3) format

Discussion:

READ EXCEPTIONS returns the current status and value of each station variable to be read, or an analog, digital, or RMSC point for which the CIU has received an exception report In order to receive exception reports for a point, the point must have been established with *ESTABLISH POINT* or *ESTABLISH AND CONNECT POINT* Normally, the point must have been connected with *CONNECT POINT LIST* or *CONNECT POINT GROUP*, but an exception report arrives for any established exception report if its alarm status chan ges. After the report of the alarm change, the disconnected point remains disconnected

READ MISCELLANEOUS STATUS EXCEPTIONS reads sta tion, RCM, and module status

READ COMMAND EXCEPTIONS is similar except it returns commands received by RMSC and station report types. Note that commands received by RCM report points may alter natively be read with *READ COMMAND EXCEPTIONS* if this option is selected in *CIU RESTART*.

For the NCIU04, *READ DATA EXCEPTIONS* is similar to *READ EXCEPTIONS* except that it also reads miscellaneous status exceptions and station exceptions

If the number of points the CIU has to report exceeds the maximum reply size, the maximum is returned The host can issue another *READ EXCEPTIONS* to get the remaining points.

If the CIU has received more than one exception report or RCM value for a particular point since the previous *READ EXCEPTIONS*, the reply contains the latest value The host receives no indication of the earlier value

If the exception report screening option selected by *CIU RES TART*, is equal to the value contained in the CIU's data base for the point, incoming exception reports are not sent to the host

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected

READ EXTENDED PROBLEM REPORT

Command:

Field	Binary Char. No	Data Type	Value
Command Code	1	code	46
Key	2	byte	0 32 Note 1
Ring*	3	byte	1 250
Node*	4	byte	1 250
Module	5 6	integer	0 31
Extended Code	7 8	integer	V1 Note 2
Block	9 10	integer	0 65535
Report Number	11 14	long	V2 Note 3

*For NCIU02/03, Ring and Node are replaced by

PCU	3 4	integer	1 63

Reply:

Field	Binary Char. No.	Data Type	Value
Reply Code	1	byte	Note 4
Report Number	2 5	long	V5 Note 3
Report Count	6	byte	V4 Note 5
Report	7.. Note 6	bytes	Note 7

NOTES

1 Refer to **Key Field** in Section 3

2 The extended code identifies the type of the extended problem report being requested V1 = 80FE (HEX) specifies Sequence of Events data V1 = 8C00 (HEX) specifies Extended Module Problem Report data

3 The complete report from a module may require more than one *READ EXTENDED PROBLEM REPORT* The host and the module use report number to coordinate the multiple commands When asking for a new report the host should issue V2 0 The host should request further segments of the report by issuing V5 as the report number

4 Reply codes < 100 refer to Table 9 1
Reply codes > 100 refer to Table A 2

5 For Sequence of Events data 0 < V4 < 15 the number of Sequence of Events Recorder (SER) points contained by V5 Each SER point has 7 bytes of associated data Otherwise this is the first byte of the Extended Module Problem Report

6 Maximum reply length
116 bytes for CIU02/03 mode
1505 bytes for the local CIU in CIU04 mode

7 Refer to Section 5 **System Status Monitoring**

Discussion:

READ EXTENDED PROBLEM REPORT allows the host to read an extended module problem report Section 5, **System Status Monitoring**, discusses the use of extended problem reports.

NETWORK 90 Effect:

The CIU sends a Read Extended Problem report to the module and expects a reply.

READ MISCELLANEOUS STATUS EXCEPTIONS

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	22
Key	2	byte	0
No to return	3	byte	V1 0 214 Note 1

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)
No returned2	byte	V1 0 214	
Index (pt 1)*	3 4	integer	0 10,000
Status (pt 1)	5 9	bytes	Note 2
Index (pt 2)*	10 11	integer	0 10,000
	12 1500**		

* For NCIU02, Value 0 2 500
For NCIU03 Value 0 5 000
** For NCIU02/03 Binary Char No 12 499

NOTES
1 V1 zero requests variable length reply, (Refer to Fixed or Variable Length Replies in Section 3)

2 Each Status that returns is described in Table A 8 Each Station Status returns the PV status in the format described in Table A 5 This is followed by Station Status as described in Table A 7 and followed by three zero bytes

Each RCM read (Point Type 15) returns a status described in Table A 15

Discussion:

READ MISCELLANEOUS STATUS EXCEPTIONS returns the current status of each station, RCM, and module for which the CIU has received an exception report In order to receive exception reports for station status, RCM, or module status, the status must have been established as a point with *ES TABLISH POINT* or *ESTABLISH AND CONNECT POINT* Station status points must normally be connected with *CON NECT POINT LIST* or *CONNECT POINT GROUP*, but a sta tion status exception report always arrives if the station's alarm status changes Module status is automatically con nected

