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DISTRIBUTED COMMUNICATIONS NETWORK  
(CDCNET)

CDCNET MESSAGE CONVENTIONS

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## 1.0 INTRODUCTION

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### 1.0 INTRODUCTION

This document describes the message conventions which will be used when defining messages for the CDCNET external interface. These conventions will apply to all command responses and unsolicited alarm messages.

Every input by the network operator should consistently produce some perceptible response output from the network. Messages comprise prompts, status messages (to indicate system state, acknowledge executed commands, etc.), error messages, warning messages, "helps" and tutorials. The guidelines given in this document are provided to assist in the creation of appropriate messages. Also command response and alarm message headers to be used within CDCNET are documented.

### 1.1 REFERENCES

Software Design Guide (CDC-PUB 15011400) July 84

Error Message Guidelines - R. K. Foster

DI Hardware GDS (ARH4948) - F. Holland

CDCNET Network ERS (ARH6226) - ACSD System Design

CYBER 180 System Interface Standard (S2196)

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 2.0 GENERAL MESSAGE GUIDELINES
 

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2.0 GENERAL MESSAGE GUIDELINES

Error messages represent a very important, though often neglected, interface between the software and user. Proper attention to producing polite, correct, and clear error messages can do a lot toward improving the overall usability of the system. The following conventions should be used in defining error message text:

- Write from the user/operators point of view. Avoid the vague "SYNTAX ERROR" or obscure internal codes. Use variable names and concepts known to the operator. Avoid computer jargon.
- Message must be written in English. Messages should follow normal rules for English grammar and punctuation, although "pidgin English" -- the omission of selected subjects, verbs and objects in the interest of brevity where the meaning is clear - is acceptable.
- Messages should be polite and courteous. Words such as "illegal" or "invalid" should be avoided in favor of words like "incorrect" or "unknown". Error Messages should, where appropriate, suggest what the user/operator ought to do to correct the error. For example

The line number must be an integer.

NOT

Illegal line number.

- Messages must be formattable for 80 character displays. Telegraph style is much better than long-winded prose. However, the message must be descriptive of the error. Messages like "Bad Argument" don't say enough.
- Consistent terminology is extremely important. Internal names and terms the user/operator may not be familiar with should not be included in the message.
- Names used in a command response should be the same as the parameter names. For example:

IF the command is:

send\_command system=columbia command='display\_date\_and\_time'

THEN for example the response should be:

Command could not be delivered to system COLUMBIA.

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2.0 GENERAL MESSAGE GUIDELINES

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- Identification must be provided with variable information. For example:

File FRED not found in catalog SALLY.  
Variable VAR1 must be scalar.

NOT

FRED not found.  
VAR1 must be scalar.

- Use ending punctuation. It indicates to the user/operator that the message is not continued on the next line and adds to the readability of the message.
- Messages should be oriented toward an inexperienced or casual user/operator such that the message can be understood and appropriately responded to without a reference to a manual.
- A single message should diagnose a single error. For example, if the meaning of a message is "more than seven characters or leading non-alphabetic character or null identifier" it should be three messages. Usually, the code must make three separate tests, so it is easy to be precise.
- Abbreviations should be avoided. Whenever possible limit the characters used to alphanumeric plus English punctuation. Avoid use of characters that appear differently on different devices.
- Acronyms may be used only if they are meaningful to the user/operator. Section 6.0 has a list of allowed acronyms for the CDCNET product. The use of any acronyms other than those listed in section 6.0 must be approved through the CDCNET review board discussed in section 7.0 .
- Words beginning with "multi" and "non" are not hyphenated. Don't use "(s)" to indicate an optional plural usage; either singular or plural is acceptable.
- Error messages should use upper and lower case as they are normally used in the English language. Upper case should be used to distinguish "computer" words from normal English words. For example:

File FRED not found.

Specify keyword NEW.

- Place the information that must be remembered the longest near the

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**2.0 GENERAL MESSAGE GUIDELINES**

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beginning of the message.

- Place information that is most difficult near the beginning and least difficult near the end.

- Messages should be affirmative, brief, simple, and employ the active voice; e.g., "To send the message press ENTER." rather than "The message is sent by pressing ENTER."

- Messages should read in the temporal sequence of events; e.g., "Complete entry before pressing ENTER." not "Press ENTER after completing entry."

- Messages which convey similiar information should be consistent, For example:

Command PURG not found in \$SYSTEM.

File FRED not found in SALLY.

Job AABC\$ not found in input queue.

- Messages which indicate that an item must be a member of a set should list the acceptable choices. For example:

Parameter KIND must be INTEGER, BOOLEAN, or STRING.

or

SCOPE parameter for CREATE\_VARIABLE command must be LOCAL, XDCL, XREF, or JOB.

