



TimeHub 5500

TL1 Reference Manual



Symmetricom, Inc.
2300 Orchard Parkway
San Jose, CA 95131-1017

<http://www.symmetricom.com>

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What's New in This Version

Issue 5 of this document contains the following updates from the previous revision.

Chapter 3, Keywords

- Added keyword descriptions for BRIDGED, SELMDE, USESUBRCK, and YEAR4
- Revised Table D, Keywords and Descriptions, Values, Commands, and Targets

Chapter 5, Troubleshooting

- Revised Table L, TimeHub 5500 Events
- Revised Table M, Message Troubleshooting

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Introduction

This chapter provides general information about the TL1 language.

Conventions

1

Uppercase letters in a command designate parameter values which must be entered as shown. Lowercase letters in a command are the parameter name, and the specific values that must be entered for the parameter. The Parameters section of this chapter describes the parameters and the values where a value is the same for all parameters. Parameter values for a particular command are listed with the command. The system accepts either uppercase, lowercase, or a mixture of both, but upper and lower case cannot be mixed within a parameter block.

The following symbols are used in the input and response messages:

[]	encloses an optional parameter
{ }	encloses a group of parameters, at least one of which must be entered
	separates alternatives in a group of parameters, at least one of which must be entered
^	indicates a space (used in the description of the response format, but not used in the command responses)
-	separates command code fields
:	separates parameter blocks
,	separates parameters within a block
;	terminates a command, and causes execution
" "	encloses text to be parsed by a machine
/* */	encloses comments for humans
< >	encloses a TL1 named variable
\ " \"	encloses a description of a condition
...	indicates the line in a response may be repeated as required

Parameters

The parameters that may be used in commands, responses, and messages are defined in Table A. When a parameter uses the same values in every instance, those values are listed with the parameter in the table. When the context requires different values for a parameter, the value is listed with the parameter in the applicable commands, responses, and messages.

Table A. Parameter Definitions

Parameter	Definition	Use
<aid>	Access identifier	Identifies the object of the command or message. May have more than one part.
<almcde>	Alarm code	Identifies the severity of the alarm based on its priority of action. If multiple alarms are reported, almcde is the highest severity of those reported.
<atag>	Automatic message tag	A number assigned to sequence and correlate automatic messages.
<chap>	Channel access privileges	Enables or disables access to a port.
<conddescr>	Condition description	Text description of the condition.
<condeff>	Condition effect	Effect on the condition of the equipment. Can be raised (SC), cleared (CL), or transient (TC).
<condtype>	Condition type	Type of alarm or event condition.
<ctag>	Correlation tag	Correlates input and response messages. Contains 1 to 6 alphanumeric characters other than 0. Must be included in a command, and the same ctag is returned in the response.
<date>	Date	Current date in 8-digit form: yy-mm-dd, where yy is the year, mm is the month (01-12), and dd is the day of the month (01-31). For example, May 3, 2000 is 00-05-03.
<errcde>	Error code	Four-character mnemonic error code. Refer to the Troubleshooting chapter.
<error message>	Error message	Error code text message.
<keyword>	Keyword	Used with commands to accomplish a task. Refer to the Keywords chapter.
<montype>	Monitor type	Performance monitoring data type. Refer to the Performance Monitoring chapter.
<monval>	Monitor value	Performance monitoring data value. Refer to the Performance Monitoring chapter.
<ntfcncde>	Notification code	Code that shows the event or alarm severity, which is one of the following: <ul style="list-style-type: none"> CR = critical alarm MJ = major alarm MN = minor alarm CL = cleared NA = non-alarmed NR = not reported

Table A. Parameter Definitions (cont'd)

Parameter	Definition	Use
<pid>	Password identifier	Password for logging into the system. Up to ten case-sensitive characters. Must include at least two non-alphabetic characters, and must include at least one special character: any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon.
<sid>	Source identifier	Name of the equipment sending the message. May be 1 to 20 alphanumeric characters.
<spec block>	Specification block	Holds a number of parameters within the command.
<srveff>	Service affecting	Identifies whether the alarm condition is service affecting: SA = service affecting NSA = not service affecting
<start retrieving messages>	Start retrieving messages	Specifies which portion of the event log is retrieved: EVTOP = retrieves 10 most recent messages from the top of the log EVTCO = continues to retrieve messages from where last left off EVTALL = retrieves all messages
<tid>	Target identifier	Identifies the equipment (TimeHub 5500) to which the command is directed. Must be a valid TL1 identifier of a maximum of 20 characters (limited to letters, digits, and hyphens). The <tid> value may be null.
<time>	Time	Current time in the six-digit form: hh-mm-ss (command) or hh:mm:ss (response or message), where hh is hours (00 to 23), mm is minutes (00 to 59), and ss is seconds (00 to 59). For example, 5:11:49 a.m. is 05:11:49.
<uap>	User access level	Used by a system administrator to assign a given level of access to system users. User access levels are USER, ADMIN, or SECURITY, with USER being the lowest access level and SECURITY being the highest access level.
<uid>	User identifier	Name for logging into the system. Contains up to 10 alphanumeric, case-insensitive characters provisioned as valid login IDs.
<value>	Value	Used in conjunction with other blocks in a command to specify a value (for example, <keyword>=<value>).

Security

If security is enabled, a user is required to log on to the system before entering TL1 commands. If disabled, logging on is not required.

Enabling

Security is enabled by adding a new user with the highest level of security, then setting a switch on the management card. To enable security, follow Procedure A.

Procedure A. Enabling Security

Step	Action
1	If the management card switch S1-1 is set to Off (factory setting), skip to Step 4. If the management card switch S1-1 is set to On, remove the card (refer to the TimeHub 5500 System Manual for details).
2	Set switch S1-1 to Off.
3	Insert the management card (refer to the TimeHub 5500 System Manual for details).
4	Use the Enter User Security command to add a new user with the highest level of security. ENT-USER-SECU:[<tid>]:<aid>:<ctag>::<pid>, ,SECURITY; <aid>= User name: up to ten case-insensitive alphanumeric characters <pid>= User password: up to ten case-sensitive characters. Must include at least two non-alphabetic characters, and must include at least one special character: any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon.
5	Remove the management card.
6	Set switch S1-1 to On.
7	Insert the management card.

End of Procedure

Command Security Levels

Factory-set command security levels are described in Table B.

Table B. Factory-Set Command Security Levels

Security Level	Accesses
None	Commands that can be executed without logging on. If the Password Required switch is off, all commands behave as if their security level were None.
User	Commands that only allow retrieving information.
Administration	Commands that allow changing the configuration.
Security	Commands that modify the security database or download new firmware.

Command Types

TL1 commands are used to perform the following management tasks:

- Security
- Provisioning
- System administration
- Performance monitoring

Security

Security commands are used when switch S1-1 on the management card has been set to On (password required). These commands are used to protect system resources and information from unauthorized users. These commands are described in the Commands chapter.

Provisioning

Provisioning commands are used in conjunction with keywords to set up and configure the system. These commands are described in the Commands chapter. Keywords are described in the Keywords chapter.

System Administration

System administration commands are used to set and retrieve system information, and force changes in system operation. These commands are described in the Commands chapter.

Performance Monitoring

Performance monitoring commands are used to retrieve network performance information, improve network performance, and identify possible future problems. These commands are described in the Performance Monitoring chapter.

Automatic Messages and Alarm Management

Automatic messages are classified as alarmed or non-alarmed events, and cause a message to be displayed and recorded in the system logs. Events are configured by using the provisioning commands to set thresholds, values, and conditions. Events and alarms are described in the Troubleshooting chapter.

Commands

This chapter describes the TL1 commands.

Command Format

A command consists of a command code of up to three fields separated by hyphens, followed by parameter blocks separated by colons. Figure 1 shows the command format. Parameter blocks consist of one or more parameters separated by commas.

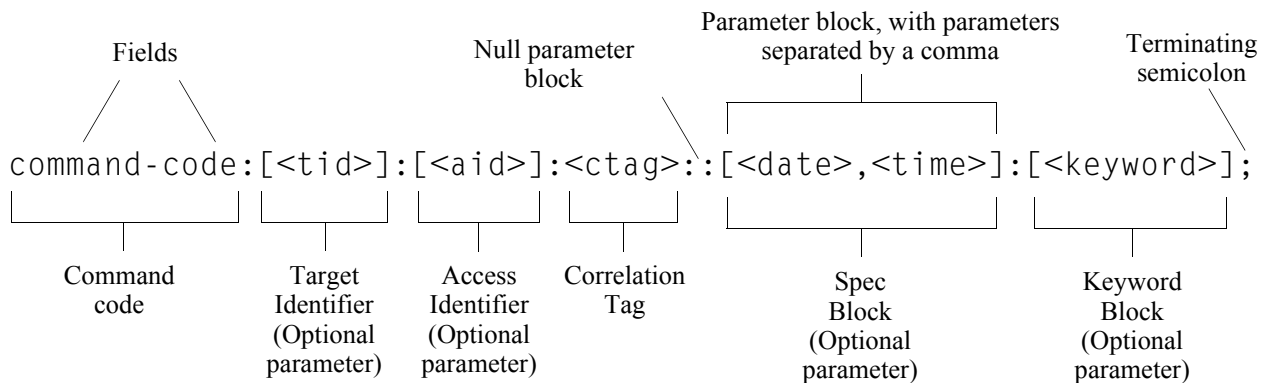
Parameter blocks may be null (contain no parameters), or contain one or more parameters. Two colons occur next to each other if a parameter block is null.

Multiple parameters in a parameter block are separated by commas. Two commas occur next to each other if a parameter is null.

Empty blocks at the end of a command line may be omitted.

Entering a semicolon at the end of the command indicates that the command statement is completed to the interpreter, and executes the command.

Figure 1. Command Format



Responses

When a command is received and processed, a response is returned. The types of responses are:

- Acknowledgement
- Normal response
- Error response

A normal or error response is returned when the TimeHub 5500 receives a command. These types of responses include the source identifier (<sid>), the date, the time, an M to indicate that it is a response to a command, and the correlation tag (<ctag>) that was entered with the command.

For a rejected command, the <ctag> may not be included in the response, instead, 0 will appear in place of the <ctag>.

Acknowledgement

If a normal response or an error response cannot be sent within 2 seconds of receipt of a command, an acknowledgment is sent. The acknowledgment codes and their meanings are as follows:

IP (In Progress)	The command has been initiated.
NA (No Acknowledgment)	The command has been accepted, but control of the processing has been lost.

If IP is sent, a normal response or an error response will follow. If NA is sent, no further response is expected; the command must be re-sent.

The IP acknowledgement format is shown below:

```
IP <ctag>
```

The NA acknowledgement format is shown below:

```
NA <ctag>
```

Normal Response

The completed normal response format is shown below:

```
^^^<sid>^<date>^<time>  
M^^<ctag>^COMPLD  
;
```

COMPLD indicates that the command was completed without error or the requested information was returned.

Notes:

1. If the ACT-USER command was entered, confirmation information would be displayed before the semicolon.
2. If the command was a query, additional information would be displayed before the semicolon.

Error Response

The completed error response format is shown below:

```
^^^<sid>^<date>^<time>  
M^^<ctag>^DENY  
^^^<errcde>  
^^^/* <error message> */  
;
```

DENY indicates that the command was denied due to an error. The <errcde> parameter indicates the error type or cause of the error.

Command Factory-Set Security Access Levels

Table A lists command types, their syntax, and their factory-set security access level (refer to the Introduction chapter for details on command types and security access levels).

Table A. Security Commands

Command	Syntax	Factory Set Access Level
<i>Security Commands</i>		
Activate User	ACT-USER	None
Cancel Port	CANC-CID-SECU	Security
Cancel User	CANC-USER	None
Cancel User Security	CANC-USER-SECU	Security
Delete Security	DLT-SECU	Security
Delete User Security	DLT-USER-SECU	Security
Edit Command Security	ED-CMD-SECU	Security
Edit Password	ED-PID	User
Edit Port Security	ED-CID-SECU	Security
Edit User Security	ED-USER-SECU	Security
Enter User Security	ENT-USER-SECU	Security
Inhibit User Security	INH-USER-SECU	Security
Reinstate User	ALW-USER-SECU	Security
Retrieve Command Security	RTRV-CMD-SECU	User
Retrieve Port Security	RTRV-CID-SECU	Security
Retrieve Status	RTRV-STATUS	User
Retrieve Status of Multiple Remote Sessions	RTRV-STATUS-SECU	Security
Retrieve User	RTRV-USER	User
Retrieve User Security	RTRV-USER-SECU	Security
<i>Provisioning Commands</i>		
Edit Equipment	ED-EQPT[-TSG]	Admin
Edit Sync	ED-SYNC[-TSG]	Admin
Retrieve Equipment	RTRV-EQPT[-TSG]	User



Table A. Security Commands (cont'd)

Command	Syntax	Factory Set Access Level
Retrieve Sync	RTRV-SYNC[-TSG]	User
Set Sync	SET-SYNCN	Admin
<i>Performance Monitoring Commands</i>		
Initialize Register	INIT-REG[-TSG]	Admin
Retrieve 24-hour Phase History	RTRV-PM-HIST	User
Retrieve Alarm Condition	RTRV-ALM[-TSG]	User
Retrieve Attribute	RTRV-ATTR[-TSG]	User
Retrieve Condition	RTRV-COND[-TSG]	User
Retrieve Performance Monitoring Information	RTRV-PM[-TSG]	User
Retrieve Threshold Information	RTRV-TH[-TSG]	User
Set Attribute	SET-ATTR[-TSG]	Admin
Set Threshold	SET-TH[-TSG]	Admin
<i>System Administration Commands</i>		
Edit Date	ED-DAT	Admin
Initialize Event Log	INIT-LOG	Admin
Operate Alarm Cutoff	OPR-ACO-ALL	Admin
Remove Equipment	RMV-EQPT	Security
Retrieve All Network Equipment Types	RTRV-NETTYPE-ALL	User
Retrieve Automatic Messages	RTRV-AO	User
Retrieve Equipment Types	RTRV-NETTYPE	User
Retrieve Header	RTRV-HDR	User
Retrieve Log	RTRV-LOG	User
Set System Identifier	SET-SID	Admin
Switch Duplex Equipment	SW-DX-EQPT	Admin
<i>Network WKG (Working)/AUX (Auxiliary) Commands</i>		
Copy Network Memory	CPY-MEM	Admin
Copy Network Memory Security	CPY-MEM-SECU	Security

Table A. Security Commands (cont'd)

Command	Syntax	Factory Set Access Level
<i>Firmware Download Commands</i>		
Activate Bulk Text Transfer Mode	ACT-BTT	Security
Activate Software Download Mode	ACT-SWDL	Security
Cancel Bulk Transfer Mode	CANC-BTT	Security
Change to Normal Mode	CANC-SWDL	Security
Copy Software from Main to Backup Memory	COPY-SFWR	Security
Erase Firmware from Main Memory	DLT-SFWR	Security
Remove Equipment	RMV-EQPT	Security
Verify Firmware Integrity	VRF-SFWR	Security

All other commands do not have a factory set access level.

Command Description

TL1 commands are listed on the following pages. After the command name, a definition of the command is given. The definition is followed by the actual command, followed by the variables that can be used with the command.

Command and response examples are shown where applicable.

Activate Bulk Text Transfer Mode

This command instructs a management card or clock card to enter into bulk text transfer mode prior to downloading segments of firmware. The command format is:

```
ACT-BTT:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	IMC	Management card
	CLK1	Clock card 1
	CLK2	Clock card 2

Command Example:

```
ACT-BTT:SYMMBITS:CLK1:SC003;
```

Response Example:

```
SYMMBITS 00-06-15 05:01:26  
M SC003 COMPLD  
;
```

Activate Software Download Mode

This command places a management card or clock card in the firmware download mode prior to a firmware download. The command format is:

```
ACT-SWDL:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	IMC	Management card
	CLK1	Clock card 1
	CLK2	Clock card 2

Command Example:

```
ACT-SWDL:SYMMBITS:CLK1:SC002;
```

Response Example:

```
SYMMBITS 00-06-15 05:01:20  
M SC002 COMPLD  
;
```

Activate User

This command logs the user onto the system, and begins a session. The command format is:

```
ACT-USER:[<tid>]:<aid>:<ctag>::<pid>;
```

Parameter	Value	Description
<aid>	Up to ten case-insensitive alphanumeric characters	Assigned user name
<pid>	Up to ten case-sensitive characters. Must include at least two non-alphabetic characters, and must include at least one special character: any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon.	Assigned password

Command Example:

```
ACT-USER::FRED:SC001::FRED.1;
```

Response Example:

```
SYMMBITS 00-06-15 15:30:45  
M SC001 COMPLD  
"FRED: 2000-12-22 1:30:04,2"  
;
```

The response in this example indicates that the previous logon for FRED was at 1:30:04 a.m. on December 22, 2000, and since then there have been two unsuccessful attempts at logging on.

Cancel Bulk Transfer Mode

This command cancels the bulk transfer mode. It signifies that all data segments have been sent. The command format is:

```
CANC-BTT:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	IMC	Management card
	CLK1	Clock card 1
	CLK2	Clock card 2

Command Example:

```
CANC-BTT:SYMMBITS:CLK1:SC005;
```

Response Example:

```
SYMMBITS 00-06-15 05:01:32  
M SC005 COMPLD  
;
```

Cancel Port

This command terminates a current session on the TimeHub 5500. It can be used to remotely cancel a session on the local port. If the port of the user is specified, the user will be logged off. The command format is:

```
CANC-CID-SECU:[<tid>]:<aid>:<ctag>;
```

Parameter	Value
<aid>	REMOTE
	LOCAL

Command Example:

```
CANC-CID-SECU::LOCAL:SC001;
```

Cancel User

This command logs the user off the system, and ends a session. The user name is not case sensitive, but must otherwise be entered exactly as assigned. The command format is:

```
CANC-USER:[<tid>]:[<aid>]:<ctag>;
```

Parameter	Value	Description
<aid>	Up to ten case-insensitive alphanumeric characters	Assigned user name

Command Example:

```
CANC-USER:::SC001;
```

Response Example:

```
SYMMBITS 00-06-15 16:30:45  
M SC001 COMPLD  
;
```

As of firmware version 4142B, the following extended capability for CANC-CID-SECU was implemented:

- If REMOTE is specified in <aid>, all users on the LAN will be logged off and the connections closed. If the command is executed from a remote port, a response will be given before the user is logged off.
- If REMOTE_{xx} (from 01 to 10) is specified, the user on that specific session will be logged off and the connection will close.
- If LOCAL is specified, the user on the local port will be logged off. Since it is a physical connection the connection cannot actually be closed.

Cancel User Security

This command terminates the session of another user on the system (for example, to terminate the session of an unauthorized user). An automatic message will be displayed on the user's terminal. The command format is:

```
CANC-USER-SECU:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	Up to ten case-insensitive alphanumeric characters	Assigned user name

Command Example:

```
CANC-USER-SECU::MARTHA:SC001;
```

The command in this example terminates MARTHA's session.

Change to Normal Mode

This command returns to the normal mode of operation, executing code from the main memory. The command format is:

```
CANC-SWDL:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	IMC	Management card
	CLK1	Clock card 1
	CLK2	Clock card 2

Command Example:

```
CANC-SWDL:SYMMBITS:IMC:SC001;
```

Response Example:

```
SYMMBITS 00-06-15 15:30:45  
M SC001 COMPLD  
;
```

Copy Network Memory

This command copies data from the working (WKG) memory to the auxiliary (AUX) memory. The command format is:

```
CPY-MEM::NET:<ctag>::WKG,AUX;
```

Copy Network Memory Security

This command verifies that the PORTAOX and PORTCMD keywords do not have the same value before copying the data from AUX memory to WKG memory. Copying will be denied if the values are the same (PORTAOX and PORTCMD are not allowed to have the same value). The command format is:

```
CPY-MEM-SECU::NET:<ctag>::WKG,AUX;
```

Copy Software from Main to Backup Memory

This command copies the current firmware from the main memory to the backup memory (or vice versa) in a management card or clock card and requests the card to validate the checksum of the memory transfer. The command format is:

```
COPY-SFWR:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	IMC-MAIN	Copies current firmware from main to backup memory in the management card
	IMC-BACKUP	Copies current firmware from backup to main memory in the management card
	CLK1-MAIN	Copies current firmware from main to backup memory in clock card 1
	CLK1-BACKUP	Copies current firmware from backup to main memory in clock card 1
	CLK2-MAIN	Copies current firmware from main to backup memory in clock card 2
	CLK2-BACKUP	Copies current firmware from backup to main memory in clock card 2

Command Example:

```
COPY-SFWR:SYMMBITS:CLK1-MAIN:SC006;IP SC006  
<IP SC006  
<IP SC006  
<IP SC006  
<IP SC006  
<IP SC006  
<;
```

Response Example:

```
SYMMBITS 00-06-15 05:03:13  
M SC006 COMPLD  
;
```

Delete Security

This command deletes all information in the security database. It is typically used after the initial installation of a TimeHub 5500. All existing user names and passwords are deleted.

Note: This command can only be executed if the switch S1 on the management card is in the OFF position (set to no password required).

The command format is:

```
DLT-SECU:[<tid>]:::<ctag>;
```

Command Example:

```
DLT-SECU:::SC001;
```

The command in this example clears the Security Database.