READ DATA EXCEPTIONS (NCIU04 only) is similar to *READ MISCELLANEOUS STATUS EXCEPTIONS*, but it reads the status, value, and miscellaneous status of all input points

READ EXCEPTIONS is similar to *READ MISCELLANEOUS STATUS EXCEPTIONS*, but it reads the status and value of analog and digital points. If the number of points the CIU has to report exceeds the maximum reply size, the maximum is returned. The host can issue another *READ MISCELLANEOUS STATUS EXCEPTIONS* to get the remaining points.

If the CIU has received more than one exception report for a particular point, since the previous *READ MISCELLANEOUS STATUS EXCEPTIONS*, the reply contains the latest status. The host receives no indication of the earlier status.

If you select the exception report screening option in *CIU RESTART*, incoming exception reports, equal to the point value contained in the CIU data base, are not sent to the host.

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected.

READ MISCELLANEOUS STATUS GROUP

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	39
Key	2	byte	0
Index (pt 1)*	3 4	integer	0 10,000 Note 1
Index (pt 2)*	5 6	integer	0 10,000 Note 1
	7 102		

*For NCIU02, Index range 1 2 500
For NCIU03, Index range 1 5 000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)
Status (pt 1)	2 6	5 bytes	Note 2
	7 251		

NOTES
1 A maximum of 50 indices can be read per group If the command code and key are the only fields issued the CIU will read the value of the last group of indices downloaded by this command

2 Each module status returned is described in Table A 8

Each station status returns the PV in the format described in Table A 5 This is followed by a status as in Table A 7 fol lowed by three zero bytes

Each RCM read (Point Type 15) returns the status described in Table A 15

Each Single Index Station Read (Point Type 17) returns a status as follows

BYTE	STATUS	TABLE
1	Station Status	A 6
2	Reply to most recent Station Status write	9 1
3	Reply to most recent Set Point write	9-1
4	Reply to most recent Ratio Index write	9 1
5	Reply to most recent Control Output write	9 1

Discussion:

READ MISCELLANEOUS STATUS GROUP returns the status of stations, RCMs, and modules in the request group of in dices Each point greater than 0 in the group must have been established as a station, RCM read, or module status with *ESTABLISH POINT*

Point index 0 is automatically established as the module status of the CIU

For current status, the stations must have been connected with *CONNECT POINT LIST* or *CONNECT POINT GROUP* Module status need not be connected explicitly

The CIU remembers the last group of indices downloaded by this command If the command code and key are the only fields issued, the remembered group of indices is used to formulate the reply

Similar commands are *READ DATA LIST* (NCIU04 only), *READ VALUE LIST*, and *READ STATUS LIST* which return data from analog and digital points.

The additional use of this command to check the progress of writes to Single Index Station Read (Point Type 17) points is discussed in *Station Control* in Section 4

NETWORK 90 Effect:

The remainder of the NETWORK 90 system is unaffected

READ MISCELLANEOUS STATUS LIST

Command:

Field	Binary Char. No.	Data Type	Value
Command Code	1	code	21
Key	2	byte	0
First Index*	3 4	integer	V1 0 10,000
Last Index	5 6	integer	V2 Note

* For NCIU02 V1 0 2,500
For NCIU03, V1 0 5,000

Reply:

Field	Binary Char. No.	Data Type	Value
Reply code	1	byte	(Table 9 1)
Status (pt 1)	2 6	5 bytes	Note 2
	7 1506		Note 3

NOTES
1 This command can read up to 301 (99 for NCIU02/03) points where

V1 < V2 < V1 + (0 98) 10 000 (5 000 for NCIU03, 2 500 for NCIU02)

2 Module Status is described in Table A 8 Station status returns PV status in the format described in Table A 5 This is followed by station status described in Table A 7 and fo lowed by three zero bytes

Each RCM read (Point Type 15) returns a status described in Table A 15

3 For point types see Table A 1
Each Single Index Station Read (Point Type 17) returns a status as follows

BYTE	Status	Table
1	Station Status	A 6
2	Reply to most recent Station Status write	9 1
3	Reply to most recent Set Point write	9 1
4	Reply to most recent Ratio Index write	9 1
5	Reply to most recent Control Output wr te	9 1

Discussion:

READ MISCELLANEOUS STATUS LIST returns the status of stations, RCMs, and modules for the request list Each point with an index greater than 0 in the list must have been established as a station, RCM read, or module status with *ESTABLISH POINT* or *ESTABLISH AND CONNECT POINT*