For sets longer than approximately seven items, the list should not be given. Use: -

IST3 is not a correct selection for TERMINAL\_CLASS parameter.

- When a value is outside of a range, list the range:

Value for YEAR must be between 1899 and 2201.

- Error messages should not be issued for trivial, correctable errors - nor should they be errors. For example, errors such as missing or redundant terminators should not be errors at all. If a reasonable assumption can be made as to the intent of an input, it should be acted upon as though it were "valid". No error message should be produced for these cases. If it is not perfectly clear what assumption was made, the assumption was probably not reasonable to begin with.

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 3.0 SPECIFIC MESSAGE GUIDELINES
 

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 3.0 SPECIFIC MESSAGE GUIDELINES

- Output bases should be displayed on messages for numeric values. Radixes will be shown in parenthesis. No radix displayed will indicate base 10.
- As little ASCII data (i.e., data type character octet) as possible should be generated as the variable data. Operator entered ASCII or strings that were configurable options are allowed. No fixed strings. For example, the Device Interface system name can be sent as part of the variable data since the system name is a configurable option (i.e., it is assigned by an operator command at configuration time).
- Wherever possible share message templates across different software components. There are common message templates which are intended to be used across the CDCNET product. When defining message templates always attempt to use existing templates.
- Within a software component share templates across alarms/logs and command responses (e.g., don't use the terminology UP and DOWN in a command response, and then use ON and OFF in an alarm message generated by the same component). Use consist terminology in a given software component and also in related components. For example all lower layer software should use the same terminology for a networks status (e.g., UP, DOWN, CNFG, DEGRADED, etc.).
- Keep displays to less than or equal to 24 lines for a single template.
- Alarms and Responses must be descriptive (i.e., template definitions should contain descriptive ASCII text describing the error). For example:

```

CDCNET ALARM *****
system_name 83/08/04 11.00.35 30432
--ERROR-- Incorrectly formatted Routing Information Data Unit
Routing Information Data Unit = ffedcl2450cdcd120123ccf
  
```

NOT

```

CDCNET ALARM *****
system_name 83/08/04 11.00.35 432
--ERROR-- error = bad RIDU
error code = 3
ridu = 1234567890abcdef0123456
  
```



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### 3.0 SPECIFIC MESSAGE GUIDELINES

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- A command response message id will be displayed with every response. The response message id uniquely identifies the condition.

- A log message id will be displayed with every alarm and log message. The message id uniquely identifies the condition. Also alarm and log message ids are distinct from command response message ids such that every condition within the CDCNET system has a system unique identifier.

- Every CDCNET command processor will generate a displayable response. No command processors should send just a success condition code with no actual response. For example:

A successful enable\_line command should result in the response "line xxx enabled" or "lines enabled" not just a success condition code.

- Logical Names and Physical Names will be used to represent physical elements. Physical names will be the default provided names. For example:

Port number 1 on LIM 2 will have a physical name of \$LIM2\_PORT1. A logical name may be JACKS\_TERMINAL\_PORT.

Exact conventions on how physical names are formed for elements is given in section 5.0 .

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 4.0 CDCNET MESSAGE HEADERS
 

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4.0 CDCNET MESSAGE HEADERS4.1 COMMAND RESPONSE HEADER

This section defines the message header for a CDCNET command response.

```
<system name> <date> <time> <response message id>
--<severity level>-- <condition description>
```

system name: The system name is the name of the system where the response was generated from. The system name can be up to 31 characters in length.

date: Date in the form of YY/MM/DD

time: Time in the form of HH.MM.SS

response message id: The response message id uniquely identifies this condition (i.e., response) within the system.

severity level: The severity level of the condition. Possible values are INFORMATIVE, WARNING, ERROR, FATAL, and CATASTROPHIC.

condition description text: Specifies the condition. This field should distinctly and descriptively specify the existing condition.

Example command response with header:

```
system_name 83/08/04 11.00.35 1033
--WARNING-- Command could not be delivered to system arh_101
```

4.2 ALARM HEADER

This section defines the message header for a CDCNET alarm message.

```
CDCNET ALARM *****
<system name> <date> <time> <log message id>
--<severity level>-- <condition description>
```

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4.0 CDCNET MESSAGE HEADERS4.2 ALARM HEADER

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system name: The system name is the name of the system where the alarm message was generated from. The system name can be up to 31 characters in length.

date: Date in the form of YY/MM/DD

time: Time in the form of HH.MM.SS

log message id: The log message id uniquely identifies this condition (i.e., log message) within the system. Log message ids are also distinct from response message ids such that every condition within the system has a unique condition code.

severity level: The severity level of the condition. Possible values are INFORMATIVE, WARNING, ERROR, FATAL, and CATASTROPHIC.

condition description text: Specifies the condition. This field should distinctly and descriptively specify the existing condition.