Delete User Security

This command allows a system administrator to delete a user. The command format is:

```
DLT-USER-SECU:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	Up to ten case-insensitive alphanumeric characters	Assigned user name

Command Example:

```
DLT-USER-SECU::FRED:SC001;
```

The command in this example deletes FRED from the Security Database.

Edit Command Security

This command changes the access level of a command. The command format is:

```
ED-CMD-SECU:[<tid>]:<aid>:<ctag>:<uap>;
```

Warning: Do not change the access level of the ACT-USER or CANC-USER commands. Doing so may make it impossible to log on or log off. If these are inadvertently changed, set them back to NONE before logging out. In an emergency, a user can set switch S1 on the management card to the OFF position, then change the ACT-USER command's access level back to NONE.

Parameter	Value	Description
<aid>	Command name	
<uap>	SECURITY	Access level
	ADMIN	
	USER	
	NONE	

Command Example:

```
ED-CMD-SECU::ED-DAT:SC001::SECURITY;
```

The command in this example changes the access level of the ED-DAT command from ADMIN (factory setting) to SECURITY.

Edit Date

This command changes the system date and time.

The command format is:

```
ED-DAT:[<tid>]::<ctag>::<date><time>;
```

Parameter	Value	Description
<date>	yy-mm-dd	Date in year-month-day
<time>	hh-mm-ss	Time in hour-minute-second

Command Example:

```
ED-DAT:::SC001::00-8-27,10-3-29;
```

The command in this example sets the date to August 27, 2000 and the time to 10:03:29 a.m.

Response Example:

```
SYMMBITS 00-08-27 10:03:29  
M SC001 COMPLD  
;
```

Edit Equipment

This command is used to change equipment parameters. To change parameters for a specific input or output port, refer to the Edit Sync command. The command format is:

```
ED-EQPT[-TSG]:[<tid>]:<aid>:<ctag>:::<keyword>=<value>;
```

Parameter	Value	Variables	Description
<aid>	CLK	—	Clock card
	IMC		Management card
	Sa-OUTb	a = 0 – 4	Shelf number. Zero (0) is master or remote, 1 – 4 are expansion shelves. SO-OUTb can always be shortened to OUTb.
		b = A, B, C, or D	Output driver card letter
	Sa-CLKb	a = 1 – 4	Expansion shelf
		b = 1, 2	Expansion controller card 1 = EC1 (leftmost slot) 2 = EC2 (rightmost slot)
	Sa-OUTb-PGc	a = 0 – 4	Shelf ID. 0 = master or remote shelf. SO- is optional. 1 – 4 are expansion shelves.
		b = A, B, C, ..., H	Output group. For master or remote shelf, range is A – D. For expansion shelf, range is A – H.
		c = 1, 2	Port group. PG1 identifies ports 1 – 20. PG2 identifies ports 21 – 40.

Edit Equipment (cont'd)

Parameter	Value	Variables	Description
<keyword>	AIS	—	Output AIS
	AOMERGE		Automatic Output Merge
	CCALIGN		Phase-align CC outputs with CC IN 1 input (master shelf only)
	CCDEL		CC Delay
	DSCTIME		Discontinuity Time
	ECONCRD		Output Connector Card Type
	EPROT		Protection
	FREEACT		Control whether or not freerun mode can produce output
	HFQLEVL		Holdover and Freerun Quality Level
	HFQLEVLSEC		Holdover and Freerun Quality Level for Secondary Oscillator
	HLDACT		Holdover Action
	INACTTIME		Inactivity Time-Out
	INSRVC		In Service
	IPEM1		IP Address of Primary Element Manager-Working Memory
	IPEM1X		IP Address of Primary Element Manager-Auxiliary Memory
	IPEM2		IP Address of Alternate Element Manager-Working Memory
IPEM2X		IP Address of Alternate Element Manager-Auxiliary Memory	
IPGATE		IP Address of Default Gateway-Working Memory	

Edit Equipment (cont'd)

Parameter	Value	Variables	Description
<keyword>	IPGATEX	—	IP Address of Default Gateway–Auxiliary Memory
	IPLM1		IP Address of Primary Local Manager–Working Memory
	IPLM1X		IP Address of Primary Local Manager–Auxiliary Memory
	IPLM2		IP Address of Alternate Local Manager–Working Memory
	IPLM2X		IP Address of Alternate Local Manager–Auxiliary Memory
	IPNE		IP Address of Network Element –Working Memory
	IPNEX		IP Address of Network Element –Auxiliary Memory
	IPSUBNET		Subnetwork Mask–Working Memory
	IPSUBNETX		Subnetwork Mask–Auxiliary Memory
	LCLAO		Local Automatic Output
	LCLBAUD		Local Baud Rate
	LCLECHO		Local Echo
	LCLFLOW		Local Flow
	MANCHAN		Manual Channel
	OMANSSM		Output Manual SSM
	OQLEVEL		Output Quality Level
	OUTESF		Output ESF
	PIRANGE		Pull-In Range
	PIRANGESEC		Pull-In Range for Secondary Oscillator
	PORTAO		Event Reporting Port Number–Working Memory
	PORTAOX		Event Reporting Port Number–Auxiliary Memory
	PORTCDMS		Command/Response Reporting Port Number–Working Memory
	PORTCDMSX		Command/Response Reporting Port Number–Auxiliary Memory
	REVERT		Revertive Mode

Edit Equipment (cont'd)

Parameter	Value	Variables	Description
<keyword>	RPTALL	—	Report All
	SCRAMBLE		Scramble Communication
	SNGCLK		Single Clock Operation
	SPRDCHN		Spread Channels
	SYNCMDE		Sync Mode
	TIDQUIET		TID Quiet
	TRAFFIC		Traffic Data Pattern
	WTRSS		Wait Time to Restore Synchronization Source
<value>	See the Keywords chapter		

Note: For detailed descriptions of keywords, see the Keywords chapter.

ED-EQPT[-TSG]:[<tid>]:<aid>:<ctag>:::<event>=<value>;

Parameter	Value	Variables	Description
<aid>	CLK	—	Clock card
	IMC		Management card
	S _a -OUT _b	a = 1 b = A, B, C, or D	Shelf number Output driver card letter
<event>	CLKGONE	—	Fail alarm
	CLKFAIL		
	CLKWARM		
	EXCD24HR		
	ECCRDMM		
	EPROTMM		
	NERROR		
	OPCDFL		
	OPCDNA		
	OPCDNP		
	SNFAIL		

Edit Equipment (cont'd)

Parameter	Value	Variables	Description
<event>	CLKOFFL	—	Major alarm
	SNFREE		
	SNHOLD		
	SNPWRA		
	SNPWRB		
	RACKALM1		
	RACKALM2		
	RACKALM3		
	RACKALM4		
	RACKALM5		
	RACKALM6		
	RACKALM7		
	RACKOOR		
	UNKALM		
	SECACTV	Minor alarm	
	INDISQ		
	XFER		
	RACKALM8		
	SNSCSUS		
	UNKALM		
CLKACTV	Event		
CLKNCOM			
CLKDISA			
SNDRIFT			
SNHAVL			
IMCRST			
INPSSM			
MEASRNG			
MEASRP			

Edit Equipment (cont'd)

Parameter	Value	Variables	Description
<event>	NETCLOS	—	Event
	CLKCDIN		
	OPCDIN		
	SNSAVL		
	SNSSM		
	SNOPER		
	SNTRCK		
	TRAOOR		
<value>	See the Keywords chapter		

Note: For detailed descriptions of keywords, see the Keywords chapter.

ED-EQPT[-TSG]:[<tid>]:<aid>:<ctag>:::<measurement>=<value>;

Parameter	Value	Variables	Description
<aid>	CLK	—	Clock card
	IMC		Management card
	Sa-OUTb	a = 1	Shelf number
		b = A, B, C, or D	Output driver card letter
<measurement>	FFOF	—	Fractional Frequency Offset
	LMRTIE		Latest Maximum Relative Time Interval Error
	MRTIE		Maximum Relative Time Interval Error
	SPRD		Frequency Spread
	TDEV		Time Deviation
	TIE		Time Interval Error
<value>	See the Keywords chapter		

Note: For detailed descriptions of keywords, see the Keywords chapter.

Edit Equipment (cont'd)

Command Example:

```
ED-EQPT::CLK:SC001:::SYNCMDE=MANUAL,MANCHAN=2;
```

The command in this example sets the input selection mode to manual and sets the input channel to 2.

Edit Password

This command edits a user's own password in the Security Database. The command format is:

```
ED-PID:[<tid>]:<aid>:<ctag>::<oldpid>,<newpid>;
```

Parameter	Value	Description
<aid>	Up to ten case-insensitive alphanumeric characters	Assigned user name
<oldpid>	Existing password	Old user password
<newpid>	Up to ten case-sensitive characters. Must include at least two non-alphabetic characters, and must include at least one special character: any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon.	New user password

Command Example:

```
ED-PID::FRED:SC001::TANK.1,CAR.2;
```

The command in this example allows FRED to change his password from TANK.1 to CAR.2.

Edit Port Security

This command disables or enables logging on at a specific communication port. However, switch S2 on the management card can be set to force enabling of the local port. The command format is:

```
ED-CID-SECU:[<tid>]:<aid>:<ctag>::<chap>;
```

Notes:

1. A user (with the proper access level) at either port can disable the execution of commands at the other port.
2. It is not possible to disable your own port.
3. Disabling a port to which a user is logged on will cause the user to be logged off.
4. Disabling a port does not prevent automatic messages from being sent to the port.
5. Any command sent to a disabled port will be denied.
6. Switch S1 on the management card has no bearing on whether or not a communications port is enabled.
7. The DLT-SECU command will also enable both communication ports.
8. Switch S2 on the management card can be set to override the disabling of the local port. This is useful if a remote user has inadvertently left the port disabled. If this switch is set to override, an attempt to use this command to disable the local port will be denied.
9. It is possible to enable your own port. This is useful if the management card switch S2 has been used to force enabling of the port. For example, if the local port has been inadvertently left disabled, follow these steps:
 - a. Set switch S2 on the management card to force enabling of the local port.
 - b. Log on (if necessary) to the local port.
 - c. Use the ED-CID-SECU command to enable the local port.
 - d. Set switch S2 on the management card back to its normal position.

Parameter	Value	Parameter Description
<aid>	REMOTE	Communication port
	LOCAL	
<chap>	ENABLED	Channel access privileges
	DISABLED	

Command Example:

```
ED-CID-SECU::REMOTE:SC001::DISABLED;
```

The command in this example disables the remote port.

Edit Sync

This command is used to change factory settings, and to modify input and output port parameters. It can only be used with a keyword specific to an input or output port. The command format is:

```
ED-SYNC[-TSG]:[<tid>]:<aid>:<ctag>:::<keyword>=<value>;
```

Parameter	Value	Variables	Description
<aid>	CLK-a	a = 0 – 4 (5- and 9-input clocks)	0 = PRS (5 or 10 MHz) 1 – 4 = DS1 terminated inputs 5 – 8 = DS1 bridged inputs 10 = CC 1 input 11 = CC 2 input
		a = 5 – 8 (9-input clocks only)	
		a = 10 – 11 (remote shelf)	
	Sa-OUTb-c	a = 0 – 4	Shelf number (0 is main shelf). This prefix is optional for main shelf.
<keyword>	AUTOPM	—	Auto-Upload PM
	B8ZS		B8ZS
	CCDENB		CC Delay
	ENABLE		Input Enable
	ESF		ESF
	MEASDLY		Measurement Delay
	MONITOR		Input Event Monitoring
	PRC5MHZ		PRC 5MHz Signal
	PRIORITY		Input Priority
	QCUTOFF		Quality Cutoff
	SQUELCH		Squelch Output
	SSMENB		Read SSM Bits
	SSMPRI		SSM Priority Grouping
	TCONST		Time Constant
TCONSTSEC		Time Constant for Secondary Oscillator	
<value>	See the Keywords chapter		

Note: For detailed descriptions of keywords, see the Keywords chapter.

Edit Sync (cont'd)

ED-SYNC[-TSG]:[<tid>]:<a id>:<ctag>:::<measurement>=<value>;

Parameter	Value	Variables	Description
<a id>	CLK-a	a = 0 – 4 (5- and 9-input clocks)	0 = PRS (5 or 10 MHz) 1 – 4 = DS1 terminated inputs 5 – 8 = DS1 bridged inputs 10 = CC 1 input 11 = CC 2 input
		a = 5 – 8 (9-input clocks only)	
		a = 10 – 11 (remote shelf)	
	Sa-OUTb-c	a = 0 – 4	Shelf number (0 is main shelf). This prefix is optional for main shelf.
<measurement>	FFOF	—	Fractional Frequency Offset
	LMRTIE		Latest Maximum Relative Time Interval Error
	MRTIE		Maximum Relative Time Interval Error
	SPRD		Frequency Spread
	TDEV		Time Deviation
	TIE		Time Interval Error
<value>	See the Keywords chapter		

Note: For detailed descriptions of keywords, see the Keywords chapter.

Command Examples:

```
ED-SYNC::S1-OUTA-3:SC001:::SQUELCH=Y;
```

The command in this example turns off output channel 3 of output card A in shelf 1.

```
ED-SYNC::CLK-5:SC001:::PRIORITY=1,ENABLE=Y;
```

The command in this example sets the priority of input channel 5 and enables the input channel.

```
ED-SYNC::CLK-0&&4:SC001:::ENABLE=Y;
```

The command in this example enables input channels 0 through 4, inclusive.

Edit Sync (cont'd)

```
ED-SYNC::CLK-3:SC001:::TDEV-1S=THR-100;
```

The command in this example sets the threshold for the 1 second TDEV measurement on input channel 3 to 100 ns.

```
ED-SYNC::CLK-3:SC001:::  
LMRTIE-15M=THR-500&CRI-Y&RPT-Y&PM-Y;
```

The command in this example specifies the LMRTIE-15M threshold to be 500 nanoseconds for input channel 3 (THR-500). It also tells the system to disqualify input channel 3 as an input reference (CRI-Y). In addition it tells the system to display an Automatic Message (RPT-Y) if the threshold is exceeded and display the measurement every 15 minutes (PM-Y).

Edit User Security

This command changes the user name, access level, or password. The command format is:

```
ED-USER-SECU:[<tid>]:<aid>:<ctag>::<newuid>,<newpid>
,,<uap>;
```

Parameter	Value	Description
<aid>	Existing user name	Old user name
<newuid>	Up to ten case-insensitive alphanumeric characters	New user name
<newpid>	Up to ten case-sensitive characters. Must include at least two non-alphabetic characters, and must include at least one special character: any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon.	New user password
<uap>	USER	Access level
	ADMIN	
	SECURITY	

Command Example:

```
ED-USER-SECU::FRED:SC001::FREDJR,TANK.1,,USER;
```

The command in this example changes the password and user name of FRED to FREDJR with a new password of TANK.1.

Note: If the new user name, password, or access level is omitted, it will be left unchanged.

Enter User Security

This command sets up a new user. Up to ten users may be entered. The command format is:

```
ENT-USER-SECU:[<tid>]:<aid>:<ctag>::<pid>, ,<uap>;
```

Parameter	Value	Description
<aid>	Up to ten case-insensitive alphanumeric characters	User name
<pid>	Up to ten case-sensitive characters. Must include at least two non-alphabetic characters, and must include at least one special character: any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon.	User password
<uap>	USER	Access level
	ADMIN	
	SECURITY	

Command Example:

```
ENT-USER-SECU::MARTHA:SC001::CHESS.1, ,ADMIN;
```

The command in this example sets up a new user (MARTHA) with a password (CHESS.1) and an access level of ADMIN.

Erase Firmware from Main Memory

This command erases the main memory of a management or clock card before downloading new firmware onto it, or erases the backup memory. The command format is:

```
DLT-SFWR:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	IMC-MAIN	Erases main memory on the management card. This command is denied if a copy of a valid firmware is not in the backup memory.
	IMC-BACKUP	Erases backup memory on the management card.
	CLK1-MAIN	Erases main memory on clock card 1. This command is denied if a copy of a valid firmware is not in the backup memory.
	CLK1-BACKUP	Erases backup memory on clock card 1.
	CLK2-MAIN	Erases main memory on clock card 2. This command is denied if a copy of a valid firmware is not in the backup memory.
	CLK2-BACKUP	Erases backup memory on clock card 2.

Command Example:

```
DLT-SFWR:SYMMBITS:IMC-MAIN:SC001;
```

Response Example:

```
SYMMBITS 00-06-15 15:30:45  
M SC001 COMPLD  
;
```

Inhibit User Security

This command temporarily inhibits a user from logging on. The command format is:

```
INH-USER-SECU:[<tid>]::<ctag>::<uid>;
```

Parameter	Value	Description
<uid>	Up to ten case-insensitive alphanumeric characters	Assigned user name

Command Example:

```
INH-USER-SECU:::SC001::FRED;
```

The command in this example will temporarily inhibit FRED from logging on.

Note: This command correlates to the ALW-USER-SECU command, which reinstates a user.

Initialize Event Log

This command clears the event log on both clock cards, or on a specific clock card.

Note: This command normally clears the event logs on both clock cards. However, it is possible to specify a particular clock card for diagnostic purposes, in which case the other clock card will not be affected. The command format is:

```
INIT-LOG:[<tid>]:<aid>:<ctag>::EVT;
```

Parameter	Value	Description
<aid>	CLK	Both clock cards
	CLK1	Clock card 1
	CLK2	Clock card 2

Command Examples:

```
INIT-LOG::CLK:SC001::EVT;
```

The command in this example clears the event log on both clock cards.

```
INIT-LOG::CLK1:SC001::EVT;
```

The command in this example clears the event log on clock card 1 only.

Initialize Register

This command clears all performance monitoring measurement data on a specific input channel and resumes taking performance monitoring measurements. The command format is:

```
INIT-REG[-TSG]:[<tid>]:<aid>:<ctag>[::DISQ];
```

Parameter	Value	Variable	Description
<aid>	CLK-a	a = 1 to 4	Number of the input channel of the clock card
DISQ		—	Restarts measurements on a channel and disqualifies the channel until a good measurement is completed

Command Example:

```
INIT-REG::CLK-1:SC001;
```

The command in this example clears and restarts all performance monitoring measurements on input channel 1.

Operate Alarm Cutoff

This command deactivates (silences) the audible office alarm. The command format is:

```
OPR-ACO-ALL:[<tid>]::<ctag>;
```

Command Example:

```
OPR-ACO-ALL:::SC001;
```

Reinstate User

This command reinstates a user who was previously inhibited from logging on (by using the INH-USER-SECU command). The command format is:

```
ALW-USER-SECU:[<tid>]::<ctag>::<uid>;
```

Parameter	Value	Description
<uid>	Up to ten case-insensitive alphanumeric characters	Assigned user name

Command Example:

```
ALW-USER-SECU:::SC001:::FRED;
```

The command in this example reinstates the user (FRED) after he was inhibited from logging on.

Retrieve Alarm Condition

This command displays alarm information. The command format is:

```
RTRV-ALM[-TSG]::[<aid>]:<ctag>;
```

Parameter	Value	Description
<aid>	(Null)	Displays all active alarms from the system
	CLK	Displays equipment related alarms from both clock cards and the output cards, but only displays input signal related alarms from the active clock card
	CLK1	Displays both equipment related and signal related alarms from clock card 1, regardless of whether it is the active card or not. Alarms from other cards will not be reported.
	CLK2	Displays both equipment related and signal related alarms from clock card 2, regardless of whether it is the active card or not. Alarms from other cards will not be reported.

Command Example:

```
RTRV-ALM:::SC1;
```

The command in this example displays all active alarms from the system.

Response Example:

```
SYMMBITS 98-01-02 16:30:45
M SC1 RTRV
"SO-CLK-1:MN,INDISQ,NSA,,:\Input disqualified\"
"SO-CLK-2:MN,INDISQ,NSA,,:\Input disqualified\"
"SO-CLK-3:MN,INDISQ,NSA,,:\Input disqualified\"
"SO-CLK-4:MN,INDISQ,NSA,,:\Input disqualified\"
>
SYMMBITS 98-01-02 16:30:45
M SC1 COMPLD
"SO-CLK2:MN,SNFAIL,SA,,:\Sync failure\"
;
```

Retrieve All Network Equipment Types

This command displays inventory information about the TimeHub 5500. The command format is:

```
RTRV-NETTYPE-ALL:::<ctag>;
```

Response Example:

```
>IP SC1
<
  SYMMBITS 00-00-00 00:00:00
M SC1 RTRV
  "TSG:Symmetricom,5500,TSG"
  "S1-IMC: ,090-55542-01-A, ,R0039A,E26658,DOTPN00AAA,
267825"
  "S1-CLK1: ,090-55512-01-A, ,R0039A,E26658,DOTPVPOAAA,
267862"
  "S1-CLK2: ,090-55512-01-A, ,R0039A,E26658,DOTPVPOAAA,
267862"
  "S1-OUT5C: ,090-55581-01-B,R0042A,E25345,DOTPJN0AAA,
267799,DS1,CC"
  "S1-OUT6C: ,090-55581-01-B,R0042A,E25345,DOTPJN0AAA,
267799,DS1,CC"
;
```

The information displayed in the response message in this example includes:

- Company (Symmetricom), model number (5500), equipment type (TSG)
- Shelf number (S1)
- Management card model number (090-55542-01), firmware revision (R0039A), serial number (E26658), CLEI code (DOTPN00AAA), and ECI code (267825)
- Clock 1 card model number (090-55512-01), firmware revision (R0039A), serial number (E26658), CLEI code (DOTPVPOAAA), and ECI code (267862)
- Clock 2 card model number (090-55512-01), firmware revision (R0039A), serial number (E26658), CLEI code (DOTPVPOAAA), and ECI code (267862)
- Output cards, model numbers (090-55581-01), firmware revision (R0042A), serial numbers (E25345), CLEI codes (DOTPJN0AAA), ECI codes (267799), output connector types for ports 1 to 20 (DS1), and output connector types for ports 21 to 40 (CC)

Retrieve Attribute

This command displays the alarm level set for a particular event. The command format is:

```
RTRV-ATTR[-TSG]:::<ctag>::<event>;
```

2

Parameter	Value	Variables	Description
<event>	CLKGONE	—	Fail alarm
	CLKFAIL		
	CLKWARM		
	EXCD24HR		
	ECCRDMM		
	EPROTMM		
	NVELOCITY		
	OPCDFL		
	OPCDNA		
	OPCDNP		
	SNFAIL		
	CLKOFFL		Major alarm
	SNFREE		
	SNHOLD		
	SNPWRA		
	SNPWRA		
	SNPWRA		
	RACKALM1		
	RACKALM2		
	RACKALM3		
RACKALM4			
RACKALM5			
RACKALM6			
RACKALM7			
RACKOOR			

Retrieve Attribute (cont'd)

Parameter	Value	Variables	Description	
<event>	UNKALM	—	Major alarm	
	SECACTV		Minor alarm	
	INDISQ			
	XFER			
	RACKALM8			
	SNSCSUS			
	UNKALM			
	CLKACTV			Event
	CLKNCOM			
	CLKDISA			
	SNDRIFT			
	SNHAVL			
	IMCRST			
	INPSSM			
	MEASRNG			
	MEASRP			
	NETCLOS			
	CLKCDIN			
	OPCDIN			
	SNSAVL			
SNSSM				
SNOPER				
SNTRCK				
TRAOOR				

Command Example:

```
RTRV-ATTR:::SC1::INDISQ;
```

The command in this example displays the alarm level that will be generated by the **INDISQ** event.

Retrieve Automatic Messages

This command displays the automatic messages (REPT ALM and REPT EVT) currently stored in the automatic output log. These messages can be selectively displayed by number or type, or by both number and type. The command format is:

```
RTRV-A0:[<tid>]::<ctag>:::<keyword>;
```

Parameter	Value	Variable	Description
<keyword>	(Null)		Displays entire contents of the automatic output log
	ATAGSEQ=a	a = a range of messages or specific messages in the log	List of message numbers
	MSGTYPE=a	a = ALM	List of alarm messages
		a = EVT	List of event messages

Note: It is recommended to specify a range of message numbers when retrieving automatic messages. Otherwise, the messages will scroll off the terminal screen before they can be read. When retrieving specific messages or ranges of messages, list them from the earliest to latest (for example, 9998&&0002 will display 9998, 9999, 0001, and 0002).

Command Examples:

```
RTRV-A0:::SC001:::ATAGSEQ=FIRST&&LAST;
```

or

```
RTRV-A0:::SC001;
```

The command in either of these examples displays all messages in the log.

```
RTRV-A0:::SC1:::ATAGSEQ=4&17&25&&30;
```

The command in this example displays messages 14, 17, and 25 through 30 from the log.

Retrieve Automatic Messages (cont'd)

```
RTRV-A0:::SC001:::MSGTYPE=ALM;
```

The command in this example displays all alarmed messages in the log.

```
RTRV-A0:::SC001:::ATAGSEQ=4&&10,MSGTYPE=EVT;
```

The command in this example displays all non-alarmed messages between 4 and 10.