Example alarm message with header:

```
CDCNET ALARM *****  
system_name 83/08/04 11.00.35 30432  
--ERROR-- Incorrectly formatted Routing Information Data Unit received  
Routing Information Data Unit = ffedc12450cdcd120123ccf
```

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5.0 CONVENTIONS FOR FORMING PHYSICAL NAMES

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5.0 CONVENTIONS FOR FORMING PHYSICAL NAMES

Physical names are the names provided by CDC to address a physical component within the DI. Examples are names to address circuit cards such as CIMS, LIMs, MPB, SMMs, etc. and physical names to address terminal lines and network solutions. Physical names will always be provided for the DI components but does not preclude network operations from configuring the DI components with logical names. The logical names are defined via the CDCNET network configuration commands. The logical name when defined is in place of not in addition to the physical name.

The physical name for a component is based on the physical location of the component within the DI and based on the circuit card type. The following conventions will be used to form the DI physical names:

- \$MPB0 .. \$MPBn where n (0 to 7) is the card slot position. For example if an MPB card was located in card slot 2 of the DI, the physical name for that MPB card would be '\$MPB2'.
- \$PMM0 .. \$PMMn where n is the card slot position.
- \$SMM0 .. \$SMMn where n is the card slot position.
- \$CIMO .. \$CIMn where n is the card slot position.
- \$PIMO .. \$PIMn where n is the card slot position.
- \$MCIO .. \$MCIn where n is the card slot position.
- \$ESCIO .. \$ESCIn where n is the card slot position.
- \$LIMO .. \$LIMn where n is the lim card slot position.
- \$LIMn\_PORTm where n is the lim card slot position and m is the port number (0 to 3) from top to bottom. Top being physically the upper-most port on the LIM card when the card is inserted in the Device Interface.
- Wild card characters can be applied to these names just as they are applied to other DI titles/names. For example:

\$LIM\* means all LIMs (i.e., matches on all names which begin with '\$LIM')

\$SMM\* means all SMMs (i.e., matches on all names which

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5.0 CONVENTIONS FOR FORMING PHYSICAL NAMES

begin with '\$SMM')

\$LIM2\* means LIM 2 as well as all ports on LIM 2 (i.e., matches on all names which begin with '\$LIM2')

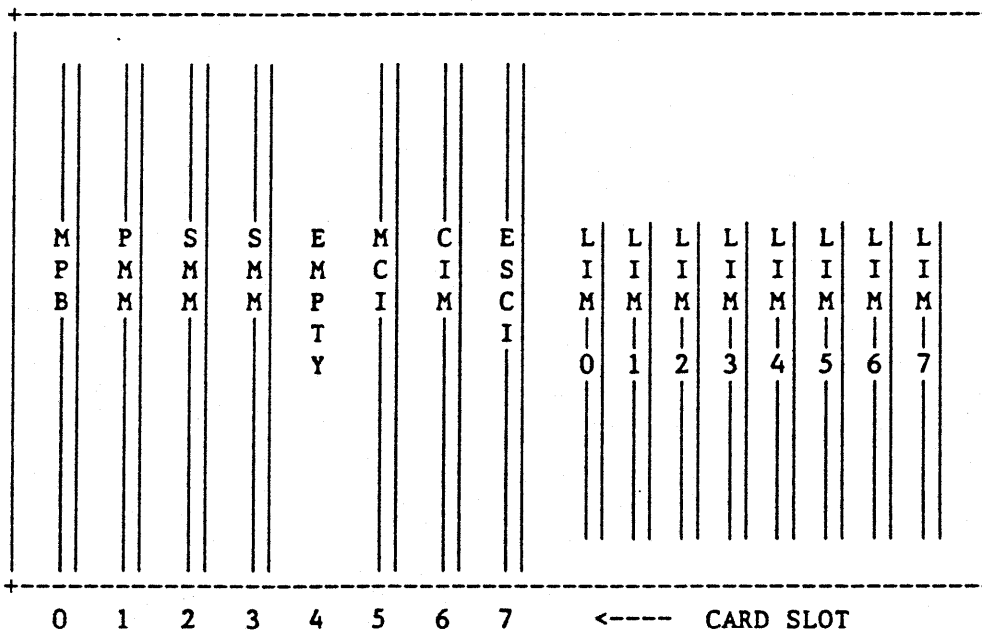
\$LIM?\_PORT2 means port 2 on all LIMs (i.e., matches on \$LIM0\_PORT2, \$LIM1\_PORT2, \$LIM2\_PORT2, \$LIM3\_PORT2, etc.)