Retrieve Command Security

This command displays the access level of a command. The command format is:

```
RTRV-CMD-SECU::
```

Parameter	Value
<aid>	Command

Command Example:

```
RTRV-CMD-SECU::SET-SID:SC001;
```

The command in this example displays the access level of the SET-SID command.

Response Format:

```
<sid> <date> <time>  
M <ctag> COMPLD  
  "<aid>:<uap>"  
;
```

The parameters which will be displayed in the response are listed below.

Parameter	Value	Description
<aid>	Command	
<uap>	SECURITY	Access level
	ADMIN	
	USER	
	NONE	

Response Example:

```
SYMMBITS 00-06-15 12:30:00  
M SC001 COMPLD  
  "SET-SID:ADMIN"  
;
```

Retrieve Condition

This command displays information about clock cards, input signals, and output cards. The command format is:

```
RTRV-COND[-TSG]::[<aid>]:<ctag>[::<spec block>];
```

Parameter	Value	Description
<aid>	(Null)	Displays equipment related conditions from both clock cards and output cards, but only displays input signal related conditions from the active clock card. Includes all active conditions, including alarmed, non-alarmed, and non-reported conditions for the active clock card.
	CLK	Displays both equipment related and signal related conditions from both clock cards, regardless of which clock card is active. Conditions from cards other than clock cards will not be displayed.
	CLK1	Displays both equipment related and signal related conditions from clock card 1, regardless of whether it is the active card or not. Conditions from other cards will not be displayed.
	CLK2	Displays both equipment related and signal related conditions from clock card 2, regardless of whether it is the active card or not. Conditions from other cards will not be displayed.
<spec block>	CFGCHD	Displays, then clears, the CFGCHD (Configuration Changed) condition with respect to the port receiving this command.
	LSTCFGC	Displays, but does not clear, the LSTCFGC (Latest Configuration Change) condition regardless of the port receiving this command.

Command Examples:

```
RTRV-COND:::SC9::CFGCHD;
```

The command in this example displays the Configuration Changed condition.

```
RTRV-COND:::SC11::LSTCFGC;
```

The command in this example displays the Latest Configuration Change condition.

Retrieve Condition (cont'd)

Response Examples:

```
SYMMBITS 00-06-19 05:57:28
M SC9 COMPLD
  "TSG:NR,CFGCHD,NSA,06-18,11-32-44,1,,\
  "Configuration changed\"";
```

The information displayed in the response message includes:

- Which shelf (S9)
- Configuration changed condition information

```
SYMMBITS 00-06-19 05:57:33
M SC11 COMPLD
  "TSG:NR,LSTCFG,NSA,06-19,05-57-25,2055,,\
  "Latest Configuration Change\"";
```

The information displayed in the response message includes:

- Which shelf (S11)
- Latest configuration change condition information

Retrieve Equipment

This command displays equipment parameters, and can only be used with keywords that relate to a card, not to a specific input or output port. The command format is:

```
RTRV-EQPT[-TSG]:[<tid>]:[<aid>]:<ctag>:::
PARAMETER=<keyword>;
```

Parameter	Value	Variables	Description
<aid>	CLK	—	Clock card. This parameter is optional.
	IMC		Management card. This parameter is optional.
	Sa-OUTb	a = 1	Shelf number. This parameter is not optional.
		b = A, B, C, or D	Output driver card letter. This parameter is not optional.
<keyword>	ACTSSM	—	Retrieve SSM value generated on DS1 ESF outputs (read only)
	AIS		Output AIS
	AOMERGE		Automatic Output Merge
	CCALIGN		Retrieve CCALIGN setting
	CCDEL		CC Delay
	DSCTIME		Discontinuity Time
	ECONCRD		Output Connector Card Type
	EPROT		Protection
	FREEACT		Retrieve FREEACT setting
	HFQLEVL		Holdover and Freerun Quality Level
	HFQLEVLSEC		Holdover and Freerun Quality Level for Secondary Oscillator
	HLDACT		Holdover Action
	INACTTIME		Inactivity Time-Out
	INSRVC		In Service
	IPEM1		IP Address of Primary Element Manager-Working Memory
IPEM1X		IP Address of Alternate Element Manager-Working Memory	

Retrieve Equipment (cont'd)

Parameter	Value	Variables	Description
<keyword>	IPEM2	—	IP Address of Alternate Element Manager–Working Memory
	IPEM2X		IP Address of Alternate Element Manager–Auxiliary Memory
	IPGATE		IP Address of Default Gateway–Working Memory
	IPGATEX		IP Address of Default Gateway–Auxiliary Memory
	IPLM1		IP Address of Primary Local Manager–Working Memory
	IPLM1X		IP Address of Primary Local Manager–Auxiliary Memory
	IPLM2		IP Address of Alternate Local Manager–Working Memory
	IPLM2X		IP Address of Alternate Local Manager–Auxiliary Memory
	IPNE		IP Address of Network Element – Working Memory
	IPNEX		IP Address of Network Element – Auxiliary Memory
	IPSUBNET		Subnetwork Mask–Working Memory
	IPSUBNETX		Subnetwork Mask–Auxiliary Memory
	LCLAO		Local Automatic Output
	LCLBAUD		Local Baud Rate
	LCLECHO		Local Echo
	LCLFLOW		Local Flow
	MAINCLK		Retrieve MAINCLK setting (read only)
	MANCHAN		Manual Channel
	OMANSSM		Output Manual SSM
	OQLEVEL		Output Quality Level
	OUTESF		Output ESF
	PIRANGE		Pull-In Range
	PIRANGESEC		Pull-In Range for Secondary Oscillator

Retrieve Equipment (cont'd)

Parameter	Value	Variables	Description
<keyword>	PORTAO	—	Event Reporting Port Number–Working Memory
	PORTAOX		Event Reporting Port Number–Auxiliary Memory
	PORTCDMS		Command/Response Reporting Port Number–Working Memory
	PORTCDMSX		Command/Response Reporting Port Number–Auxiliary Memory
	QLEVEL		Output Quality Level
	REVERT		Revertive Mode
	RPTALL		Report All
	SCRAMBLE		Scramble Communication
	SNGCLK		Single Clock Operation
	SPRDCHN		Spread Channels
	SYNCMDE		Sync Mode
	TIDQUIET		TID Quiet
	TRAFFIC		Traffic Data Pattern
WTRSS	Wait Time to Restore Synchronization Source		
<value>	See the Keywords chapter		

Note: For detailed descriptions of keywords, see the Keywords chapter.



Retrieve Equipment (cont'd)

RTRV-EQPT[-TSG]:[<tid>]:[<aid>]:<ctag>:::PARAMETER=<event>;

Parameter	Value	Variables	Description
<aid>	CLK	—	Clock card. This parameter is optional.
	IMC		Management card. This parameter is optional.
	Sa-OUTb	a = 1	Shelf number. This parameter is not optional.
		b = A, B, C, or D	Output driver card letter. This parameter is not optional.
<event>	CLKGONE	—	Fail alarm
	CLKFAIL		
	CLKWARM		
	EXCD24HR		
	ECCRDMM		
	EPROTMM		
	NVEERROR		
	OPCDFL		
	OPCDNA		
	OPCDNP		
	SNFAIL		
	CLKOFFL		
	SNFREE		
	SNHOLD		
	SNPWRA		
	SNPW RB		
	RACKALM1		
	RACKALM2		
	RACKALM3		

Retrieve Equipment (cont'd)

Parameter	Value	Variables	Description
<event>	RACKALM4	—	Major alarm
	RACKALM5		
	RACKALM6		
	RACKALM7		
	RACKOOR		
	UNKALM		
	SECACTV		Minor alarm
	INDISQ		
	XFER		
	RACKALM8		
	SNSCSUS		
	UNKALM		
	CLKACTV		Event
	CLKNCOM		
	CLKDISA		
	SNDRIFT		
	SNHAVL		
	IMCRST		
	INPSSM		
	MEASRNG		
	MEASRP		
	NETCLOS		
	CLKCDIN		
	OPCDIN		
	SNSAVL		
	SNSSM		
	SNOPER		
	SNTRCK		

Retrieve Equipment (cont'd)

Parameter	Value	Variables	Description
<event>	TRAOOR	—	Event
<value>	See the Keywords chapter		

Note: For detailed descriptions of keywords, see the Keywords chapter.

```
RTRV-EQPT[-TSG]:[<tid>]:[<aid>]:<ctag>:::
PARAMETER=<measurement>;
```

Parameter	Value	Variables	Description
<aid>	CLK	—	Clock card. This parameter is optional.
	IMC		Management card. This parameter is optional.
	Sc-OUTb	a = 1 b = A, B, C, or D	Shelf number. This parameter is not optional. Output driver card letter. This parameter is not optional.
<measurement>	FFOF	—	Fractional Frequency Offset
	LMRTIE		Latest Maximum Relative Time Interval Error
	MRTIE		Maximum Relative Time Interval Error
	SPRD		Frequency Spread
	TDEV		Time Deviation
	TIE		Time Interval Error
<value>	See the Keywords chapter		

Note: For detailed descriptions of keywords, see the Keywords chapter.

Command Examples:

```
RTRV-EQPT::CLK:SC1:::PARAMETER=SYNCMDE;
```

The command in this example displays the selection algorithm setting.

Retrieve Equipment (cont'd)

```
RTRV-EQPT::CLK:SC1:::PARAMETER=SYNCMDE&MANCHAN;
```

The command in this example displays the selection algorithm setting and the selected manual channel number.

```
RTRV-EQPT::CLK:SC1:::PARAMETER=INPLOS;
```

The command in this example displays the properties for the Input Loss Of Signal event.

```
RTRV-EQPT::OUTA:SC1:::PARAMETER=HLDACT;
```

The command in this example displays the holdover action setting for output card A.

```
RTRV-EQPT::S2-OUTA:SC1:::PARAMETER=HLDACT&AIS;
```

The command in this example displays the holdover action setting for output card A of shelf 2 and whether AIS is the normal output for output card A.

```
RTRV-EQPT::CLK:SC1:::PARAMETER=SPRD-12S;
```

```
SYMMBITS 01-05-24 11:25:52
M SC1 COMPLD
"CLK::SPRD-12S = THR-0.000 & CRI-N & RPT-N & PM-M"
;
```

The command in this example displays the threshold value along with the CRI, RPT, and PM settings.

Retrieve Equipment Type

This command displays basic information about the TimeHub 5500. The command format is:

```
RTRV-NETYPE:::<ctag>;
```

Command Example:

```
RTRV-NETYPE:::SC1;
```

The command in this example displays basic information about the TimeHub 5500.

Response Format:

```
<sid> <date> <time>  
M <ctag> COMPLD  
  "<company>,<model number>,<equipment type>,  
<management card firmware revision>"  
;
```

Retrieve Header

This command displays the response header information which includes the system identification (<sid>), date, and time for the unit. It can be used to verify operation of the communication link between the TimeHub 5500 and the computer communication port. The command format is:

```
RTRV-HDR:::<ctag>;
```

Response Format:

```
    <sid> <date> <time>  
M <ctag> COMPLD  
;
```

Command Example:

```
RTRV-HDR:::SC1;
```

The command in this example displays system header information.

Response Example:

```
    SYMMBITS 00-06-15 15:03:27  
M SC1 COMPLD  
;
```

Retrieve Log

This command displays all events in the event log. The event log is displayed in reverse chronological order, last in, first out. Events placed in the log are those which have their LOG property set to Y. It can include both alarmed and non-alarmed events, and events not initially reported (those with ALM property set to NONE). Events are displayed in groups of ten. The command format is:

```
RTRV-LOG:[<tid>]:<aid>:<ctag>::<start retrieving messages>;
```

Parameter	Value	Description
<aid>	CLK	Displays all events from the active clock card event log
	CLK1	Displays all events from the clock card 1 event log
	CLK2	Displays all events from the clock card 2 event log
<start retrieving messages>	EVTTOP	Displays the ten most recent events from the top of the event log
	EVTCONT	Continues to display the next ten log messages from where last left off
	EVTALL	Displays the entire event log

Note: EVTALL displays the entire contents of the event log which can hold up to 1000 events consisting of 100 response blocks of ten events each. Once started, the retrieval cannot be aborted. EVTTOP and EVTCONT are recommended for retrieving the event log.

Command Example:

```
RTRV-LOG::CLK:SC1::EVTTOP;
```

The command in this example displays the ten most recent events in the event log.

Retrieve Log (cont'd)

Response Example:

```
SYMMBITS 00-09-28 10:58:58:
M SC1 COMPLD
  "EVTTOP"
  /*
  "OUT3:NA,OPCDNA,SA,,:\\"Output Card Not Accessible\\"
  "OUT3:NA,OPCDIN,NSA,,:\\"Output Card Inserted\\"
  */
;
```

2

Retrieve Performance Monitoring Information

This command displays the current set of performance monitoring data for one input channel. The command format is:

```
RTRV-PM[-TSG]:[<tid>]:<aid>:<ctag>::<montype>;
```

Parameter	Value	Variables	Description
<aid>	CLK	—	Displays data for all input channels.
	CLK-a	a = 1 to 4	Displays data for input channel specified.
<montype>	FFOF-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	FFOF monitored type, where a is the averaging time interval in seconds
	LMRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	LMRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	MRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	MRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	SPRD-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	SPRD monitored type, where a is the averaging time interval in seconds
	TDEV-a	a = 1S, 4S, 16S, 64S, 256S, 1024S	TDEV monitored type, where a is the averaging time interval in seconds
	TIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	TIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)

Command Example:

```
RTRV-PM::CLK-4:SC1::MRTIE;
```

The command in this example displays **MRTIE** information about input channel 4.

Retrieve Performance Monitoring Information (cont'd)

Response Example:

```
SYMMBITS 98-09-05 12:07:38
M SC1 COMPLD
"CLK1-4:MRTIE-1S,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-1M,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-15M,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-30M,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-1H,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-2H,NA,NA,,75-MIN"
"CLK1-4:MRTIE-8H,NA,NA,,75-MIN"
"CLK1-4:MRTIE-24H,NA,NA,,75-MIN"
;
```

The response in this example indicates that MRTIE data has been collected over the past 75 minutes (measurement time), and MRTIE values have been calculated for observation times of 1 second, 1 minute, 15 minutes, 30 minutes, and 1 hour. The values for observation times of 2 hours, 8 hours, and 24 hours are not yet available because the system has not been running long enough to collect that data. These values will become available as the unit continues to collect data. The total measurement time is only indicated for MRTIE measurements and will continue to increase in 15 minute increments for 24 hours. The <aid> field indicates that this data was collected by clock card 1.

Once the measurement time reaches 24 hours, data prior to 24 hours will be lost as new data is collected.

A specific measurement may be specified if only that one value is desired (for example, RTRV-PM::CLK-4:SC1::MRTIE-1S;).

Retrieve Port Security

This command displays the state of a communication port. The command format is:

```
RTRV-CID-SECU:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	REMOTE	Communication port
	LOCAL	

Command Example:

```
RTRV-CID-SECU::LOCAL:SC1;
```

The command in this example displays the state of the local port.

Response Format:

```
<sid> <date> <time>  
M <ctag> COMPLD  
  "<aid>:<state>"  
;
```

The parameters which will be displayed in the response are listed below.

Parameter	Value	Description
<aid>	LOCAL	Local communication port
	REMOTE	Remote communication port
<state>	ENABLED	Communication port is enabled
	DISABLED	Communication port is disabled
	HWENABLE	Switch S2 on the management card is set to force enabling of the local communication port. Applies only to the local communication port.

Retrieve Port Security (cont'd)

Response Example:

```
SYMMBITS 00-11-05 12:30:00  
M SC1 COMPLD  
"LOCAL:ENABLED"  
;
```

Retrieve Status

This command displays the names of users logged on and users inhibited from logging on. The command format is:

```
RTRV-STATUS:[<tid>]::<ctag>;
```

Command Example:

```
RTRV-STATUS:::SC1;
```

Response Example:

```
SYMMBITS 00-12-02 16:30:45  
M SC1 RTRV  
":LOCAL&REMOTE , FRED&MARTHA , RS&GH&KL "  
;
```

The above response indicates that users FRED and MARTHA are logged on at the LOCAL and REMOTE ports, respectively, and that users RS, GH, and KL have been inhibited from logging on.

Retrieve Status of Multiple Remote Sessions

This command displays a list of all currently connected users. TimeHub supports up to 10 TCP connections simultaneously, as well as a single local connection. If a user is logged on, the username is shown in the response. For TCP connections, the IP address on the connection is also shown.

The general form of the command is:

```
RTRV-STATUS-SECU:[<tid>]::ctag;
```

The general form of the response is:

```
<tid> <Date> <Time>  
M <ctag> COMPLD  
"LOCAL:<user name>,"  
"REMOTExx:<user name>,<ip>  
"REMOTExx:<user name>,<ip>  
...  
"REMOTExx:<user name>,<ip>  
;
```

Where xx = 01, 02, ..., 10 and each line will have a unique xx.

Command Example:

```
RTRV-STATUS-SECU:::SV506;
```

Response Example:

```
SYMMBITS 02-07-10 13:36:30  
M SV506 COMPLD  
"LOCAL:,"  
"REMOTE02:TEST,192.168.3.75"  
"REMOTE01: ,192.168.5.108"  
;
```

Retrieve Status of Multiple Remote Sessions (cont'd)

The preceding response shows that a LOCAL session is available (this is the serial port connection available at the back of the shelf or on the management card) and no one is logged on. The LAN sessions are automatically identified with a name of the form REMOTE xx , where $xx = 01, 02, \dots, 10$. Once a connection is established and its REMOTE number is assigned, that number will be constant throughout that connection session. This example shows that session REMOTE02 has a user logged on named TEST and the connection is from IP 192.168.3.75. An additional connection, REMOTE01 is established without a logon from IP 192.168.5.108.

Note: This command is available in firmware versions 4142B or later.

Retrieve Sync

This command displays input and output port parameters. The command format is:

```
RTRV-SYNC[-TSG]:[<tid>]:<aid>:<ctag>:::PARAMETER=<keyword>;
```

Parameter	Value	Variables	Description
<aid>	CLK-a	a = 1 to 4	Input channel number of clock card
	Sa-OUTb-c	a = 1	Shelf number
		b = A, B, C, or D	Output driver card letter
		c = 1 to 40	Output port number
<keyword>	AUTOPM	—	Auto-Upload PM
	B8ZS		B8ZS
	CCDENB		CC Delay
	ENABLE		Input Enable
	ESF		ESF
	MEASDLY		Measurement Delay
	MONITOR		Input Event Monitoring
	PRC5MHZ		PRC 5MHz Signal
	PRIORITY		Input Priority
	QCUTOFF		Quality Cutoff
	SQUELCH		Squelch Output
	SSMENB		Read SSM Bits
	SSMPRI		SSM Priority Grouping
	TCONST		Time Constant
TCONSTSEC		Time Constant for Secondary Oscillator	

Note: For detailed descriptions of keywords, see the Keywords chapter.

Retrieve Sync (cont'd)

```
RTRV-SYNC[-TSG]:[<tid>]:<aid>:<ctag>:::
PARAMETER=<measurement>;
```

Parameter	Value	Variables	Description
<aid>	CLK-a	a = 1 to 4	Input channel number of clock card
	Sa-OUTb-c	a = 1	Shelf number
		b = A, B, C, or D	Output driver card letter
		c = 1 to 40	Output port number
<measurement>	FFOF	—	Fractional Frequency Offset
	LMRTIE		Latest Maximum Relative Time Interval Error
	MRTIE		Maximum Relative Time Interval Error
	SPRD		Frequency Spread
	TDEV		Time Deviation
	TIE		Time Interval Error

Command Examples:

```
RTRV-SYNC::S2-OUTA-3:SC1:::PARAMETER=SQUELCH;
```

The command in this example displays squelch information about Output Channel 3 on Output Card A in shelf 2.

```
RTRV-SYNC::CLK-3:SC1:::PARAMETER=PRIORITY;
```

The command in this example displays the priority of input channel 3.