\$LIM[3..4]\_PORT3 means port 3 on LIM 3 and LIM 4 (i.e., matches on \$LIM3\_PORT3 and \$LIM4\_PORT3)

ETC.

For more details on wild card character support refer to the Network Operations section of the CDCNET Network ERS.

The above conventions are best described through an illustrated example. Below is an example DI configuration and the physical names provided.



The following physical names will exist for the above configuration:

\$MPB0, \$PMM1, \$\$SMM2, \$\$SMM3, \$MCI5, \$CIM6, \$ESCI7, \$LIM0, \$LIM1, \$LIM2, \$LIM3, \$LIM4, \$LIM5, \$LIM6, \$LIM7, \$LIM0\_PORT0 to \$LIM0\_PORT3, \$LIM1\_PORT0 to \$LIM1\_PORT3, \$LIM2\_PORT0 to \$LIM2\_PORT3, \$LIM3\_PORT0 to \$LIM3\_PORT3, \$LIM4\_PORT0 to \$LIM4\_PORT3, \$LIM5\_PORT0 to \$LIM5\_PORT3, \$LIM6\_PORT0 to \$LIM6\_PORT3, and \$LIM7\_PORT0 to

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**5.0 CONVENTIONS FOR FORMING PHYSICAL NAMES**

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`$LIM7_PORT3.`

These names are maintained appropriately through the associated configuration commands which are used to configure the different components. For more details on the DI layout and hardware components refer to the DI Hardware GDS (ARH4948).

In the above DI configuration, if the following command were entered:

```
display_hardware_status device_name=$LIM*
```

the response would contain the hardware status for all LIMs (LIMs 0 to 7) including the status of each port.

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6.0 ALLOWED ACRONYMS

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6.0 ALLOWED ACRONYMS

<u>ACRONYMS</u>	<u>DESCRIPTION</u>
CDCNET	Control data Distributed Communications NETWORK
MDI	Mainframe Device Interface
NDI	Network Device Interface
TDI	Terminal Device Interface
MTI	Mainframe Terminal Interface
URI	Unit Record Interface
DNC	Data Network Concentrator
RCI	Remote Concentrator Interface
MPB	Master Processor Board
SMM	System Main Memory
PMM	Private Main Memory
PIM	Parallel Interface Module
CIM	Communications Interface Module
ESCI	Ethernet Serial Channel Interface
LIM	Line Interface Module
MCI	Mainframe Channel Interface
TIP	Terminal Interface Program
IVT	Interactive Virtual Terminal
RS232	EIA Recommended Standard (port type)
RS449	EIA Recommended Standard (port type)
HDLC	High level Data Link Control
SSR	Stream Service Routine

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**6.0 ALLOWED ACRONYMS**

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X.25	CCITT recommendation that specifies the interface between user data terminal equipment (DTE) and packet-switching data circuit-terminating equipment (DCE).
TELENET	Communications carrier network. A public, intelligent packet-switched network connecting subscriber terminals and computers. Based on X.25 .
TYMNET	Communications carrier network. A network similar to TELENET but based on minicomputer switching. Based on X.25 .
DATAPAC	Canadian communications carrier network
TRANSPAC	French communications carrier network



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7.0 REVIEW PROCESS

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7.0 REVIEW PROCESS

The entire CDCNET message set will be periodically reviewed by a review board. Each message will be evaluated using the guidelines. Where possible improved messages will be proposed.

All response messages to an operator or user should be documented in the External Reference Specification. This includes log message documentation and command documentation. The documenting of command responses is as important as the documentation of the command itself. The responses generated will be evaluated by the Advanced Communication Systems Development (ACSD) Technical Design Review Board (TDRB) for adherence to the guidelines set forth in this document.

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Appendix B - CONVENTIONS FOR THE FORMAT OF SPECIFIC MESSAGES  
TO BE SUPPLIED

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Appendix B - Planned Enhancements and Corrections

The following enhancements are planned for these conventions:

- . Addition of specific conventions for the format of specific messages (e.g., logs/alarms for invalid PDU's, unexpected disconnects etc.) that are common across multiple components in DCNS software. These conventions will form the contents of Appendix A to this document.

-- ERROR -- brief loud

Error; brief quiet

-- ERROR PM ~~id~~ Full loud

~~Error~~ Full quiet

Error PM id:

-- ERROR --

-- WARNING --