```
RTRV-SYNC::CLK-3:SC1:::PARAMETER=PRIORITY&ENABLE;
```

The command in this example displays the priority of input channel 3 and whether it is enabled.

Retrieve Sync (cont'd)

```
RTRV-SYNC::CLK-3:SC1:::PARAMETER=TDEV-1S;
```

The command in this example displays the properties for a 1 second TDEV measurement on input channel 3.

Retrieve Threshold Information

This command displays the threshold of a measurement for a particular input channel. The command format is:

```
RTRV-TH[-TSG]::<aid>:<ctag>::<montype>;
```

Parameter	Value	Variables	Description
<aid>	CLK	—	Use for SPRD measurements only
	CLK-a	a = 1 to 4	Input port number of clock card
<montype>	FFOF-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	FFOF monitored type, where a is the averaging time interval in seconds
	LMRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	LMRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	MRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	MRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	SPRD-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	SPRD monitored type, where a is the averaging time interval in seconds
	TDEV-a	a = 1S, 4S, 16S, 64S, 256S, 1024S	TDEV monitored type, where a is the averaging time interval in seconds
	TIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	TIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)

Command Example:

```
RTRV-TH::CLK-2:SC1::LMRTIE-15M;
```

The command in this example displays the threshold value set for the LMRTIE-15M measurement on input channel 2.

Retrieve User

This command displays the currently logged in user's access level. The command format is:

```
RTRV-USER:::<ctag>;
```

Command Example:

```
RTRV-USER:::SC1;
```

The command in this example displays the currently logged in user's access level.

Response Example:

```
SYMMBITS 00-11-02 16:30:45  
M SC1 RTRV  
"FRED:LOCAL,SECURITY"
```

The above response indicates that the currently logged in user name is FRED, logged on at the LOCAL port with the highest (SECURITY) access level.

Retrieve User Security

This command displays another user's access level or all users' access levels. The command format is:

```
RTRV-USER-SECU::[<uid>]:<ctag>;
```

Parameter	Value	Description
<uid>	Up to ten case-insensitive alphanumeric characters.	Assigned user name. Displays access level of specific user.
	(Null)	Displays access levels of all users.

Command Example:

```
RTRV-USER-SECU::FRED:SC1;
```

The command in this example displays another user's access level.

Response Example:

```
SYMMBITS 00-11-02 16:30:45  
M SC1 RTRV  
"FRED: ,SECURITY"
```

The above response indicates that FRED has the highest access level (SECURITY).

Set Attribute

This command sets the alarm level that an event will generate. The command format is:

```
SET-ATTR[-TSG]:::<ctag>::<value>,<event>;
```

Parameter	Value	Description
<value>	NONE	No alarm
	NONALM	Non-alarmed
	MINOR	Minor alarm
	MAJOR	Major alarm
	FAIL	Critical alarm
<event>	CLKGONE	The management card cannot detect the presence of the indicated clock card
	CLKFAIL	A hardware or firmware failure has occurred on the indicated clock card
	CLKWARM	The clock card is warming up, and the card is not yet active
	EXCD24HR	The indicated clock card has been in holdover for over 24 h
	ECCRDMM	A different connector card exists than the one specified through the TL1 command. Specified outputs have been disabled
	EPROTMM	There are less than two output driver cards in the indicated output pair
	NVEERROR	The non-volatile random access memory has failed on the indicated card
	OPCDFL	A hardware or firmware failure has occurred on the indicated output driver card(s) or active clock card
	OPCDNA	The clock cards cannot communicate with the indicated output driver card
	OPCDNP	The management card cannot detect the presence of a required output driver card
	SNFAIL	An alarm signal is present within the shelf that has not been identified by the card generating the alarm signal
	CLKOFFL	The indicated clock card is offline

Set Attribute (cont'd)

Parameter	Value	Description
<event>	SNFREE	The clock card is generating a reference output, but there are no qualified inputs, and holdover mode is not available
	SNHOLD	The indicated clock card is in holdover
	SNPWRA	The -48V A input failed
	SNPW RB	The -48V B input failed
	RACKAIM1 RACKAIM2 RACKAIM3 RACKAIM4 RACKAIM5 RACKAIM6 RACKAIM7	Equipment external to the shelf is generating the indicated rack alarm
	RACKOOR	The rack identification switch has been set to an invalid number
	UNKALM	A major alarm condition exists in the shelf
	SECACTV	The clock card designated with the inferior oscillator is active because the Force Active pushbutton was pressed or the superior clock card failed
	INDISQ	A reference input has been disqualified by the clock card
	XFER	The parameter settings in the two clock cards are not identical
	RACKAIM8	Equipment external to the shelf is generating an alarm
	SNSCSUS	During holdover, the oscillator frequency has drifted outside the pull-in range and the oscillator is no longer using the SmartClock algorithm
	UNKALM	A minor alarm condition exists in the shelf
	CLKACTV	The indicated clock card is the synchronization signal source for all output cards
	CLKNCOM	A communications error exists between the clock cards
	CLKDISA	The clock cards are reporting different quality levels for the same reference input
	SNDRIFT	The frequency of an input signal, as compared to the clock oscillator, has drifted beyond the acceptable limits
	SNHAVL	The clock card has collected enough tracking data to enter holdover mode if all inputs become disqualified

Set Attribute (cont'd)

Parameter	Value	Description
<event>	IMCRST	The network address parameters of the management card have been changed, and the management card is reinitializing
	INPSSM	The SSM value of the indicated input has changed
	MEASRNG	The input frequency has drifted beyond the measurement range of the clock card
	MEASRP	A performance measurement has crossed the indicated threshold
	NETCLOS	The Network IMC card is closing the network connection
	CLKCDIN	A second clock card has been inserted
	OPCDIN	An output driver card has been inserted in the indicated location in the shelf
	SNSAVL	The clock card has been operating continuously for at least 32 h
	SNSSM	The clock card is using SSM to determine which input should be tracked
	SNOOPER	The indicated time constant is being used by the clock card to track the active input
	SNTRCK	The clock card has begun tracking the indicated input
	TRAOOR	The value of the Traffic Data Pattern (TRAFFIC) keyword is invalid for the output driver card type

Command Example:

```
RSET-ATTR:::SC1::MAJOR,INDISQ;
```

The command in this example sets a major alarm if an **INDISQ (Input Channel Disqualified)** event occurs.

Set Synchronization

This command forces a clock card to assume that the oven is fully warmed up. When power is first applied to a clock card (when first inserted into the shelf), it begins a warm-up sequence during which the tracking bandwidth is adjusted as the oven warms up. If the oven is already warmed up following a firmware download, use this command to force the unit to its final tracking bandwidth without waiting the usual period of time.

Warning: The oven should actually be warmed up before using this command.

The command format is:

```
SET-SYNCN:[<tid>]:<aid>:<ctag>::NORM;
```

Parameter	Value	Description
<aid>	CLK1	Clock card 1
	CLK2	Clock card 2

Command Example:

```
SET-SYNCN::CLK1:SC1::NORM;
```

The command in this example forces clock card 1 to assume its oven is fully warmed up.

Set System Identifier

This command sets the name of the equipment sending the message. The command format is:

```
SET-SID:[<tid>]::<ctag>::<sid>;
```

Parameter	Value	Description
<sid>	1 to 20 alphanumeric characters	Source identifier. Factory set value is SYMMBITS.

Command Example:

```
SET-SID:::SC1::SYMMBITS2;
```

The command in this example sets the system identification code to SYMMBITS2.

Note: If a target identifier (<tid>) is included in a command, it will be compared against the system identifier (SID) of the TimeHub 5500, and the command will only be executed if these match. If they do not match, the command will be rejected.

Set Threshold

This command changes the threshold of a measurement for a particular input channel, and specifies a measurement threshold that automatically disqualifies an input signal when the threshold is exceeded, provided the CRI property of the measurement is set to Y.

Thresholds can also be used to cause automatic reporting of the measurement when it crosses the threshold in either direction (using the RPT property of the measurement). (See the Performance Monitoring chapter.) The command format is:

```
SET-TH[-TSG]::<aid>:<ctag>::<montype>,<value>;
```

Parameter	Value	Variables	Description
<aid>	CLK-a	a = 1 to 4	Input port number of clock card
<montype>	See the Performance Monitoring chapter		
<value>	a	If <montype> = TDEV: a = 0 to 800,000	Threshold value for TDEV in nanoseconds. Factory setting is 0.
	a	If <montype> = MRTIE: a = 0 to 1,900,000,000	Threshold value for MRTIE in nanoseconds. Factory setting is 0.
	a	If <montype> = LMRTIE: a = 0 to 1,900,000,000	Threshold value for LMRTIE in nanoseconds. Factory setting is 0.
	a	If <montype> = SPRD: a = 0 to 7,300,000	Threshold value for SPRD in parts per million. Factory setting is 0. No input port is specified in <aid>.
	a	If <montype> = FFOFF: 0 to 7,300,000	Threshold value for FFOFF in parts per million. Factory setting is 0.

Command Example:

```
SET-TH::CLK-2:SC1::LMRTIE-15M,100;
```

This example sets a threshold of 100 ns on the LMRTIE-15M measurement for clock input channel 2.

Switch Duplex Equipment

This command forces the system to switch the inactive clock card to the active state. The effect is the same as pressing the Force Active pushbutton on the inactive clock card. The command format is:

```
SW-DX-EQPT:[<tid>]:CLK:<ctag>;
```

Note: This command is primarily for testing purposes.

Command Example:

```
SW-DX-EQPT::CLK:SC1;
```

The command in this example causes the active clock card to switch to the secondary clock card.

Response Example:

```
<IP SC1
<
  SYMMBITS 00-07-22 15:52:31
M SC1 COMPLD
;
  SYMMBITS 00-07-22 15:52:31
A 0095 REPT EVT TSG
  "CLK1:CLKACTV,SC,02-22,15-52-31:\"CLK Active\""
```

Verify Firmware Integrity

This command requests a management card or clock card to validate the checksum of the firmware in the main memory. The command format is:

```
VRF-SFWR:[<tid>]:<aid>:<ctag>;
```

Parameter	Value	Description
<aid>	IMC-MAIN	Validates the checksum of the firmware in the main memory on the management card. This command is denied if the checksum cannot be validated.
	IMC-BACKUP	Validates the checksum of the firmware in the backup memory on the management card.
	CLK1-MAIN	Validates the checksum of the firmware in the main memory on clock card 1. This command is denied if the checksum cannot be validated.
	CLK1-BACKUP	Validates the checksum of the firmware in the backup memory on clock card 1.
	CLK2-MAIN	Validates the checksum of the firmware in the main memory on clock card 2. This command is denied if the checksum cannot be validated.
	CLK2-BACKUP	Validates the checksum of the firmware in the backup memory on clock card 2.

Command Example:

```
VRF-SFWR:SYMMBITS:CLK1-MAIN:SC001;IP SC001
<IP SC001
<IP SC001
<IP SC001
<IP SC001
<
```

Response Example:

```
SYMMBITS 00-06-15 09:19:11
M SC001 COMPLD
;
```

Keywords

This chapter describes the keywords that can be used with provisioning commands.

Chapter 3

Overview

Keywords are used with provisioning commands. Table D lists the keywords and their descriptions, their default values, their accepted values, and their example commands.

Table D. Keywords and Descriptions, Values, Commands, and Targets

Keyword/Description	Default Value	Accepted Value	Example Command
ACTSSM (Active SSM)	--	--	RTRV-EQPT::CLK:SC16:::PARAMETER=ACTSSM;
AIS (Output AIS)	N	Y / N	ED-EQPT::OUTA:SC2:::AIS=Y;
AOMERGE (Automatic Output Merge)	N	Y / N	ED-EQPT::IMC:SC3:::AOMERGE=Y;
AUTOPM (Auto-Upload PM)	N	Y / N	ED-SYNC::CLK-0:SC4:::AUTOPM=Y;
B8ZS (B8ZS)	Y	Y / N	ED-SYNC::CLK-3:SC5:::B8ZS=Y;
BRIDGED	N	Y / N	ED-SYNC::CLK-2:SV12:::BRIDGED=Y;
CBCOMP	0	0 - 6000	ED-EQPT::S1-OUTA-PG1:SC12:::CBCOMP=100;
CCALIGN (Composite Clock Alignment)	N (Master shelf only)	Y / N	ED-EQPT::CLK:SC16:::CCALIGN=N;
CCDEL (CC Delay Value)	0	-10000 - 10000	ED-EQPT::OUTB-PG1:SC7:::CCDEL=80;
CCDENB (CC Delay)	N	Y / N	ED-SYNC::OUTC-20&&40:SC8:::CCDENB=Y;
CLRPTALL	N	Y / N	ED-EQPT::S0-OUTB:SC10:::CLRPTALL=Y;
CURRSSM (Current Synchronization Status Message (SSM) Value)	--	--	RTRV-SYNC::CLK-2:SC9:::PARAMETER=CURRSSM;
DSCTIME (Discontinuity Time)	2	1 - 15	ED-EQPT::CLK:SC10:::DSCTIME=10;
ECLKEXP	N	Y / N	ED-EQPT::S2-CLK2:SV01:::ECLKEXP=N;

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Table D. Keywords and Descriptions, Values, Commands, and Targets (cont'd)

Keyword/Description	Default Value	Accepted Value	Example Command
ECONCRD (Output Connector Card Type)	DONT-CARE	DONT-CARE / DSC1/ CC	ED-EQPT::OUTD-PG1:SC11::ECONCRD=DS1;
ENABLE (Input Enable)	Y (Inputs 1-4 only)	Y / N	ED-SYNC::CLK-4:SC13::ENABLE=N;
EPROT (Protection)	DONT-CARE	DONT-CARE / REQUIRED	ED-EQPT::OUTD:SC14::EPROT=REQUIRED;
ESF (ESF)	Y	Y / N	ED-SYNC::CLK-3:SC15::ESF=N;
FREEACT (Freerun Action)	CONTINUE (Master Shelf) / SQUELCH (Remote Shelf)	CONTINUE / SQUELCH	ED-EQPT::CLK:SC16::FREEACT=CONTINUE;
HFQLEVL (Holdover and Freerun Quality Level)	3	1 - 9	RTRV-EQPT::CLK:SC16::PARAMETER=HFQLEVL;
HFQLEVLSEC (Holdover and Freerun Quality Level for Secondary Oscillator)	5	1 - 9	ED-EQPT::CLK:SC17::HFQLEVLSEC=5;
HLDACT (Holdover Action)	CONTINUE	CONTINUE / AIS / SQUELCH	ED-EQPT::OUTC:SC18::HLDACT=AIS;
INACTTIME (Inactivity Time-Out)	100	0 - 10000	ED-EQPR::IMC:SC20::INACTTIME=200;
INSRVC (In Service)	N	Y / N	ED-EQPT::OUTA:SC21::INSRVC=Y;
IPEM1 (IP Address of Primary Element Manager-Working Memory)	0.0.0.1	--	RTRV-EQPT::IMC:SC22::PARAMETER=IPEM1;
IPEM1X (IP Address of Primary Element Manager-Auxiliary Memory)	0.0.0.1	0.0.0.0 - 223.255.255.255	ED-EQPT::IMC:SC23::IPEM1X=123.123.12.123;

Table D. Keywords and Descriptions, Values, Commands, and Targets (cont'd)

Keyword/Description	Default Value	Accepted Value	Example Command
IPEM2 (IP Address of Alternate Element Manager–Working Memory)	0.0.0.1	--	RTRV-EQPT::IMC:SC24:::PARAMETER=IPEM2;
IPEM2X (IP Address of Alternate Element Manager–Auxiliary Memory)	0.0.0.1	0.0.0.0 - 223.255.255.255	ED-EQPT::IMC:SC25:::IPEM2X=123.123.12.122
IPGATE (IP Address of Default Gateway–Working Memory)	0.0.0.1	--	RTRV-EQPT::IMC:SC26:::PARAMETER=IPGATE;
IPGATEX (IP Address of Default Gateway–Auxiliary Memory)	0.0.0.1	0.0.0.0 - 223.255.255.255	ED-EQPT::IMC:SC27:::IPGATEX=123.123.12.1;
IPLM1 (IP Address of Primary Local Manager–Working Memory)	0.0.0.1	--	RTRV-EQPT::IMC:SC28:::PARAMETER=IPLM1;
IPLM1X (IP Address of Primary Local Manager–Auxiliary Memory)	0.0.0.1	0.0.0.0 - 223.255.255.255	ED-EQPT::IMC:SC29:::IPLM1X=123.123.12.11;
IPLM2 (IP Address of Alternate Local Manager–Working Memory)	0.0.0.1	--	RTRV-EQPT::IMC:SC30:::PARAMETER=IPLM2;
IPLM2X (IP Address of Alternate Local Manager–Auxiliary Memory)	0.0.0.1	0.0.0.0 - 223.255.255.255	ED-EQPT::IMC:SC31:::IPLM2X=123.123.12.12;
IPNE (IP Address of Network Element–Working Memory)	0.0.0.0	--	RTRV-EQPT::IMC:SC32:::PARAMETER=IPNE;

Table D. Keywords and Descriptions, Values, Commands, and Targets (cont'd)

Keyword/Description	Default Value	Accepted Value	Example Command
IPNEX (IP Address of Network Element–Auxiliary Memory)	0.0.0.0	0.0.0.0 - 223.255.255.255	ED-EQPT::IMC:SC33:::IPNEX=123.123.12.120;
IPSUBNET (Subnetwork Mask–Working Memory)	255.255.248.0	--	RTRV-EQPT::IMC:SC34:::PARAMETER=IPSUBNET;
IPSUBNETX (Subnetwork Mask–Auxiliary Memory)	255.255.248.0	0.0.0.0 - 255.255.255.xxx (0 or 128)	ED-EQPT::IMC:SC35:::IPSUBNETX=255.255.255.0;
LCLAO (Local Automatic Output)	ALWAYS	ALWAYS / LOGIN / NEVER	ED-EQPT::IMC:SC36:::LCLAO=LOGIN;
LCLBAUD (Local Baud Rate)	9600	1200 / 2400 / 9600 / 19200	ED-EQPT::IMC:SC37:::LCLBAUD=19200;
LCLECHO (Local Echo)	Y	Y / N	ED-EQPT::IMC:SC38:::LCLECHO=N;
MAINCLK (Main Clock)	Y	Y / N	RTRV-EQPT::CLK:SC38:::MAINCLK=Y;
MANCHAN (Manual Channel)	0	0 - 4	ED-EQPT::CLK:SC39:::MANCHAN=1;
MEASDLY (Measurement Delay)	0	0 - 1800	ED-SYNC::CLK-3:SC40:::MEASDLY=20;
MONITOR (Input Event Monitoring)	Y (Inputs 1-4) N (Inputs 4-8)	Y / N	ED-SYNC::CLK-4:SC41:::MONITOR=N;
OMANSSM (Output Manual SSM)	N	Y / N	ED-EQPT::S0-OUTA:SC43:::OMANSSM=Y;
OQLEVEL (Output Quality Level)	9	1 - 9	ED-EQPT::OUTB:SC44:::OQLEVEL=9;
OUTESF (Output ESF)	Clock firmware prior to version 4236B: N Clock firmware version 4236B or later: Y	Y / N	ED-EQPT::S1-OUTA-PG1:SC45:::OUTESF=Y;
PIRANGE (Pull-In Range)	16	10 - 10000	RTRV-EQPT::CLK:SC46:::PARAMETER=PIRANGE;

Table D. Keywords and Descriptions, Values, Commands, and Targets (cont'd)

Keyword/Description	Default Value	Accepted Value	Example Command
PIRANGESEC (Pull-In Range for Secondary Oscillator)	4600	10 - 10000	RTRV-EQPT::CLK:SC47::PARAMETER=PIRANGESEC;
PORTAO (Event Reporting Port Number-Working Memory)	7589	--	RTRV-EQPT::IMC:SC48::PARAMETER=PORTAO;
PORTAOX (Event Reporting Port Number-Auxiliary Memory)	7589	5001 - 20000	ED-EQPT::IMC:SC49::PORTAOX=5003;
PORTCMDS (Command/Response Reporting Port Number-Working Memory)	7588	--	RTRV-EQPT::IMC:SC52::PARAMETER=PORTCMDS;
PORTCMDSX (Command/Response Reporting Port Number-Auxiliary Memory)	7588	5001 - 20000	ED-EQPT::IMC:SC53::PORTCMDSX=5002;
PRC5MHZ (PRC 5MHz Signal)	N	Y / N	ED-SYNC::CLK-0:SC54::PRC5MHZ=Y;
PRIORITY (Input Priority)	Clock firmware prior to version 4236B: (Channel Number) + 1 Clock firmware 4236B or later: Master shelf: 1 (PRS), 2 (other inputs) Remote shelf: 2 (both CC inputs)	0 - 9	ED-SYNC::CLK-2:SC55::PRIORITY=3;
QCUTOFF (Quality Cutoff)	3	1 - 9	ED-SYNC::CLK-3:SC56::QCUTOFF=5;
QLEVEL (Quality Level)	1 (PRS) 2 (Inputs 1-4)	1 - 9	ED-SYNC::CLK-0:SC57::QLEVEL=1;

Table D. Keywords and Descriptions, Values, Commands, and Targets (cont'd)

Keyword/Description	Default Value	Accepted Value	Example Command
REVERT (Revertive Mode removed as of clock firmware 4236B)	Y	Y / N	ED-EQPT::CLK:SC58::REVERT=N;
RPTALL (Report All)	N	Y / N	ED-EQPT::IMC:SC60::RPTALL=Y;
SCRAMBLE (Scramble Communication)	N	Y / N	ED-EQPT::IMC:SC61::SCRAMBLE=Y;
SELMDE (Input Selection Mode)	AUTO	AUTO/ MANUAL/ FORCED	ED-EQPT::CLK:SV46::SELMDE=MANUAL;
SNGCLK (Single Clock)	N	Y / N	ED-EQPT::IMC:SC62::SNGCLK=Y;
SPRDCHN (Spread Channels)	0 & 1 & 2 & 3 & 4	Any combination of Inputs 1 - 8	ED-EQPT::CLK:SC62::SPRDCHN=0&&8;
SQUELCH (Squelch Output)	N	Y / N	ED-SYNC::OUTA-1&&20:SC63::SQUELCH=N;
SSMENB (Read SSM Bits)	N	Y / N	ED-SYNC::CLK-1:SC64::SSMENB=Y;
SSMPRI (SSM Priority Grouping removed as of clock firmware 4236B)	(Channel Number) + 1	0 - 9	ED-SYNC::CLK-3:SC65::SSMPRI=4;
SYNCMDE (Sync Mode)	AUTO	Prior to FW 4236B: AUTO/ MANUAL/ FORCED/ SSM FW 4236B or later: AUTO/ SSM	ED-EQPT::CLK:SC66::SYNCMDE=MANUAL;
TCONST (Time Constant)	768	96 - 49152	ED-SYNC::CLK-1:SC69::TCONST=768;
TCONSTSEC (Time Constant for Secondary Oscillator)	384	96 - 49152	ED-SYNC::CLK-2:SC70::TCONSTSEC=384;

Table D. Keywords and Descriptions, Values, Commands, and Targets (cont'd)

Keyword/Description	Default Value	Accepted Value	Example Command
TIDQUIET (TID Quiet)	N	Y / N	ED-EQPT::SC72::TIDQUIET=Y;
TRAFFIC (Traffic Data Pattern)	255	0 - 255	ED-EQPT::OUTA:SC73::TRAFFIC=17;
USESUBRCK	N	Y / N	ED-EQPT::IMC:SC77::USESUBRCK=Y;
WTRSS (Wait Time to Restore Synchronization Source)	30	0 - 1000	ED-EQPT::CLK:SC78::WTRSS=60;
YEAR4	N	Y / N	ED-EQPT::IMC:SC79::YEAR4=Y;

Keyword Description

Keywords are listed on the following pages. After the keyword name, a definition of the keyword is given. The definition is followed by the format of the keyword, followed by the value(s) that can be used with the keywords.

ACTSSM (Active SSM)

This keyword provides a method for retrieving the SSM value that is currently being applied to any ESF-framed DS1 outputs. This is a read-only keyword. The value returned is the SSM quality level (see chart in [Quality Level](#) keyword description for mapping of SSM quality level to associated description). The keyword format is:

CCALIGN=<value>

Notes:

- This feature is available in firmware versions 4142B and later.
- If a manually set output SSM value has been selected (see "Output Manual SSM" and "Output Quality Level" keyword topics), ACTSSM will not report the manually set SSM value. Instead, ACTSSM will report the SSM value that would be applied if the manual capability was disabled.

AIS (Output AIS)

This keyword forces an output driver card to generate AIS instead of the usual formatted signal. The keyword format is:

AIS=<value>

Parameter	Value	Description
<value>	Y	Output driver card generates AIS
	N	Output driver card generates framed data

AOMERGE (Automatic Output Merge)

This keyword specifies whether the automatic output messages and commands will be carried separately on two different communication ports or combined on one port. The network parameters for the two ports are: PORTCMDS and PORTAO. The keyword format is:

AOMERGE=<value>

Parameter	Value	Description
<value>	Y	Messages and commands will be carried combined on one communication port
	N	Messages and commands will be carried separately on two different communication ports

If the IP address of the manager matches IPLM1 or IPLM2, the output will be merged, regardless of the AOMERGE value.

Following a firmware download to the management card, AOMERGE may be reset to N. If one port had been used to carry both automatic events and commands, the AOMERGE setting should be checked and changed to Y, if necessary.

AUTOPM (Auto-Upload PM)

This keyword inhibits or allows automatic display of performance data for a particular input channel. The data to be displayed is determined by the setting of the PM property of the performance monitoring measurements (e.g., MRTIE, TDEV, LMRTIE, FFOFF, SPRD, TIE). The primary purpose of this keyword is to disable all automatic measurement displays from a channel without turning off the PM property on each indicated measurement. The keyword format is:

AUTOPM=<value>

Parameter	Value	Description
<value>	Y	Performance data will be displayed for the channel
	N	Performance data will not be displayed for the channel

Performance monitoring data will be displayed automatically only if the following parameters have been set:

- AUTOPM has been set to Y for the desired input channel.
- The PM property has been set to Y for the desired <montype> and input channel.

If requesting more data to be displayed than the communications channels can handle, some reports may be lost. This problem is most likely to occur if data is displayed at 1 second intervals.

To avoid this problem, display 1 second LMRTIE data at 1 minute or 15 minute intervals, rather than every second. For measurements, enabling automatic reporting of the 1 minute or 15 minute LMRTIE and MRTIE values also will cause the 1 second or 1 minute values to be reported along with the 15 minute values, even though 1 second data is not explicitly enabled for automatic reporting. If the reporting of the 1 second data is enabled, it will be displayed every second (except for MRTIE which is only calculated at 15 minute intervals).

B8ZS (B8ZS)

This keyword enables bipolar 8-zero substitution (B8ZS) coding on an input channel. This keyword does not affect the PRC (Primary Reference Clock) input. The keyword format is:

B8ZS=<value>

Parameter	Value	Description
<value>	Y	B8ZS coding is enabled
	N	B8ZS coding is disabled

BRIDGED (Bridged Input)

This keyword provides a method for setting any of the inputs 1-4 to expect a bridged rather than a terminated DS1 input. A bridged connection will typically have signal levels at about 1/10 (or 20 dB down) from the normally terminated DS1 input (nominally 3 volt peak into 100 ohm). Use of this setting causes signal conditioning circuitry associated with the selected input channel to appropriately adjust to expect the lower signal strength associated with a bridged input. To configure an input channel to expect a bridged input, set the BRIDGED setting for that channel to Y. The keyword format is:

```
BRIDGED=<value>;
```

Parameter	Value	Description
<value>	Y	The selected input will expect a bridged input
	N	The selected input will NOT expect a bridged input. In other words, it will expect a normally terminated DS1 signal. This is the default

Note: The BRIDGED setting applies only to inputs 1-4. Clock cards that have inputs 5-8, which are used only for DS1 performance monitoring, are not configurable but always expect bridged inputs.

Command Examples:

Enable BRIDGED mode for input 3:

```
ED-SYNC::CLK-3:SV13:::BRIDGED=Y;
```

This is the response:

```
SYMMBITS 03-03-24 09:10:50  
M SV13 COMPLD  
;
```

To retrieve the BRIDGED setting for input 4, send:

```
RTRV-SYNC::CLK-4:SC14:::PARAMETER=BRIDGED;
```

BRIDGED (Bridged Input) (cont'd)

This is the response:

```
SYMMBITS 03-03-24 09:12:12  
M SC14 COMPLD  
"S1-OUTC-PG1::CBCOMP=100"  
;
```

indicating that input 4 is currently NOT set for BRIDGED mode.

CBCOMP (Cable Compensation)

This keyword provides a method for compensating Composite Clock (CC) outputs for cable delays by entering the approximate number of feet of cable from the CC output to where the signal is being used. The effect of using this setting is to cause the CC output to be moved earlier in time so that it can arrive at the point of usage as if the cable transit time is effectively zero. The conversion factor used for this setting is that 1 foot of cable has an associated delay of 1.63 nanoseconds.

The compensation amount can be set uniquely for groups of 20 output ports. Ports 1-20 can have a single value, and ports 21-40 can have a different value. PG1 and PG2 are part of the AID in the TL1 command, which is what distinguishes which group of 20 ports will be set.

Each port can be set to either have no compensation or have the amount set by the CBCOMP setting. See keyword CCDENB.

It is also possible to set adjust the CC delay using the CCDEL (CC Delay) keyword. CCDEL provides a method for making the adjustment based on time (in nanoseconds) rather than length of cable. CBCOMP and CCDEL are interrelated. If the value of either keyword is changed, a corresponding change will occur in the value for the other keyword. The keyword format is:

CBCOMP=<value>

Parameter	Value	Description
<value>	0 to 6000 feet	Cable compensation in amount of feet using conversion of 1 foot = 1.63 nanoseconds

Note: This feature is available in firmware versions 4209C and later.

Command Examples:

Set the CC compensation for expansion shelf 1 (S1-) output card group C, ports 1-20 (PG1) to 100.

```
ED-EQPT::S1-OUTC-PG1:SV322:::CBCOMP=100;
```

This is the response:

```
SYMMBITS 02-07-09 11:29:09  
M SV322 COMPLD  
;
```

CBCOMP (Cable Compensation) (cont'd)

Retrieve the CBCOMP setting:

```
RTRV - EQPT::S1-OUTC-PG1:SV323:::parameter=CBCOMP;
```

This is the response:

```
SYMMBITS 02-07-09 11:29:09  
M SV323 COMPLD  
    "S1-OUTC-PG1::CBCOMP=100"  
;
```

CCALIGN (Composite Clock Alignment)

This keyword provides a method for aligning the CC (Composite Clock) outputs from a Master shelf to a user-provided CC input. The input should be connected to CC IN 1 wirewrap pins on the input connector card. When CCALIGN is set to Y, any output CCs from the master shelf will be phase-aligned to this input. Use of an oscilloscope is recommended to observe that the alignment has taken place. When CCALIGN is set to N, the master shelf uses its normal inputs (5/10 MHz and DS1) for reference timing. The keyword format is:

CCALIGN=<value>

Parameter	Value	Description
<value>	Y	Master shelf output Composite Clock (CC) signals will be continually phase-aligned to a valid CC input applied to CC IN 1. If the input is not valid, shelf will use its normal reference inputs for timing.
	N	Master shelf will operate normally, using 5/10 MHz and DS1 inputs as timing references. If a CC input is connected, it will be ignored.

Notes:

- This feature is available in firmware versions 4142B and later.
- When CCALIGN=Y, DS1 outputs from the master shelf will also be adjusted in phase at the same rate as any CC outputs.
- If any CC output has a non-zero delay set (see keywords CCDENB and CCDEL) this amount of delay will not be compensated. In other words, the user-selected delay amount will be preserved when CCALIGN is activated. The result will be that the CC output will be offset from the input CC by the user-selected delay amount.

CCDEL (CC Delay Value)

This keyword sets the delay (in nanoseconds) for a Composite Clock (CC) output. A negative value for delay causes the CC output to be moved earlier in time, a positive value delays the output by the amount of time specified.

The delay amount can be set uniquely for groups of 20 output ports. Ports 1-20 can have a single value, ports 21-40 can have a different value. PG1 and PG2 are part of the AID in the TL1 command which is what distinguishes which group of 20 ports will be set.

It is also possible to set adjust the CC delay using the CBCOMP (Cable Compensation) keyword. CBCOMP provides a method for making the adjustment based on feet of cable rather than delay time. CBCOMP and CCDEL are interrelated. If the value of either keyword is changed, a corresponding change will occur in the value for the other keyword. The keyword format is:

CCDEL=<value>

Parameter	Value	Description
<value>	-10000 to 10000	Delay in ns

Note: This keyword applies only if the individual output port delay is enabled (CCDENB=Y) and if the output connector card is a CC type.

Command Example:

```
RTRV-EQPT::OUTA-PG1:SC050:::PARAMETER=CCDEL;
```

Response Example:

```
SYMMBITS 00-06-18 11:40:54  
M SC050 COMPLD  
"OUTA-PG1::CCDEL = 80"  
;
```

CCDENB (CC Delay)

This keyword enables the delay for a specific port on an output connector card.
The keyword format is:

CCDENB=<value>

Parameter	Value	Description
<value>	Y	Delay is enabled
	N	Delay is disabled

Note: If this keyword is enabled, the amount of delay is controlled by the CC Delay Value (CCDEL).

CLRPTALL (Clear Port Alarm)

This keyword provides a method for attempting to clear an output port alarm that may have become set due to a temporary external condition. When an externally-induced port alarm occurs, upon removal of the condition that caused the port alarm the output port alarms normally self-clears. However, in a situation where the temporary external condition causes only one output card of a protected pair to alarm, this alarm will not self-clear when the external condition is removed. This is the situation where using CLRPTALL can be helpful. The keyword format is:

CLRPTALL=<value>

Parameter	Value	Description
<value>	Y	Attempt to clear any port alarms on output cards in the selected output card group. Along with attempting to clear alarms, in response to completing the attempt the value will be set to N. In other words, the clearing attempt is performed once immediately upon having the value set to Y.
	N	Do not attempt port alarm clear. When the CLRPTALL value is queried, it will nearly always be set to N since the TimeHub 5500 automatically sets the value to N after a port alarm clear attempt.

Note: This feature is available in firmware versions 4209C and later. If port alarms exist, they can be seen using the RTRV-ALRM command.

Command Examples:

Attempt to clear any port alarms on expansion shelf 1 (S1-), output card(s) in the C group (OUTC).

```
ED-EQPT::S1-OUTC:SV820:::CLRPTALL=Y;
```

This is the response:

```
SYMMBITS 02-07-09 16:52:53
M SV820 COMPLD
;
```

CLRPTALL (Clear Alarm Port) (cont'd)

Retrieve the current value of CLRPTALL:

```
RTRV - EQPT::S1-OUTC:SV821:::PARAMETER=CLRPTALL;
```

This is the response:

```
SYMMBITS 02-07-09 16:53:30  
M SV821 COMPLD  
"S1-OUTC::CLRPTALL=N"  
;
```

CURRSSM (Current SSM Value)

This keyword retrieves the current SSM value from the specified input channel.

Note: The current SSM value is only read from the input channel if the channel has been set to SSMENB=Y and ESF=Y. If SSM has been disabled (SSMENB=N), the assumed SSM (QLEVEL) will be retrieved instead.

The keyword format is:

PARAMETER=CURRSSM

Command Example:

```
RTRV - SYNC :: CLK - 2 : SC321 :: : PARAMETER=CURRSSM ;
```

Response Example:

```
SYMMBITS 00-06-18 11:43:10  
M SC321 COMPLD  
"CLK-2::CURRSSM = 0"  
;
```

DSCTIME (Discontinuity Time)

This keyword determines the number of consecutive seconds with severe errors the system will wait before disqualifying the channel. The keyword format is:

DSCTIME=<value>

Parameter	Value	Description
<value>	1 to 15	Number of seconds

Command Example:

```
RTRV - EQPT::CLK:SC334:::PARAMETER=DSCTIME;
```

Response Example:

```
SYMMBITS 00-06-18 11:43:16  
M SC334 COMPLD  
"CLK::DSCTIME = 15"  
;
```

ECLKEXP (Expected Expansion Controller Card)

This keyword provides a method for establishing whether or not an expansion shelf (or shelves) is expected to be part of the TimeHub system. Since an expansion shelf cannot function without at least one expansion controller (EC) card, communication from the master shelf with an EC card in a given expansion shelf is used as the method for determining whether or not there is a functioning expansion shelf connected. The keyword format is:

ECLKEXP=<value>

Parameter	Value	Description
<value>	Y	Communication with the identified expansion controller card is expected. If communication with this card is not taking place, an EXCLKGONE event will be generated (refer to command example).
	N	Communication with the identified expansion controller card is NOT expected.

There is automatic behavior associated with this keyword. Whenever communication with an EC card occurs, the associated ECLKEXP value is automatically set to Y. The benefit of this is that there is no need to explicitly establish that connection to a particular expansion shelf is expected. The underlying assumption is that connection to an EC card would not occur if there was not intention to actually use the expansion shelf associated with it. Setting ECLKEXP to N while communication with that EC card is continuing will cause the ECLKEXP value to be automatically be returned to Y.

If it is desired to remove an expansion shelf from a TimeHub system, the ECLKEXP settings for EC cards in that shelf should be set to N after the shelf connection has been removed. This will prevent the EXCLKGONE condition from being reported for those EC cards.

Command Examples:

Retrieve the current setting of ECLKEXP for expansion shelf 2 (S2-) for the right side expansion controller card (CLK2).

Note: For each expansion shelf, the left side EC card (labeled EC1 on the shelf) is identified by CLK1. The right side EC card (labeled EC2 on the shelf) is identified by CLK2.

```
RTRV-EQPT::S2-CLK2:SV01:::PARAMETER=ECLKEXP;
```

ECLKEXP (Expected Expansion Controller Card) (cont'd)

This is the response:

```
SYMMBITS 02-07-10 11:22:40
M SV01 COMPLD
  "S2-CLK2::ECLKEXP=Y"
;
```

The preceding example shows that it is expected that there is communication with the right side controller card in expansion shelf 2. If there is actually no communication, the following condition will be present:

```
"S2-CLK2:MJ,EXCLKGONE,NSA,07-10,13-05-52:\\"Expansion CLK
card missing\\""
```

Setting ECLKEXP to N will cause this condition to end:

```
ED-EQPT::S2-CLK2:SV01:::ECLKEXP=N;
```

Which results in this response:

```
SYMMBITS 02-07-10 13:09:51
M SV01 COMPLD
;
```

And an automatic message showing that the condition has ended:

```
SYMMBITS 02-07-10 13:09:51
A 0296 REPT ALM TSG
  "S2-CLK2:CL,EXCLKGONE,NSA,07-10,13-09-51:\\"ENDED
Expansion CLK card missing\\""
;
```

ECONCRD (Output Connector Card Type)

This keyword sets the requirement for the output connector card type. If a card type other than the type specified is detected, or this keyword's value is set to EMPTY and a card exists, an event (ECCRDMM) is generated stating an output connector card mismatch. The keyword format is:

ECONCRD=<value>

Parameter	Value	Description
<value>	DONT-CARE	No card type requirement
	CC	CC card type
	DS1	DS1 card type

Note: Outputs are not disabled when the ECCRDMM event is generated.

Command Example:

```
RTRV - EQPT :: OUTA - PG1 : SC341 :: : PARAMETER = ECONCRD ;
```

Response Example:

```
SYMMBITS 00-06-18 11:54:40  
M SC341 COMPLD  
"OUTA-PG1::ECONCRD = DONT-CARE"  
;
```


ENABLE (Input Enable)

This keyword controls whether an input will be considered as a reference source.
The keyword format is:

ENABLE=<value>

Parameter	Value	Description
<value>	Y	Channel may be used
	N	Channel may not be used

Shelf Configuration	Meaningful Channel Assignments
Master	0 = PRS (5 or 10 MHz)
	1 = DS1 1
	2 = DS1 2
	3 = DS1 3
	4 = DS1 4
	The following only apply to 9-input clock cards:
	5 = DS1 5
	6 = DS1 6
	7 = DS1 7
	8 = DS1 8
Remote	10 = CC1
	11 = CC2
	The following are used for SSM enabling:
	1 = DS1 1 (SSM read only, not a timing input)
	2 = DS1 2 (SSM read only, not a timing input)

EPROT (Protection)

This keyword sets the requirement for output card protection. If the requirement is not met, an event (EPROTMM) is generated stating an output protection mismatch, but the outputs are enabled if possible. The keyword format is:

EPROT=<value>

Parameter	Value	Description
<value>	DONT-CARE	No requirement
	REQUIRED	Two output driver cards must be in the specified slot pair

Command Example:

```
RTRV - EQPT::OUTA:SC505:::PARAMETER=EPROT;
```

Response Example:

```
SYMMBITS 00-06-18 11:55:55  
M SC505 COMPLD  
"OUTA::EPROT = DONT-CARE"  
;
```

ESF (ESF)

This keyword sets the framing for a specific input channel. The keyword format is:

ESF=<value>

Parameter	Value	Description
<value>	Y	ESF framing
	N	D4 framing

FREEACT (Freerun Action)

This keyword provides a method for controlling whether or not the shelf will be allowed to generate outputs when in FREERUN mode. The clock cards have an LED on their front panel that indicates when in freerun mode. Freerun occurs just after the clock card completes warmup (also indicated with an LED) but has yet to qualify a input timing reference. If there is a valid timing reference connected, the freerun condition will be brief (usually less than a minute). If there is no valid timing reference connected, the clock card will remain in freerun indefinitely. During freerun, the clock card uses its internal oscillator as the timing source for output generation. The keyword format is:

FREEACT=<value>

Parameter	Value	Description
<value>	CONTINUE	The shelf will be capable of generating outputs when in freerun mode.
	SQUELCH	The shelf will NOT be capable of generating outputs when in freerun mode.

Notes:

- This feature is available in firmware versions 4142B and later.
- The default FREEACT setting for a clock in a master shelf is CONTINUE. This means that, for a master shelf, output will normally be possible when in freerun.
- The default FREEACT setting for a clock in a remote shelf is SQUELCH. This means that, for a remote shelf, output will normally NOT be possible when in freerun.
- For output to be possible when in freerun mode, not only must FREEACT=CONTINUE but the selected output port must be enabled and in service (see "In Service" and "Squelch Output" keyword topics).

HFQLEVL (Holdover and Freerun Quality Level)

This keyword defines the quality assumed for the clock card in SSM mode. This value is used for placing SSM bits onto the output stream when in holdover. The keyword format is:

HFQLEVL=<value>

Parameter	Value	Description
<value>	1	Stratum 1 Traceable (PRS)
	2	Synchronized – Traceability Unknown (STU)
	3	Stratum 2 Traceable (ST2)
	4	Transit Node Clock Traceable (TNC)
	5	Stratum 3E Traceable (ST3E)
	6	Stratum 3 Traceable (ST3)
	7	SONET Minimum Clock (SMC)
	8	Do not use for synchronization (DUS)

Command Example:

```
RTRV - EQPT::CLK:SC566:::PARAMETER=HFQLEVL;
```

Response Example:

```
SYMMBITS 00-06-18 11:45:28  
M SC566 COMPLD  
"CLK::HFQLEVL = 4"  
;
```



HFQLEVLSEC (Holdover and Freerun Quality Level for Secondary Oscillator)

This keyword defines the quality assumed for the secondary clock card (with the lower quality oscillator) in a mixed clock card pair in SSM mode.

The quality level value is only transmitted if the secondary clock card becomes active while it is in holdover.

The keyword format is:

HFQLEVLSEC=<value>

Parameter	Value	Description
<value>	1	Stratum 1 Traceable (PRS)
	2	Synchronized – Traceability Unknown (STU)
	3	Stratum 2 Traceable (ST2)
	4	Transit Node Clock Traceable (TNC)
	5	Stratum 3E Traceable (ST3E)
	6	Stratum 3 Traceable (ST3)
	7	SONET Minimum Clock (SMC)
	8	Do not use for synchronization (DUS)

Command Example:

```
RTRV - EQPT::CLK:SC581:::PARAMETER=HFQLEVLSEC;
```

Response Example:

```
SYMMBITS 00-06-18 11:45:35  
M SC581 COMPLD  
"CLK::HFQLEVLSEC = 4"  
;
```

HLDAPACT (Holdover Action)

This keyword controls the output driver card operation when the system is in holdover. The keyword format is:

HLDAPACT=<value>

Parameter	Value	Description
<value>	CONTINUE	Output driver card will continue to operate
	AIS	Output driver card will output an AIS signal
	SQUELCH	Output driver card will be squelched

Command Example:

```
RTRV - EQPT::OUTA:SC594:::PARAMETER=HLDAPACT;
```

Response Example:

```
SYMMBITS 00-06-18 11:45:41  
M SC594 COMPLD  
"OUTA::HLDAPACT = CONTINUE"  
;
```

INACTTIME (Inactivity Time-Out)

This keyword specifies the length of time a connection to the event reporting port (PORTAO) will continue without the occurrence of an automatic output message. The inactivity timer has a setting range of 0 to 10000, where each has a time value of 0.1 seconds (100 ms). For example, a setting of 100 specifies that after 10 seconds without an automatic message, the connection to the TimeHub 5500 PORTAO will be closed. The connection will be re-established when another automatic message occurs. The keyword format is:

INACTTIME=<value>

Parameter	Value	Description
<value>	0 to 10000	Timeout in units of 100 ms

Command Example:

```
RTRV-EQPT::IMC:SC639:::PARAMETER=INACTTIME;
```

Response Example:

```
SYMMBITS 00-06-18 11:45:59  
M SC639 COMPLD  
"IMC::INACTTIME = 200"  
;
```

INSRVC (In Service)

This keyword disables an output driver card (in case maintenance is required). The keyword format is:

INSRVC=<value>

Parameter	Value	Description
<value>	Y	Disabled output
	N	Enabled output

IPEM1 (IP Address of Primary Element Manager–Working Memory)

This keyword sets the primary element manager IP address in working memory. Working memory controls the actual operation of the network. The keyword format is:

IPEM1=<a.b.c.d>

Parameter	Value	Description
a	0 to 255	Working memory primary element manager IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Note: Network parameters in working memory cannot be directly modified.

Command Example:

```
RTRV - EQPT - TSG :: IMC : SC678 :: : PARAMETER = IPEM1 ;
```

Response Example:

```
SYMMBITS 00-06-18 11:46:21  
M SC678 COMPLD  
"IMC :: IPEM1 = 0.0.0.0"  
;
```

IPEM1X (IP Address of Primary Element Manager–Auxiliary Memory)

This keyword sets the primary element manager IP address in auxiliary memory. Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network). The keyword format is:

IPEM1X=<a . b . c . d>

Parameter	Value	Description
a	0 to 255	Auxiliary memory primary element manager IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Command Example:

```
RTRV - EQPT:::SC681:::PARAMETER=IPEM1X;
```

Response Example:

```
SYMMBITS 00-06-18 11:46:22  
M SC681 COMPLD  
"IMC::IPEM1X = 123.123.12.123"  
;
```

IPEM2 (IP Address of Alternate Element Manager–Working Memory)

This keyword sets the alternate element manager IP address in working memory. The alternate element manager IP address is used for event reporting if communication failure to the primary element manager occurs. Working memory controls the actual operation of the network. The keyword format is:

IPEM2=<a . b . c . d>

Parameter	Value	Description
a	0 to 255	Working memory alternate element manager IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Note: Network parameters in working memory cannot be directly modified.

Command Example:

```
RTRV - EQPT :: IMC : SC692 :: : PARAMETER = IPEM2 ;
```

Response Example:

```
SYMMBITS 00-06-18 11:46:43  
M SC692 COMPLD  
"IMC :: IPEM2 = 0.0.0.0"  
;
```

IPEM2X (IP Address of Alternate Element Manager–Auxiliary Memory)

This keyword sets the alternate element manager IP address in auxiliary memory. The alternate element manager IP address is used for event reporting if communication failure to the primary element manager occurs. Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network). The keyword format is:

IPEM2X=<a . b . c . d>

Parameter	Value	Description
a	0 to 255	Auxiliary memory alternate element manager IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Command Example:

```
RTRV - EQPT::IMC:SC693:::PARAMETER=IPEM2X;
```

Response Example:

```
SYMMBITS 00-06-18 11:46:44  
M SC693 COMPLD  
"IMC::IPEM2X = 0.0.0.0"  
;
```

IPGATE (IP Address of Default Gateway–Working Memory)

This keyword sets the default gateway IP address in working memory. Working memory controls the actual operation of the network. The keyword format is:

IPGATE=<a . b . c . d>

Parameter	Value	Description
a	0 to 255	Working memory default gateway IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Note: Network parameters in working memory cannot be directly modified.

Command Example:

```
RTRV - EQPT::IMC:SC708:::PARAMETER=IPGATE;
```

Response Example:

```
SYMMBITS 00-06-18 11:47:06  
M SC708 COMPLD  
"IMC::IPGATE = 192.207.10.15"  
;
```

IPGATEX (IP Address of Default Gateway–Auxiliary Memory)

This keyword sets the default gateway IP address in auxiliary memory. Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network). The keyword format is:

IPGATEX=<a.b.c.d>

Parameter	Value	Description
a	0 to 255	Auxiliary memory default gateway IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Command Example:

```
RTRV - EQPT:::SC723:::PARAMETER=IPGATEX;
```

Response Example:

```
SYMMBITS 00-06-18 11:47:18  
M SC723 COMPLD  
"IMC::IPGATEX = 145.34.45.99"  
;
```

IPLM1 (IP Address of Primary Local Manager–Working Memory)

This keyword sets the primary local manager IP address in working memory. The local manager IP address sets the address of a local PC connected to the LAN port of the shelf. Working memory controls the actual operation of the network. The keyword format is:

IPLM1=<a.b.c.d>

Parameter	Value	Description
a	0 to 255	Working memory primary local manager IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Command Example:

```
RTRV - EQPT::IMC:SC728:::PARAMETER=IPLM1;
```

Response Example:

```
SYMMBITS 00-06-18 11:47:31  
M SC728 COMPLD  
"IMC::IPLM1 = 0.0.0.0"  
;
```


IPLM1X (IP Address of Primary Local Manager–Auxiliary Memory)

This keyword sets the primary local manager IP address in auxiliary memory. The local manager IP address sets the address of a local PC connected to the LAN port of the shelf. Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network). The keyword format is:

IPLM1X=<a . b . c . d>

Parameter	Value	Description
a	0 to 255	Auxiliary memory primary local manager IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Command Example:

```
RTRV - EQPT - TSG :: SC739 :: PARAMETER=IPLM1X;
```

Response Example:

```
SYMMBITS 00-06-18 11:47:35  
M SC739 COMPLD  
"IMC::IPLM1X = 145.34.45.99"  
;
```

IPLM2 (IP Address of Alternate Local Manager–Working Memory)

This keyword sets the alternate local manager IP address in working memory. The alternate local manager IP address is used for event reporting if communication failure to the primary local manager occurs. (The local manager IP address sets the address of a local PC connected to the LAN port of the shelf.) Working memory controls the actual operation of the network. The keyword format is:

IPLM2=<a.b.c.d>

Parameter	Value	Description
a	0 to 255	Working memory alternate local manager IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Command Example:

```
RTRV - EQPT::IMC:SC750:::PARAMETER=IPLM2;
```

Response Example:

```
SYMMBITS 00-06-18 11:47:57  
M SC750 COMPLD  
"IMC::IPLM2 = 0.0.0.0"  
;
```

IPLM2X (IP Address of Alternate Local Manager–Auxiliary Memory)

This keyword sets the alternate local manager IP address in auxiliary memory. The alternate local manager IP address is used for event reporting if communication failure to the primary local manager occurs. (The local manager IP address sets the address of a local PC connected to the LAN port of the shelf.) Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network). The keyword format is:

IPLM2X=<a . b . c . d>

Parameter	Value	Description
a	0 to 255	Auxiliary memory alternate local manager IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Command Example:

```
RTRV - EQPT:::SC753:::PARAMETER=IPLM2X;
```

Response Example:

```
SYMMBITS 00-06-18 11:47:58  
M SC753 COMPLD  
"IMC::IPLM2X = 123.123.12.123"  
;
```

IPNE (IP Address of Network Element –Working Memory)

This keyword sets the network element (TimeHub 5500) IP address in working memory. Working memory controls the actual operation of the network. The keyword format is:

IPNE=<a . b . c . d>

Parameter	Value	Description
a	0 to 255	Working memory network element IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Note: Network parameters in working memory cannot be directly modified.

Command Example:

```
RTRV - EQPT :: IMC : SC768 :: : PARAMETER = IPNE ;
```

Response Example:

```
SYMMBITS 00-06-18 11:48:21  
M SC768 COMPLD  
"IMC :: IPNE = 192.207.10.205"  
;
```

IPNEX (IP Address of Network Element –Auxiliary Memory)

This keyword sets the network element (TimeHub 5500) IP address in auxiliary memory. Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network). The keyword format is:

IPNEX=<a.b.c.d>

Parameter	Value	Description
a	0 to 255	Auxiliary memory network element IP address
b	0 to 255	
c	0 to 255	
d	0 to 255	

Command Example:

```
RTRV - EQPT::IMC:SC765:::PARAMETER=IPNEX;
```

Response Example:

```
SYMMBITS 00-06-18 11:48:20  
M SC765 COMPLD  
"IMC::IPNEX = 192.207.10.205"  
;
```

IPSUBNET (Subnetwork Mask–Working Memory)

This keyword sets the subnetwork mask in working memory. The subnetwork mask is used to extract the network identifier from the IP address. Working memory controls the actual operation of the network. The keyword format is:

IPSUBNET=<a.b.c.d>

Parameter	Value	Description
a	0 to 255	Working memory subnetwork mask
b	0 to 255	
c	0 to 255	
d	0 or 128	

Note: Network parameters in working memory cannot be directly modified.

Command Example:

```
RTRV-EQPT::IMC:SC782:::PARAMETER=IPSUBNET;
```

Response Example:

```
SYMMBITS 00-06-18 11:58:41  
M SC782 COMPLD  
"IMC::IPSUBNET = 255.255.248.0"  
;
```

IPSUBNETX (Subnetwork Mask–Auxiliary Memory)

This keyword sets the subnetwork mask in auxiliary memory. The subnetwork mask is used to extract the network identifier from the IP address. Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network). The keyword format is:

IPSUBNETX=<a.b.c.d>

Parameter	Value	Description
a	0 to 255	Auxiliary memory subnetwork mask
b	0 to 255	
c	0 to 255	
d	0 or 128	

Command Example:

```
RTRV-EQPT::IMC:SC779:::PARAMETER=IPSUBNETX;
```

Response Example:

```
SYMMBITS 00-06-18 11:58:40  
M SC779 COMPLD  
"IMC::IPSUBNETX = 0.0.0.0"  
;
```

LCLAO (Local Automatic Output)

This keyword sets the local port to report automatic messages always, never, or only when logged into the local port. The keyword format is:

LCLAO=<value>

Parameter	Value	Description
<value>	ALWAYS	Always report automatic messages
	LOGIN	Only report automatic messages when logged into the local port
	NEVER	Never report automatic messages

Command Example:

```
RTRV - EQPT:::SC801:::PARAMETER=LCLAO;
```

Response Example:

```
SYMMBITS 00-06-18 11:58:49  
M SC801 COMPLD  
"IMC::LCLAO = LOGIN"  
;
```

LCLBAUD (Local Baud Rate)

This keyword sets the baud rate on the local port.

Note: The baud rate of the port in use cannot be set.

The keyword format is:

LCLBAUD=<value>

Parameter	Value	Description
<value>	1200	Baud rate
	2400	
	9600	
	19200	

Command Example:

```
RTRV - EQPT::IMC:SC806:::PARAMETER=LCLBAUD;
```

Response Example:

```
SYMMBITS 00-06-18 11:58:57  
M SC806 COMPLD  
"IMC::LCLBAUD = 9600"  
;
```

LCLECHO (Local Echo)

This keyword tells the system to echo commands to the local terminal. The keyword format is:

LCLECHO=<value>

Parameter	Value	Description
<value>	Y	System echoes commands to the local terminal
	N	System does not echo commands to the local terminal

MAINCLK (Main Clock)

This keyword provides a method for determining whether the shelf is configured for Master or Remote use. This is a read-only keyword. The keyword format is:

MAINCLK=<value>

Parameter	Value	Description
<value>	Y	The shelf is configured as a Master shelf.
	N	The shelf is configured as a Remote shelf.

Note: This feature is available in firmware versions 4142B and later.

MANCHAN (Manual Channel)

This keyword specifies which channel to be used in the manual or forced synchronization mode. The keyword format is:

MANCHAN=<value>

Parameter	Value	Description
<value>	0 to 11	Input channel (0 indicates the 5/10 MHz PRC input)

Command Example:

```
RTRV-EQPT::CLK:SC818:::PARAMETER=MANCHAN;
```

Response Example:

```
SYMMBITS 00-06-18 11:59:02  
M SC818 COMPLD  
"CLK::MANCHAN = 2"  
;
```

MEASDLY (Measurement Delay)

This keyword allows an input channel to be held disqualified for a specific number of minutes following measurement restarts. This setting could have significant impact on the time required to qualify a signal. The performance measurements are restarted by any of the following conditions:

- Initial startup of the clock card
- Input signal frequency outside the measurement range.
- Discontinuities on the input signal exceeding the Discontinuity Time (DSCTIME) value
- The Initialize Register (INIT-REG) command used to restart performance measurements is executed with the DISQ parameter. For example:
INIT-REG::CLK-2:SC1::DISQ;

The keyword format is:

MEASDLY=<value>

Parameter	Value	Description
<value>	0 to 1800	Number of minutes following measurement restarts

Command Example:

```
RTRV - SYNC::CLK-1:SC839:::PARAMETER=MEASDLY;
```

Response Example:

```
SYMMBITS 00-06-18 11:59:10  
M SC839 COMPLD  
"CLK-1::MEASDLY = 1"  
;
```

MONITOR (Input Event Monitoring)

This keyword allows events from disabled inputs to be suppressed.

Set this keyword (MONITOR) to N for disabled channels that do not have an input signal connected. If the value for the input keyword (ENABLE) is Y, the setting for this keyword has no effect.

To monitor an input signal that is not being used as a system reference, set the input keyword (ENABLE) for the input to be monitored to N, set this keyword (MONITOR) to Y, and connect the signal.

The keyword format is:

MONITOR=<value>

Parameter	Value	Description
<value>	Y	Disabled inputs events are not suppressed
	N	Disabled inputs events are suppressed

OMANSSM (Output Manual SSM)

This keyword allows the user to set the SSM quality level for the specified output slot pair (OQLEVEL). For this keyword to be effective, the output format must be set to Y (OUTESF=Y). The keyword format is:

OMANSSM=<value>

Parameter	Value	Description
<value>	Y	Allow user to specify SSM quality level
	N	Do not allow user to specify SSM quality level

OQLEVEL (Output Quality Level)

This keyword specifies the SSM quality level for the specified output slot pair. This SSM level is used when the Output Manual SSM function has been enabled (OMANSSM=Y). The keyword format is:

OQLEVEL=<value>

Parameter	Value	Description
<value>	1	Stratum 1 Traceable (PRS)
	2	Synchronized – Traceability Unknown (STU)
	3	Stratum 2 Traceable (ST2)
	4	Transit Node Clock Traceable (TNC)
	5	Stratum 3E Traceable (ST3E)
	6	Stratum 3 Traceable (ST3)
	7	SONET Minimum Clock (SMC)
	8	Do not use for synchronization (DUS)

Command Example:

```
RTRV - EQPT::OUTD:SC1010:::PARAMETER=OQLEVEL;
```

Response Example:

```
SYMMBITS 00-06-18 12:00:30  
M SC1010 COMPLD  
"OUTD::OQLEVEL = 4"  
;
```

OUTESF (Output ESF)

This keyword sets the framing for a specific output connector card port group. The keyword format is:

OUTESF=<value>

Parameter	Value	Description
<value>	Y	ESF framing
	N	D4 framing

Note: This keyword applies only if the output connector card is a DS1 type.

PIRANGE (Pull-In Range)

This keyword controls how far the input can be off from the absolute frequency for the local oscillator before it is disqualified.

Note: Because this is over the lifetime of the oscillator, this is not a substitute for frequency deviation.

The keyword format is:

PIRANGE=<value>

Parameter	Value	Description
<value>	10 to 10000	Range in ppb (parts per billion = parts in 10^9)

Command Example:

```
RTRV-EQPT::CLK:SC1056:::PARAMETER=PIRANGE;
```

Response Example:

```
SYMMBITS 00-06-18 12:00:57  
M SC1056 COMPLD  
"CLK::PIRANGE = 4731"  
;
```

PIRANGESEC (Pull-In Range for Secondary Oscillator)

This keyword sets the pull-in range for the secondary oscillator; it applies only to the clock card with the inferior oscillator when mixed clock oscillator types are used in the TimeHub 5500 system.

This keyword can set how far off in fractional frequency the incoming signal can be from the secondary oscillator and still have this clock card successfully track it.

The keyword format is:

PIRANGESEC=<value>

Parameter	Value	Description
<value>	10 to 10000	Range in ppb (parts per billion = parts in 10^9)

Command Example:

```
RTRV-EQPT::CLK:SC1071:::PARAMETER=PIRANGESEC;
```

Response Example:

```
SYMMBITS 00-06-18 12:01:04  
M SC1071 COMPLD  
"CLK::PIRANGESEC = 105"  
;
```

PORTAO (Event Reporting Port Number–Working Memory)

This keyword sets the port number for automatic event reporting in working memory. Working memory controls the actual operation of the network.

Note: If the Automatic Output Merge function is disabled (AOMERGE=N), responses and commands will be carried on a separate port from automatic events. If the Automatic Output Merge function is enabled (AOMERGE=Y), events will be carried on the Command/Response Reporting (PORTCDMS) port.

- Setting AOMERGE=Y does not stop events from being reported to the AO port. In this case events are reported to the port specified by PORTAO as well as the command port.

The keyword format is:

PORTAO=<value>

Parameter	Value	Description
<value>	5001 to 20000	Working memory port number for automatic event reporting

Note: Network parameters in working memory cannot be directly modified.

Command Example:

```
RTRV - EQPT:::SC1087:::PARAMETER=PORTAO;
```

Response Example:

```
SYMMBITS 00-06-18 12:01:11  
M SC1087 COMPLD  
"IMC::PORTAO = 7589"  
;
```

PORTAOX (Event Reporting Port Number–Auxiliary Memory)

This keyword sets the port number for automatic event reporting in auxiliary memory. Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network).

Note: If the Automatic Output Merge function is disabled (AOMERGE=N), responses and commands will be carried on a separate port from automatic events. If the Automatic Output Merge function is enabled (AOMERGE=Y), events will be carried on the Command/Response Reporting (PORTCDMS) port.

- Setting AOMERGE= Y does not stop events from being reported to the AO port. In this case events are reported to the port specified by PORTAO as well as the command port.

The keyword format is:

PORTAOX=<value>

Parameter	Value	Description
<value>	5001 to 20000	Auxiliary memory port number for automatic event reporting

Command Example:

```
RTRV - EQPT:::SC1088:::PARAMETER=PORTAOX;
```

Response Example:

```
SYMMBITS 00-06-18 12:01:11  
M SC1088 COMPLD  
"IMC:::PORTAOX = 7589"  
;
```

PORTCMDS (Command/Response Reporting Port Number—Working Memory)

This keyword sets the port number for command and response reporting in working memory. Working memory controls the actual operation of the network.

Note: If the Automatic Output Merge function is enabled (AOMERGE=Y), events, in addition to commands and responses, will be carried on this port.

The keyword format is:

PORTCMDS=<value>

Parameter	Value	Description
<value>	5001 to 20000	Working memory port number for command and response reporting

Note: Network parameters in working memory cannot be directly modified.

Command Example:

```
ED-EQPT:::SC4:::PORTCMDS=7588;
```

Response Example:

```
SYMMBITS 01-05-29 10:41:16
M SC4 DENY
  "IDNV"
  /* Input Data Not Valid */
  /* Cannot directly set this parameter */
;
```

PORTCMDSX (Command/Response Reporting Port Number–Auxiliary Memory)

This keyword sets the port number for command and response reporting in auxiliary memory. Auxiliary memory contains a backup copy of network parameters in working memory (working memory controls the actual operation of the network).

Note: If the Automatic Output Merge function is enabled (AOMERGE=Y), events, in addition to commands and responses, will be carried on this port.

The keyword format is:

PORTCMDSX=<value>

Parameter	Value	Description
<value>	5001 to 20000	Auxiliary memory port number for command and response reporting

Command Example:

```
RTRV - EQPT::IMC:SC1131:::PARAMETER=PORTCMDSX;
```

Response Example:

```
SYMMBITS 00-06-18 12:01:28  
M SC1131 COMPLD  
"IMC::PORTCMDSX = 5001"  
;
```

PRC5MHZ (PRC 5MHz Signal)

This keyword specifies a 5 MHz or 10 MHz signal on the PRC input channel. The keyword format is:

PRC5MHZ=<value>

Parameter	Value	Description
<value>	Y	5 MHz signal on the PRC input channel
	N	10 MHz signal on the PRC input channel

Note: This keyword should only be used with an <aid> of CLK-0.

PRIORITY (Input Priority)

This keyword specifies a priority for an input channel. A lower number represents a higher priority. The channel priority is used by the selection algorithm in determining which channel will be tracked. For all channels with the same priority value, the lowest numbered channel will be considered to have top priority. For remote shelf configuration, PRIORITY is also used to determine which DS1 SSM input to use (CLK-1 or CLK-2) if both SSM inputs are enabled and providing valid SSM. The keyword format is:

PRIORITY=<value>

Parameter	Value	Description
<value>	1 to 9	Input channel priority

Command Example:

```
RTRV-SYNC::CLK-0:SC1162:::PARAMETER=PRIORITY;
```

Response Example:

```
SYMMBITS 00-06-18 12:01:42  
M SC1162 COMPLD  
"CLK-0::PRIORITY = 9"  
;
```

QCUTOFF (Quality Cutoff)

This keyword specifies the minimum SSM quality level required for an input to be used. SSM sync mode must be enabled (SYNCMDE=SSM) for this keyword to operate. The input will be disqualified if the current SSM value exceeds QCUTOFF. The keyword format is:

QCUTOFF=<value>

Parameter	Value	Description
<value>	0 to 8	SSM quality level

Command Example:

```
RTRV-SYNC::CLK-0:SC1206:::PARAMETER=QCUTOFF;
```

Response Example:

```
SYMMBITS 00-06-18 12:02:00  
M SC1206 COMPLD  
"CLK-0::QCUTOFF = 6"  
;
```

QLEVEL (Quality Level)

This keyword specifies the assumed SSM quality level for the specified input channel. This assumed SSM level is used when SSM has been disabled (SSMENB=N). The assumed SSM level is always used for the PRC input. The keyword format is:

QLEVEL=<value>

Parameter	Value	Description
<value>	1	Stratum 1 Traceable (PRS)
	2	Synchronized – Traceability Unknown (STU)
	3	Stratum 2 Traceable (ST2)
	4	Transit Node Clock Traceable (TNC)
	5	Stratum 3E Traceable (ST3E)
	6	Stratum 3 Traceable (ST3)
	7	SONET Minimum Clock (SMC)
	8	Stratum 4 Traceable (ST4)
	9	Do not use for synchronization (DUS)

Command Example:

```
RTRV - SYNC :: CLK-0:SC1293:::PARAMETER=QLEVEL;
```

Response Example:

```
SYMMBITS 00-06-18 12:02:38  
M SC1293 COMPLD  
"CLK-0::QLEVEL = 6"  
;
```

REVERT (Revertive Mode)

This keyword controls how an input reference is chosen in automatic and manual mode. The keyword format is:

REVERT=<value>

Parameter	Value	Description
<value>	Y	Highest priority qualified input is always chosen as the active input
	N	Current input remains active until it is disqualified

RPTALL (Report All)

When this keyword is set to Y, events are not filtered based on whether a clock card is active. The initial occurrence (setting) of the event condition, the clearing of the event condition (for non-transient events), and the reporting of the event by Retrieve Condition (RTRV-COND) or Retrieve Alarm Condition (RTRV-ALM) occur regardless of whether the clock card is active. Examples:

- The loss of an input signal is reported by both clock cards.
- Both cards reports which input is being tracked.

When this keyword is set to N, redundant reports of input related events are prevented. The keyword format is:

RPTALL=<value>

Parameter	Value	Description
<value>	Y	Both clock cards report all active events
	N	Events are filtered from the inactive clock card

Note: This keyword has no effect on the Event Log (each clock maintains its own event log, and will log all of its events for which the LOG property is set to Y). The Retrieve Log (RTRV-LOG) command may either specify which log is to be retrieved, or, if it does not specify, the log from the “active” clock will be retrieved. By contrast, however, the automatic output (AO) log only contains entries for those events that were reported by automatic output messages.

SCRAMBLE (Scramble Communication)

This keyword allows an encryption for communications to and from the TimeHub 5500. It requires use of the TimePictra software and a network connection to the LAN port of the TimeHub 5500. The keyword format is:

SCRAMBLE=<value>

Parameter	Value	Description
<value>	Y	Encryption for communications is enabled
	N	Encryption for communications is disabled

Notes:

1. Changing the value of SCRAMBLE will close the network connection.
2. If the SCRAMBLE value is set to Y over the LAN port, the network program being used to communicate with the TimeHub 5500 must also be capable of supporting the Scramble algorithm. Otherwise, the Scramble function will have to be disabled via the Local Port.
3. The Local port is not affected by the SCRAMBLE keyword setting.

SELMDE (Selection Mode)

This keyword controls whether the selection of the active timing reference will be performed automatically by the TimeHub 5500 or directly selected by the user.

Note: This keyword is only available in clock card firmware versions 4236B or later. Firmware version can be observed in RTRV-NETTYPE-ALL response.

The keyword format is:

SELMDE=<value>

Parameter	Value	Description
<value>	AUTO	TimeHub will automatically select the qualified input to use as the active timing reference. The actual choice will depend on PRIORITY and SYNCMDE (see those keyword topics for details).
	MANUAL	<p>When selected, an attempt will be made to use the requested channel as the active timing reference. The requested channel is determined by the MANCHAN setting (see MANCHAN keyword).</p> <p>If the requested channel is not qualified at the time SELMDE is set to MANUAL, the SELMDE setting will become AUTO.</p> <p>Once the MANUAL setting has been accepted, if the requested channel later becomes disqualified for any reason, the SELMDE setting will become auto.</p>
	FORCED	<p>When selected, an attempt will be made to use the requested channel as the active timing reference. The requested channel is determined by the MANCHAN setting (see MANCHAN keyword).</p> <p>If the requested channel is not qualified at the time SELMDE is set to FORCED, the clock card will enter holdover mode (even if there are other qualified inputs). If the requested channel subsequently becomes qualified, it will become the active timing reference. The SELMDE setting will remain FORCED until changed by command.</p>

SELMDE (Selection Mode) (cont'd)

Command Example (for setting SELMDE to MANUAL setting):

```
ED - EQPT :: CLK : SV46 :: SELMDE=MANUAL ;
```

Retrieve the SELMDE setting with the following command:

```
RTRV - EQPT :: CLK : SV49 :: PARAMETER=SELMDE ;
```

Which generates a response similar to:

```
SYMMBITS 02-12-13 10:50:37  
M SV49 COMPLD  
"CLK :: SELMDE=FORCED"  
;
```

In this case the setting was FORCED.

SNGCLK (Single Clock)

This keyword allows establishment of alarm behavior associated with single clock card operation. If normal operation for a shelf is with a single clock card (non-redundant operation), it may be preferable to establish a non-alarm for this condition by setting the keyword to Y. The keyword format is:

SNGCLK=<value>

Parameter	Value	Description
<value>	Y	Single clock card operation will not generate an alarm
	N	Single clock card operation will generate an alarm

Command Example (for setting single clock operation as normal operating mode):

```
ED-EQPT::IMC:SC01::SNGCLK=Y;
```

Response Example:

```
SYMMBITS 01-06-19 08:09:52  
M SC01 COMPLD  
;
```

Command Example (for retrieving SNGCLK setting):

```
RTRV-EQPT::IMC:SC02::PARAMETER=SNGCLK;
```

Response Example:

```
SYMMBITS 01-06-19 08:11:09  
M SC02 COMPLD  
"IMC::SNGCLK=Y"  
;
```

Notes:

1. If the SNGCLK value is set to Y and two clock cards are installed, the non-alarmed event SGLSWMM (single clock card setting mismatch) will be set, indicating that although single clock operation has been specified there are actually dual clock cards in this shelf. This condition is reported to inform the user that if a clock card is removed, no alarm will be generated. If SNGCLK is subsequently set to N, the SGLSWMM event will be cleared.
2. Regardless of SNGCLK setting, if there is no clock card in the shelf, a CLKGONE event will be generated.

SNGCLK (Single Clock) (cont'd)

3. The setting of SNGCLK is stored on the management card (090-55542-01). The value is retained even if this card is power-cycled. Note that if the management card is replaced, it may be necessary to configure the SNGCLK setting.
4. The SNGCLK functionality is available starting with management card firmware version 4109D or higher. The firmware version can be checked with the RTRV-NETTYPE-ALL command.
5. If using Symmetricom's TimePictra version 1.0 management software, the SNGCLK setting can be configured by using the TimePictra Passthru feature.
6. If using Symmetricom's TimeScan THC version 1.0 management software, the SNGCLK setting can be configured by using the Communication form and entering the command manually.

SPRDCHN (Spread Channels)

This keyword defines which channels will be used for the SPRD measurement. Spread is the maximum difference of FFOFF over the channels specified. The default is all channels. A minimum of two channels must be selected. Channels with no signal are automatically excluded from SPRD. The keyword format is:

SPRDCHN=<value>

Parameter	Value	Description
<value>	0 to 8	List of input channels to be included.

Keyword Examples:

SPRDCHN=2&4

The keyword in this example includes channels 2 and 4 for SPRD measurements.

SPRDCHN=2&&4

The keyword in this example includes channels 2 through 4 for SPRD measurements.

Note: SPRD is recalculated if a measurement is restarted (for example, using the Initialize Register [INIT-REG] command) on a channel that is included in the SPRD calculation.

Command Example:

```
ED-EQPT::CLK:SC1419:::SPRDCHN=1&&4;
```

Response Example:

```
SYMMBITS 00-06-18 12:03:35  
M SC1419 COMPLD  
;
```

SQUELCH (Squelch Output)

This keyword specifies which output channels are to be squelched. The keyword format is:

SQUELCH=<value>

Parameter	Value	Description
<value>	Y	Output channel is squelched
	N	Output channel is not squelched

SSMENB (Read SSM Bits)

This keyword enables the reading of the SSM bit on the specified input. If this function is disabled (SSMENB=N), the assumed SSM value (QLEVEL) will be used instead. For an input SSM bit to be read correctly, the input format must be set to Y (ESF=Y). This keyword has no effect on the PRC (Primary Reference Clock) input. The keyword format is:

SSMENB=<value>

Parameter	Value	Description
<value>	Y	SSM is enabled
	N	SSM is disabled

SSMPRI (SSM Priority Grouping)

When in SSM mode, this keyword provides a means to select between different inputs that all have the same SSM value. If multiple inputs have an identical SSM value that is the lowest (numerically) and are equally qualified in SSM terms to be the input, the SSMPRI provides a means to select one input over another.

The SSM selection process will always choose an input of the lowest valued SSMPRI, but will not revert within the same SSMPRI value.

For example, the system would choose input 1 under the following conditions:

- inputs 1–4 are all qualified at CURRSSM=4,
- input 1 has SSMPRI of 2,
- inputs 2 and 3 have SSMPRI of 5, and
- input 4 has SSMPRI of 7.

If input 1 becomes disqualified, the system must select 2 or 3. If they are the same and neither is the current input, the system selects the one with the lowest PRIORITY value.

If input 2 also becomes disqualified, the system uses input 3. If input 2 becomes requalified, the system remains on input 3 because inputs 2 and 3 have the same SSMPRI. If input 1 becomes requalified, the system uses input 1 because it has a lower SSMPRI.

The keyword format is:

SSMPRI=<value>

Parameter	Value	Description
<value>	0 to 8	SSM priority

Command Example:

```
RTRV - SYNC :: CLK-0:SC1643 :: PARAMETER=SSMPRI ;
```

Response Example:

```
SYMMBITS 00-06-18 12:05:43  
M SC1643 COMPLD  
"CLK-0::SSMPRI = 8"  
;
```

SYNCMDE (Sync Mode)

Note: The behavior associated with this keyword has changed as of clock card firmware version 4236B or later. Firmware version can be observed in RTRV-NETTYPE-ALL response. Two descriptions are provided: one for firmware versions prior to 4236B, and one for firmware version 4236B and later.

Clock Card Firmware prior to 4236B

This keyword controls how the input channel is chosen as a synchronization source. The keyword format is:

SYNCMDE=<value>

Parameter	Value	Description
<value>	AUTO	The input channel is chosen based on the given priorities among the available channels. Channel availability is determined by measurements on the channel and by the channel enabled.
	MANUAL	The input channel is chosen based on manual selection, unless the given input is disqualified, in which case, it goes into automatic mode.
	SSM	The input channel is chosen based on the SSM algorithm, which combines the measurements and qualifying conditions with the quality levels for each channel; the highest priority amongst the qualified input channels is chosen.
	FORCED	The input channel is chosen based on manual selection, unless the given input is disqualified, in which case, it goes into holdover.

Command Example:

```
RTRV - EQPT::CLK:SC1687:::PARAMETER=SYNCMDE;
```

Response Example:

```
SYMMBITS 00-06-18 12:06:01  
M SC1687 COMPLD  
"CLK::SYNCMDE = MANUAL"  
;
```

SYNCMDE (Sync Mode) (cont'd)

Clock Card Firmware 4236B or Later

This keyword controls whether or not Synchronization Status Messaging (SSM) will be used as a criteria for qualification of input channels. The keyword format is:

SYNCMDE=<value>

Parameter	Value	Description
<value>	AUTO	The qualification of input channels will not use SSM as one of its criteria. The qualified input that is actually selected as the active reference will depend on SELMDE and PRIORITY settings.
	SSM	<p>The qualification of input channels will use SSM as one of its criteria. If the SSM quality value is worse than that of the internal oscillator on the clock card, the input will not be able to qualify.</p> <p>The qualified input that is selected to be active will depend on SELMDE and PRIORITY settings. If SELMDE=AUTO, the selected active reference will be the qualified input having the best SSM value.</p>

Command Example (set SYNCMDE to AUTO):

```
ED - EQPT::CLK:SV54::SYNCMDE=AUTO;
```

Retrieve the current SYNCMDE setting with:

```
RTRV - EQPT::CLK:SV55::PARAMETER=SYNCMDE;
```

Which produces a response similar to:

```
SYMMBITS 02-12-13 11:26:15  
M SV55 COMPLD  
"CLK::SYNCMDE = AUTO"  
;
```


TCONST (Time Constant)

This keyword sets the loop tracking time constant for each input once the system is fully warmed up. If a value other than those listed below is given, the nearest one from the list below will be substituted. For example, if a value of 191 was assigned, a value of 192 would be implemented. The keyword format is:

TCONST=<value>

Parameter	Value	Description
<value>	192	Time constant
	768	
	3072	
	12288	
	49152	

Command Example:

```
RTRV-SYNC::CLK-4:SC1729::PARAMETER=TCONST;
```

Response Example:

```
SYMMBITS 00-06-18 12:06:31  
M SC1729 COMPLD  
"CLK-4::TCONST = 49152"  
;
```

TCONSTSEC (Time Constant for Secondary Oscillator)

This keyword sets the time constant for the secondary oscillator; it applies only to the clock card with the inferior oscillator when mixed clock oscillator types are used in the TimeHub 5500 system.

This keyword can be used to set the loop tracking time constant for each input. The assigned value applies only after the system is fully warmed up. This "slow" tracking mode has a default value based upon the type of clock card oscillator used. The time constant can be changed to one of several other values if it is determined that the default value is not appropriate given the characteristics of the reference inputs.

The keyword format is:

TCONSTSEC=<value>

Parameter	Value	Description
<value>	102	Time constant
	190	
	384	
	1824	
	24864	

Command Example:

```
RTRV - SYNC :: CLK - 2 : SC1745 :: : PARAMETER = TCONSTSEC ;
```

Response Example:

```
SYMMBITS 00-06-18 12:06:40  
M SC1745 COMPLD  
"CLK-2::TCONSTSEC = 384"  
;
```

TIDQUIET (TID Quiet)

This keyword causes the system to suppress the DENY response that is normally generated when the target identifier <tid> specified in the current command does not match the current system identifier <sid>. The keyword format is:

TIDQUIET=<value>

Parameter	Value	Description
<value>	Y	DENY response is not displayed when the <tid> specified is not the same as the current <sid>
	N	DENY response is displayed when the <tid> specified is not the same as the current <sid>

TRAFFIC (Traffic Data Pattern)

This keyword specifies a data pattern to be carried in the traffic time slots of the output driver card.

Note: 255 (all ones) is the preferred value because this causes the greatest number of clock pulses to occur.

The keyword format is:

TRAFFIC=<value>

Parameter	Value	Description
<value>	127	Traffic pattern value that produces one zero
	191	
	223	
	239	
	247	
	251	
	253	
	254	
255	Traffic pattern value that produces all ones	

Command Example:

```
RTRV - EQPT::OUTA:SC1769:::PARAMETER=TRAFFIC;
```

Response Example:

```
SYMMBITS 00-06-18 12:06:52  
M SC1769 COMPLD  
"OUTA::TRAFFIC = 255"  
;
```

USESUBRCK

This keyword provides a method for adding the shelf-identifying prefix for a shelf that currently contains no expansion shelves. This prefix, S0, provides a method for indentifying (in a multiple shelf system) that that particular response item is associated with the master shelf (as opposed to an expansion shelf). For example, there can be an output card in slot 4B in a master shelf and in any expansion shelf in its 4B location. The shelf prefix identifies which shelf the card is actually in (S0 = Master shelf, S1 = first expansion shelf, ...).

Note that when there actually are one or more expansion shelves in the system, the S0 prefix will automatically be used to identify the master shelf. The sole purpose of USESUBRCK is to enable the S0 prefix when there are no expansion shelves attached. The likely reason to do this is for consistency with other shelves in the network that may contain expansion shelves, where it might be preferred to have all shelves providing a shelf prefix. The keyword format is:

USESUBRCK=<value>

Parameter	Value	Description
<value>	Y	Enable the S0 prefix response for a master shelf that contains no expansion shelves
	N	Disable the S0 prefix response for a master shelf that contains no expansion shelves. This is the default setting

Note: Setting USESUBRCK=N in a system that contains expansion shelves does not cause the S0- prefix to be omitted.

Command Examples:

```
ED - EQPT :: IMC : SV13 :: USESUBRCK=Y ;
```

This is the response:

```
SYMMBITS 03-03-24 10:23:14  
M SV13 COMPLD  
;
```

To retrieve the USESUBRCK setting, send:

```
RTRV - EQPT :: IMC : SC14 :: PARAMETER=USESUBRCK ;
```

USESUBRCK (cont'd)

This is the response:

```
SYMMBITS 03-03-24 10:25:05
M SC14 COMPLD
"SO-IMC::USESUBRCK=Y"
;
```

indicating that the shelf is configured with USESUBRCK enabled.

The following example illustrates how the USESUBRCK setting affects the RTRV-NETTYPE-ALL response on a TimeHub configured with only a master shelf:

USESUBRCK set to N:

```
send RTRV-NETTYPE-ALL:::SV48;
```

produces the following response (note that there are no SO- on response lines):

```
SYMMBITS 03-03-24 15:21:23
M SV48 COMPLD
"EQPT:Symmetri com,5500,EQPT"
"IMC: ,090-55542-01-A, ,R4236B,DOTPNONAAA,106063"
"CLK1: ,090-55514-01-A, ,R4236B,0000001,DOTPKPKAAA,
299461"
"CLK2: ,090-55514-02, ,R4236B,J44993,DOTPKRKAAA,299462"
"OUT6C: ,090-55581-01-A, ,R4209A,00J21559,DOTPJNOAAA,
267799,DS1,DS1"
"OUT8D: ,090-55581-01-B, ,R4209A,00J43250,DOTPJNOAAA,
267799,CC"
;
```

USESUBRCK (cont'd)

USESUBRCK set to Y:

```
send RTRV-NETTYPE-ALL:::SV48;
```

produces the following response (note S0- now present on response lines):

```
SYMMBITS 03-03-24 15:25:30
M SV49 COMPLD
"EQPT:Symmetricom,5500,EQPT"
"S0-IMC: ,090-55542-01-A, ,R4236B,J44568,DOTPNONAAA,
106063"
"S0-CLK1: ,090-55514-01-A, ,R4236B,0000001,DOTPKPKAAA,
299461"
"S0-CLK2: ,090-55514-02, ,R4236B,J44993,DOTPKRKAAA,
299462"
"S0-OUT6C: ,090-55581-01-A, ,R4209A,00J21559,DOTPJNOAAA,
267799,DS1,DS1"
"S0-OUT8D: ,090-55581-01-B, ,R4209A,00J43250,DOTPJNOAAA,
267799,CC"
;
```

WTRSS (Wait Time to Restore Synchronization Source)

This keyword sets the period of time (wait time) an input channel is provided to re-establish all its operating parameters before it will be considered for use as a synchronization source. The keyword format is:

WTRSS=<value>

Parameter	Value	Description
<value>	0 to 1000	Time in seconds

Command Example:

```
RTRV-EQPT:::SC1801:::PARAMETER=WTRSS;
```

Response Example:

```
SYMMBITS 00-06-18 12:07:05  
M SC1801 COMPLD  
"CLK::WTRSS = 731"  
;
```


YEAR4

This keyword provides a method for controlling the format of the year information that appears in the TL1 response headers. With YEAR4=N, the last two digits of the year are provided in the response header (e.g., 2006 is expressed as 06). With YEAR4=Y, all four digits of the year are provided. The keyword format is:

YEAR4=<value>

Parameter	Value	Description
<value>	Y	Response headers will contain four-digit year
	N	Response headers will contain last two digits of year. This is the default

Command Examples:

Enable YEAR4:

```
ED-EQPT::IMC:SV13:::YEAR4=Y;
```

This is the response (note that the four-digit year is already in the response):

```
SYMMBITS 2003-03-24 17:09:00  
M SV13 COMPLD  
;
```

Disable YEAR4:

```
ED-EQPT::IMC:SV13:::YEAR4=N;
```

This is the response (note that two-digit year is already in the response):

```
SYMMBITS 03-03-24 17:11:49  
M SV13 COMPLD  
;
```

Retrieve the current setting of YEAR4 with:

```
RTRV-EQPT::IMC:SC14:::PARAMETER=YEAR4;
```

YEAR4 (cont'd)

This is the response:

```
SYMMBITS 03-03-24 17:13:34  
M SC14 COMPLD  
"IMC::YEAR4 = N"  
;
```

indicating that, in this case, YEAR4 is disabled.

Performance Monitoring

This chapter describes input signal performance monitoring measurements.

Chapter 4

Overview

The TimeHub 5500 continuously makes phase deviation measurements on each input reference. Network performance parameters based on these measurements are computed and updated periodically.

Depending on the type of measurement, the time periods are either averaging time or observation time and are performed on a single input port or across all enabled input ports.

Measurement properties can be displayed to determine the measurement criteria currently active for an input port, or specified to determine how measurement results affect system operation.

Measurements

Performance monitoring measurement types are listed on the following pages. After the measurement name, a definition is given. The definition is followed by the actual command that can be used to display the measurement.

The response format shows how the response will appear. Command and response examples are shown where applicable.

Fractional Frequency Offset

This measurement is displayed in parts-per-million (ppm) and measures an input port's Fractional Frequency Offset (FFOFF) at specific averaging time intervals. The command format is:

```
RTRV-PM[-TSG]:[<tid>]:CLK-a:<ctag>::FFOFF;
```

Parameter	Value	Description
CLK-a	a = 0 to 4	Input port number of active clock card 555xx-01 (5 input)
	a = 0 to 8	Input port number of active clock card 555xx-02 (9 input)

Response Format:

```
<sid> <date> <time>
M <ctag> COMPLD
  "CLK a-b:FFOF-a,<monval>,<status>"...
;
```

The parameters which will be displayed in the response are listed below.

Parameter	Value	Description
CLK a-b	a = 1 or 2	Clock card from which data was collected
	b = 1 to 4	Input port number of clock card from which data was collected
FFOFF-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	Performance monitoring measurement type, where a is the averaging time interval (refer to Table E for details). Variable a can also be appended to FFOFF in RTRV-PM to obtain a response for only that measurement time
<monval>	Calculated values for averaging times in ppm	
<status>	COMPL	Averaging time calculation was completed
	NA,NA	Averaging time calculation is not yet available

Fractional Frequency Offset (cont'd)

Table E lists FFOFF measurements and the measurement time period for an input port.

Table E. FFOFF Measurements and Time Periods for Single Input Port

Measurement Averaging Time	First Data Available After	Updated Every	Includes Data from Last
FFOFF-3S	3 s	1 s	3 s
FFOFF-12S	12 s	4 s	12 s
FFOFF-48S	48 s	16 s	48 s
FFOFF-192S	192 s	64 s	192 s
FFOFF-768S	768 s	256 s	768 s
FFOFF-3072S	3072 s	1024 s	3072 s

Command Example:

```
RTRV - PM::CLK-4:SC1::FFOFF;
```

The response to the command in this example displays FFOFF information about input port 4.

Response Example:

```
SYMMBITS 00-06-15 12:07:38
M SC1 COMPLD
"CLK1-4:FFOFF-3S,2.000000,COMPL"
"CLK1-4:FFOFF-12S,2.000000,COMPL"
"CLK1-4:FFOFF-48S,2.000000,COMPL"
"CLK1-4:FFOFF-192S,2.000000,COMPL"
"CLK1-4:FFOFF-768S,NA,NA"
"CLK1-4:FFOFF-3072S,NA,NA"
;
```

The response in this example shows FFOFF values calculated for averaging times of 3 seconds, 12 seconds, 48 seconds, and 192 seconds for input port 4 of clock card 1. The values for averaging times of 768 seconds and 3072 seconds are not yet available, but will become available as the system collects data.

Frequency Spread

This measurement is displayed in ppm and measures the Frequency Spread (SPRD) of the input ports at specific averaging times. SPRD is the maximum difference of FFOFF over all input ports unless some ports have been excluded from the measurement by the Edit Equipment (ED-EQPT) command.

Note: It is recommended to use SPRD instead of FFOFF for performance monitoring because SPRD gives a view of relative performance across all ports. If a problem is observed (for example, if SPRD is too large), FFOFF values for individual ports may be useful in diagnosing the problem.

SPRD is recalculated if a measurement is restarted on a port that is included in the SPRD calculation. The command format is:

```
RTRV-PM[-TSG]:[<tid>]:CLK:<ctag>::SPRD;
```

Response Format:

```
<sid> <date> <time>
M <ctag> COMPLD
  "CLK a:SPRD-a,<monval>,<status>"...
;
```

The parameters which will be displayed in the response are listed below.

Parameter	Value	Description
CLK a	a = 1 or 2	Clock card from which data was collected
SPRD-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	Performance monitoring measurement type, where a is the averaging time (refer to Table F for details). Variable a can also be appended to SPRD in RTRV-PM to obtain a response for only that measurement time
<monval>	Calculated values for averaging times in ppm	
<status>	COMPL	Averaging time calculation was completed
	NA,NA	Averaging time calculation is not yet available

Frequency Spread (cont'd)

Table F lists SPRD measurements and the measurement time period for an input port.

Table F. SPRD Measurements and Time Periods for All Input Ports

Measurement Averaging Time	First Data Available After:	Updated Every:	Includes Data from Last:
SPRD-3S	See Note 1	See Note 1	See Note 1
SPRD-12S	See Note 1	See Note 1	See Note 1
SPRD-48S	See Note 1	See Note 1	See Note 1
SPRD-192S	See Note 1	See Note 1	See Note 1
SPRD-768S	See Note 2	See Note 2	See Note 2
SPRD-3072S	See Note 2	See Note 2	See Note 2

Note 1: Because SPRD depends on FFOFF measurements from multiple ports, and these FFOFF values may be updated at different times, SPRD measurements are not updated as regularly as the other measurements. For averaging times of 3 seconds, 12 seconds, 48 seconds, and 192 seconds. SPRD will be updated approximately once per minute.

Note 2: For longer averaging times, SPRD will be updated when new FFOFF values become available, provided at least 1 minute has elapsed since the last update (in some cases the updates may occur more often).

Command Example:

```
RTRV - PM::CLK:SC1::SPRD;
```

The command in this example displays SPRD information about the input ports on the active clock card.

Frequency Spread (cont'd)

Response Example:

```
SYMMBITS 01-05-31 10:46:29
M SC1 COMPLD
"CLK-1:SPRD-3S,2.000000,COMPL"
"CLK-1:SPRD-12S,2.000000,COMPL"
"CLK-1:SPRD-48S,2.000000,COMPL"
"CLK-1:SPRD-192S,2.000000,COMPL"
"CLK-1:SPRD-768S,NA,NA"
"CLK-1:SPRD-3072S,NA,NA"
;
```

The response in this example shows SPRD values calculated for averaging times of 3 seconds, 12 seconds, 48 seconds, and 192 seconds. The values for averaging times of 768 seconds and 3072 seconds are not yet available, but will become available as the system collects data.

Latest Maximum Relative Time Interval Error

This measurement is displayed in nanoseconds (ns) and measures an input port's Latest Maximum Relative Time Interval Error (LMRTIE) at specific observation time intervals. LMRTIE is based on the maximum phase deviation over an interval of time.

LMRTIE values from 1 second to 24 hour observation times are available every 15 minutes. The 1 second data is available after 1 second and is updated each 1 second. The command format is:

```
RTRV-PM[-TSG]:[<tid>]:CLK-a:<ctag>::LMRTIE;
```

Parameter	Value	Description
CLK-a	a = 0 to 4	Input port number of active clock card 555xx-01 (5 input)
	a = 0 to 8	Input port number of active clock card 555xx-02 (9 input)

Response Format:

```
<sid> <date> <time>
M <ctag> COMPLD
  "CLK a-b:LMRTIE-a,<monval>,<status>,,,<meas time>"...
;
```

The parameters which will be displayed in the response are listed below.

Parameter	Value	Description
CLK a-b	a = 1 or 2	Clock card from which data was collected
	b = 1 to 4	Input port number of clock card from which data was collected
LMRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	Performance monitoring measurement type, where a is the observation time interval (refer to Table G for details). Variable a can also be appended to LMRTIE in RTRV-PM to obtain a response for only that measurement time
<monval>	Calculated values for maximum phase variation of the input signal in ns	

Parameter	Value	Description
<status>	COMPL	Observation time calculation was completed
	NA,NA	Observation time calculation is not yet available

Latest Maximum Relative Time Interval Error (cont'd)

Parameter	Value	Description
<meas time>		Measurement time in which data was collected. Once the measurement time reaches 24 h, data older than 24 h will be lost as new data is collected.

Table G lists LMRTIE measurements and the measurement time period for an input port.

Table G. LMRTIE Measurements and Time Periods for Single Input Port

Measurement Observation Time	First Data Available After	Updated Every	Includes Data from Last
LMRTIE-1S	1 s	1 s	1 s
LMRTIE-1M	1 min	1 min	1 min
LMRTIE-15M	15 min	15 min	15 min
LMRTIE-30M	30 min	15 min	30 min
LMRTIE-1H	1 h	15 min	1 h
LMRTIE-2H	2 h	15 min	2 h
LMRTIE-8H	8 h	15 min	8 h
LMRTIE-24H	24 h	15 min	24 h

Command Example:

```
RTRV-PM::CLK-4:SC1::LMRTIE;
```

The response to the command in this example displays LMRTIE information about input port 4.

Latest Maximum Relative Time Interval Error (cont'd)

Response Example:

```
SYMMBITS 01-05-31 10:57:58
M SC1 COMPLD
"CLK-4:LMRTIE-1S,2.000000,COMPL,,75-MIN"
"CLK-4:LMRTIE-1M,2.000000,COMPL,,75-MIN"
"CLK-4:LMRTIE-15M,2.000000,COMPL,,75-MIN"
"CLK-4:LMRTIE-30M,2.000000,COMPL,,75-MIN"
"CLK-4:LMRTIE-1H,2.000000,COMPL,,75-MIN"
"CLK-4:LMRTIE-2H,NA,NA,,75-MIN"
"CLK-4:LMRTIE-8H,NA,NA,,75-MIN"
"CLK-4:LMRTIE-24H,NA,NA,,75-MIN"
;
```

The response in this example shows that LMRTIE data has been collected over the past 75 minutes (known as measurement time), and LMRTIE values have been calculated for observation times of 1 second, 1 minute, 15 minutes, 30 minutes, and 1 hour. The values for observation times 2, 8, and 24 hours are not yet available because the system has not been running long enough to collect that data. They will become available as the system continues to collect data.

Maximum Relative Time Interval Error

This measurement is displayed in ns and measures an input port's Maximum Relative Time Interval Error (MRTIE) at specific observation time intervals. MRTIE is based on the maximum phase deviation over an interval of time.

MRTIE values from 1 second to 24 hour observation times are available every 15 minutes. The command format is:

```
RTRV-PM[-TSG]:[<tid>]:CLK-a:<ctag>::MRTIE;
```

Parameter	Value	Description
CLK-a	a = 0 to 4	Input port number of clock active card 555xx-01 (5 input)
	a = 0 to 8	Input port number of clock active card 555xx-02 (9 input)

Response Format:

```
<sid> <date> <time>
M <ctag> COMPLD
  "CLK a-b:MRTIE-a,<monval>,<status>,,,<meas time>"...
;
```

The parameters which will be displayed in the response are listed below.

Parameter	Value	Description
CLK a-b	a = 1 or 2	Clock card from which data was collected
	b = 1 to 4	Input port number of clock card from which data was collected
MRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	Performance monitoring measurement type, where a is the observation time interval (refer to Table H for details). Variable a can also be appended to MRTIE in RTRV-PM to obtain a response for only that measurement time
<monval>	Calculated values for maximum phase variation of the input signal in ns	
<status>	COMPL	Averaging time calculation was completed
	NA,NA	Averaging time calculation is not yet available

Maximum Relative Time Interval Error (cont'd)

Parameter	Value	Description
<meas time>		Measurement time in which data was collected. Once the measurement time reaches 24 h, data older than 24 h will be lost as new data is collected.

Table H lists MRTIE measurements and the measurement time period for an input port.

Table H. MRTIE Measurements and Time Periods for Single Input Port

Measurement Observation Time	First Data Available After	Updated Every	Includes Data from Last
MRTIE-1S	15 min	15 min	24 h
MRTIE-1M	15 min	15 min	24 h
MRTIE-15M	15 min	15 min	24 h
MRTIE-30M	30 min	15 min	24 h
MRTIE-1H	1 h	15 min	24 h
MRTIE-2H	2 h	15 min	24 h
MRTIE-8H	8 h	15 min	24 h
MRTIE-24H	24 h	15 min	24 h

Command Example:

```
RTRV - PM::CLK-4:SC1::MRTIE;
```

The response to the command in this example displays MRTIE information about input port 4.

Maximum Relative Time Interval Error (cont'd)

Response Example:

```
SYMMBITS 00-06-15 12:07:38
M SC1 COMPLD
"CLK1-4:MRTIE-1S,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-1M,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-15M,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-30M,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-1H,2.000000,COMPL,,75-MIN"
"CLK1-4:MRTIE-2H,NA,NA,,75-MIN"
"CLK1-4:MRTIE-8H,NA,NA,,75-MIN"
"CLK1-4:MRTIE-24H,NA,NA,,75-MIN"
;
```

The response in this example shows MRTIE values calculated over the past 75 minutes for observation time intervals of 1 second, 1 minute, 15 minutes, 30 minutes, and 1 hour for input port 4 of clock card 1. The values for time intervals of 2 hours, 8 hours, and 24 hours are not yet available, but will become available as the system collects data.

Time Deviation

This measurement is displayed in ns and measures an input port's Time Deviation (TDEV). TDEV is the input's port's RMS value of second difference of phase deviation expressed in time units for various averaging times.

The mathematical formula for TDEV computation is based on Type II of the Efficient Algorithms for Computing Time Variance (TVAR) and TDEV.

TDEV values are computed based on 98 average phase deviation values separated by τ , the averaging time. Therefore, measurement time is 98 times the averaging time. For example, a 16 second TDEV value is based on 1,568 seconds of phase measurements in the immediate past.

The command format is:

```
RTRV-PM[-TSG]:[<tid>]:CLK-a:<ctag>::TDEV;
```

Parameter	Value	Description
CLK-a	a = 0 to 4	Input port number of active clock card 555xx-01 (5 input)
	a = 0 to 8	Input port number of active clock card 555xx-02 (9 input)

Response Format:

```
<sid> <date> <time>
M <ctag> COMPLD
  "CLK a-b:TDEV-a,<monval>,<status>"...
;
```

The parameters which will be displayed in the response are listed below.

Parameter	Value	Description
CLK a-b	a = 1 or 2	Clock card from which data was collected
	b = 1 to 4	Input port number of clock card from which data was collected
TDEV-a	a = 1S, 4S, 16S, 64S, 256S, 1024S	Performance monitoring measurement type, where a is the averaging time (refer to Table 1 for details). Variable a can also be appended to TDEV in RTRV-PM to obtain a response for only that measurement time
<monval>	Calculated values for averaging times in ns	

Time Deviation (cont'd)

Parameter	Value	Description
<status>	COMPL	Averaging time calculation was completed
	NA,NA	Averaging time calculation is not yet available

Table I lists TDEV measurements and the measurement time period for an input port.

Table I. TDEV Measurements and Time Periods for Single Input Port

Measurement Averaging Time	First Data Available After	Updated Every	Includes Data from Last
TDEV-1S	98 s	96 s	98 s
TDEV-4S	392 s	192 s	392 s
TDEV-16S	1568 s	384 s	1568 s
TDEV-64S	6272 s	768 s	6272 s
TDEV-256S	25088 s	1536 s	25088 s
TDEV-1024S	100352 s	3072 s	100532 s

Command Example:

```
RTRV - PM::CLK-4:SC1::TDEV;
```

The response to the command in this example displays TDEV information about input port 4.

Time Deviation (cont'd)

Response Example:

```
SYMMBITS 00-06-15 12:07:38
M SC1 COMPLD
"CLK1-4:TDEV-1S,2.000000,COMPL"
"CLK1-4:TDEV-4S,2.000000,COMPL"
"CLK1-4:TDEV-16S,2.000000,COMPL"
"CLK1-4:TDEV-64S,2.000000,COMPL"
"CLK1-4:TDEV-256S,NA,NA"
"CLK1-4:TDEV-1024S,NA,NA"
;
```

The response in this example shows TDEV values calculated for averaging times of 1 seconds, 4 seconds, 16 seconds, and 64 seconds for input port 4 of clock card 1. The values for averaging times of 256 seconds and 1024 seconds are not yet available, but will become available as the system collects data.

Time Interval Error

This measurement is displayed in ns and measures an input port's Time Interval Error (TIE) over specific observation time intervals. TIE is based on the net phase deviation over an interval of time. It is calculated by taking the phase deviation of the final sample in a block of data and subtracting the phase deviation of the final sample in the previous block of data.

LMRTIE values from 1 second to 24 hour observation times are available every 15 minutes. The 1 second data is available after 1 second and is updated each second.

For example, a 1 minute TIE measurement is the difference in the phase deviation between two samples 1 minute apart. Similarly, a 1 second TIE measurement is the difference between phase deviation samples captured 1 second apart.

The command format is:

```
RTRV-PM[-TSG]:[<tid>]:CLK-a:<ctag>::TIE;
```

Parameter	Value	Description
CLK-a	a = 0 to 4	Input port number of active clock card 555xx-01 (5 input)
	a = 0 to 8	Input port number of active clock card 555xx-02 (9 input)

Response Format:

```
<sid> <date> <time>  
M <ctag> COMPLD  
"CLK a-b:TIE-a,<monval>,<status>"...  
;
```

Time Interval Error (cont'd)

The parameters which will be displayed in the response are listed below.

Parameter	Value	Description
CLK a-b	a = 1 or 2	Clock card from which data was collected
	b = 1 to 4	Input port number of clock card from which data was collected
TIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	Performance monitoring measurement type, where a is the observation time interval (refer to Table J for details). Variable a can also be appended to TDEV in RTRV-PM to obtain a response for only that measurement time
<monval>	Calculated values for maximum phase variation of the input signal in ns	
<status>	COMPL	Observation time calculation was completed
	NA,NA	Observation time calculation is not yet available

Table J lists TIE measurements and the measurement time period for an input port.

Table J. TIE Measurements and Time Periods for Single Input Port

Measurement Observation Time	First Data Available After	Updated Every	Includes Data from Last
TIE-1S	1 s	1 s	1 s
TIE-1M	1 min	1 min	1 min
TIE-15M	15 min	15 min	15 min
TIE-30M	30 min	15 min	30 min
TIE-1H	1 h	15 min	1 h
TIE-2H	2 h	15 min	2 h
TIE-8H	8 h	15 min	8 h
TIE-24H	24 h	15 min	24 h

Time Interval Error (cont'd)

Command Example:

```
RTRV - PM: :CLK-4:SC1::TIE;
```

The response to the command in this example displays TIE information about input port 4.

Response Example:

```
SYMMBITS 00-06-15 12:07:38
M SC1 COMPLD
"CLK1-4:TIE-1S,2.000000,COMPL"
"CLK1-4:TIE-1M,2.000000,COMPL"
"CLK1-4:TIE-15M,2.000000,COMPL"
"CLK1-4:TIE-30M,2.000000,COMPL"
"CLK1-4:TIE-1H,2.000000,COMPL"
"CLK1-4:TIE-2H,NA,NA"
"CLK1-4:TIE-8H,NA,NA"
"CLK1-4:TIE-24H,NA,NA"
;
```

The response in this example shows TIE values for observation time intervals of 1 second, 1 minute, 15 minutes, 30 minutes, and 1 hour for input port 4 of clock card 1. The values for time intervals of 2 hours, 8 hours, and 24 hours are not yet available, but will become available as the system collects data.

Measurement Properties

Measurement property descriptions and factory settings are listed in Table K.

Table K. Measurement Properties

Measurement Property	Measurement Description	Factory Setting
THR	Threshold value, in ns, for TDEV monitored type	0
	Threshold value, in ns, for MRTIE monitored type	0
	Threshold value, in ns, for LMRTIE monitored type	0
	Threshold value, in ppm, for SPRD monitored type	0
	Threshold value, in ppm, for FFOFF monitored type	0
CRI	Indicates whether an input port is qualified (Y) or disqualified (N). Does not apply to SPRD or FFOFF monitored types	N
RPT	Indicates whether an event is generated (Y) or not generated (N) when a threshold is crossed	N
PM	Automatically displays (Y) or does not automatically display (N) each new measurement as it occurs	N
GOOD	Number of consecutive good measurements that must occur following a bad measurement before an input signal can be qualified and for the INMEAS event to be cleared	1



Displaying

To display measurement properties for an input port, the command format is:

```
RTRV-[-TSG]:[<tid>]:<aid>:<ctag>:::PARAMETER=<mo ...>
      SYNC;
```

Parameter	Value	Variables	Description
<aid>	CLK-a	a = 1 to 4	Input port number of clock card. Applies to monitored types other than SPRD.
	CLK	—	All input ports of clock card. Applies to SPRD monitored type only.
<montype>	FFOFF-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	FFOFF monitored type, where a is the averaging time interval in seconds
	LMRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	LMRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	MRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	MRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	SPRD-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	SPRD monitored type, where a is the averaging time interval in seconds
	TDEV-a	a = 1S, 4S, 16S, 64S, 256S, 1024S	TDEV monitored type, where a is the averaging time interval in seconds
	TIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	TIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)

Response Format:

```
<sid> <date> <time>
M <ctag> COMPLD
  "<aid>::<montype>=THR-a&CRI-a&RPT-a&PM-a&GOOD-a:"
;
```


Displaying (cont'd)

The parameters which will be displayed in the response are listed below.

Parameter	Value	Variables	Description
<aid>	CLK-a	a = 1 to 4	Input port number of clock card. Applies to monitored types other than SPRD.
	CLK	—	All ports of clock card. Applies to SPRD monitored type only.
<montype>	FFOFF-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	FFOFF monitored type, where a is the averaging time interval in seconds
	LMRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	LMRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	MRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	MRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	SPRD-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	SPRD monitored type, where a is the averaging time interval in seconds
	TDEV-a	a = 1S, 4S, 16S, 64S, 256S, 1024S	TDEV monitored type, where a is the averaging time interval in seconds
	TIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	TIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
THR-a	a = 0 ns to 1,900,000,000 ns		Threshold value, in ns, for LMRTIE and MRTIE monitored types
	a = 0 ppm to 7,300,000 ppm		Threshold value, in ppm, for SPRD and FFOFF monitored type
	a = 0 ns to 800,000 ns		Threshold value, in ns, for TDEV monitored type
CRI-a	a = Y or N		Indicates whether an input port is qualified (Y) or disqualified (N). Does not apply to SPRD monitored type
RPT-a	a = Y or N		Indicates whether an event is generated (Y) or not generated (N) when a threshold is crossed
PM-a	a = Y or N		Automatically displays (Y) or does not automatically display (N) each new measurement as it occurs
GOOD-a	a = 1 to 15		Number of consecutive good measurements that must occur following a bad measurement before an input signal can be qualified and for the INMEAS event to be cleared

Changing

Measurement properties can be specified for all input ports of a clock card or a single input port of a clock card.

All Input Ports

To specify measurement properties for all input ports of a clock card, the command format is:

```
ED-EQPT[-TSG]:[<tid>]:CLK0&&a:<ctag>:::  
    <montype>=THR-a&RPT-a&PM-a&GOOD-a;
```

a = 4 if clock card is 555xx-01 (5 input)

or

a = 8 if clock card is 555xx-02 (9 input)

Command Example:

```
ED-SYNC::CLK-0&&8:SC3:::TDEV-1s=THR-10;
```

Response Example:

```
SYMMBITS 01-06-01 10:25:04  
M SC3 COMPLD  
;
```

Changing (cont'd)

Parameter	Value	Variables	Description
<montype>	FFOFF-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	FFOFF monitored type, where a is the averaging time interval in seconds
	LMRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	LMRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	MRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	MRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	SPRD-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	SPRD monitored type, where a is the averaging time interval in seconds
	TDEV-a	a = 1S, 4S, 16S, 64S, 256S, 1024S	TDEV monitored type, where a is the averaging time interval in seconds
	TIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	TIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
THR-a	a = 0 ns to 1,900,000,000 ns		Threshold value, in ns, for LMRTIE and MRTIE monitored types
	a = 0 ppm to 7,300,000 ppm		Threshold value, in ppm, for SPRD and FFOFF monitored types
	a = 0 ns to 800,000 ns		Threshold value, in ns, for TDEV monitored type
RPT-a	a = Y or N		Indicates whether an event is generated (Y) or not generated (N) when a threshold is crossed
PM-a	a = Y or N		Automatically displays (Y) or does not automatically display (N) each new measurement as it occurs
GOOD-a	a = 1 to 15		Number of consecutive good measurements that must occur following a bad measurement before an input signal can be qualified and for the INMEAS event to be cleared

Individual Input Ports

To specify measurement properties for a single input port of a clock card, the command format is:

```
ED-SYNC[-TSG]:[<tid>]:CLK-a:<ctag>:::
<montype>=THR-a&CRI-a&RPT-a&PM-a&GOOD-a;
```

Changing (cont'd)

Parameter	Value	Variables	Description
CLK-a	a = 1 to 4		Input port number of clock card. Applies to monitored types other than SPRD.
<montype>	FFOFF-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	FFOFF monitored type, where a is the averaging time interval in seconds
	LMRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	LMRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	MRTIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	MRTIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
	SPRD-a	a = 3S, 12S, 48S, 192S, 768S, 3072S	SPRD monitored type, where a is the averaging time interval in seconds
	TDEV-a	a = 1S, 4S, 16S, 64S, 256S, 1024S	TDEV monitored type, where a is the averaging time interval in seconds
	TIE-a	a = 1S, 1M, 15M, 30M, 1H, 2H, 8H, 24H	TIE monitored type, where a is the observation time interval in seconds (S), minutes (M), or hours (H)
THR-a	a = 0 ns to 1,900,000,000 ns		Threshold value, in ns, for LMRTIE and MRTIE monitored types
	a = 0 ppm to 7,300,000 ppm		Threshold value, in ppm, for SPRD and FFOFF monitored types
	a = 0 ns to 800,000 ns		Threshold value, in ns, for TDEV monitored type
CRl-a	a = Y or N		Indicates whether an input port is qualified (Y) or disqualified (N). Does not apply to SPRD monitored type
RPT-a	a = Y or N		Indicates whether an event is generated (Y) or not generated (N) when a threshold is crossed
PM-a	a = Y or N		Automatically displays (Y) or does not automatically display (N) each new measurement as it occurs
GOOD-a	a = 1 to 15		Number of consecutive good measurements that must occur following a bad measurement before an input signal can be qualified and for the INMEAS event to be cleared

Troubleshooting

This chapter provides troubleshooting information using messages, events, and alarms.

Overview

Automatic messages automatically report network and system alarmed and non-alarmed events. Events are conditions that are detected by the TimeHub 5500. The alarm property of each event determines how it is reported, if at all. For certain events, this property is user configurable to control which automatic messages are generated by the system.

Automatic Messages

Automatic messages are generated by the TimeHub 5500, saved in the automatic output (AO) log, and sent to the communications port (and displayed if there is a terminal connected to the port).

Automatic messages are listed as follows: After the message name, a definition of the message is given. The definition is followed by the actual message, followed by the variables displayed in the message.

User Logged Off

This message appears when a user logs off the system or when the user has been automatically logged off by another user. The message format is:

```
<sid> <date> <time>  
A 0010 CANC  
  <user>  
;
```

Alarm Event

This message reports an alarmed event. In general, an alarmed event causes a standing condition and has immediate or potential impact on the operation or performance of the TimeHub 5500. The message format is:

```
<sid> <date> <time>
<severity> 0014 REPT ALM TSG
  "<aid>:<ntfcnde>,<event>,<svreff>,,,\\"<conddescr>\","
;
```

Parameter	Value	Description
<severity>	**	Major alarm
	*	Minor alarm
	*C	Critical alarm
	A	Alarm cleared or no alarm
<event>	Refer to the Event Code column in Table M.	Event code
<conddescr>	Refer to the Error Message column in Table M.	Condition description

User Logged On

This message appears when a user logs on the system. The message format is:

```
<sid> <date> <time>
A 0009 REPT EVT SESSION
  "LOCAL"
  /* NOTICE: This is a private computer system.
    Unauthorized access or use may lead to prosecution. */
;
```

Non-Alarmed Event

This message reports a non-alarmed event. In general, a non-alarmed event indicates a change of status or the occurrence of a system irregularity, which by itself is not severe enough to warrant an alarm indication. The message format is:

```
<sid> <date> <time>
A 0011 REPT EVT TSG
  "<aid>:<event>:<condeff>,,,:\"<conddescr>\", "
;
```

Parameter	Value	Description
<event>	Refer to the Event Code column in Table M.	Event code
<conddescr>	Refer to the Error Message column in Table M.	Condition description

Performance Monitoring Data

This message displays performance monitoring information. This property can be configured to display the information automatically or manually using the Edit Sync command (refer to the Commands chapter) with the Auto-Upload PM keyword (refer to the Keywords chapter).

If the system is configured to display the information automatically, measurement properties must be specified using the Edit Sync or Edit Equipment commands. (Refer to the Performance Monitoring chapter for details.)

The message format is:

```
<sid> <date> <time>
A 0009 REPT PM TSG
  "<aid>:<montype>,<mondatt>,<status>,,,[<meas time>]"...
```

Parameter	Value	Description
<montype>	Refer to the Performance Monitoring chapter	
<mondatt>		
<status>		
<meas time>		

Events

Events are conditions that occur or are detected in the TimeHub 5500. Alarms are a subset of these events which have been configured, either by factory setting or by the user, to indicate an alarm and generate an Alarm Event (RPT ALM TSG) message.

Table L lists the TimeHub 5500 events.

Table L. TimeHub 5500 Events

Event Code	Default Alarm Severity	Default Log	Configurable Alarm Severity	Configurable Log Settings
BTTMODE	NONE	NO	NO	NO
CFGCHD	NONE	NO	NO	NO
CFGRST	NONALM	YES	NO	YES
CLKACTV	NONALM	YES	YES (NONE or NONALM only)	YES
CLKCDIN	NONALM	YES	YES (Cannot be set to FAIL)	YES
CLKCDRM	NONALM	YES	YES (NONE or NONALM only)	YES
CLKDISA	MAJOR	YES	YES	YES
CLKFAIL	FAIL	YES	YES	YES
CLKGONE	FAIL (both clocks gone) MAJOR (one clock gone)	NO	NO (see SNGCLK keyword)	NO
CLKNCDN	MINOR	YES	YES	YES
CLKNCOM	MINOR	YES	YES	YES
CLKNCUP	MINOR	YES	YES	YES
CLKNVFL	MAJOR	YES	YES	YES
CLKOFFL	MAJOR	YES	YES	YES
CLKPRFL	MAJOR	YES	YES	YES
CLKSTBY	NONALM	YES	YES (NONE or NONALM only)	YES
CLKWARM	FAIL	YES	YES	YES
DIAGWRN	MINOR	YES	YES	YES
DIAGFAIL	MAJOR	YES	YES	YES
ECCRDMM	MAJOR	YES	NO	YES
EODRVMM	MAJOR	YES	NO	YES
EXD24HR	NONALM	YES	YES (NONE or NONALM only)	YES

Table L. TimeHub 5500 Events (cont'd)

Event Code	Default Alarm Severity	Default Log	Configurable Alarm Severity	Configurable Log Settings
EXCLKGONE	MAJOR	YES	NO	YES
EXCLKIN	NONALM	YES	NO	YES
EXCLKRM	NONALM	YES	NO	YES
EXNC1L1	MAJOR	YES	NO	YES
EXNC1L2	MAJOR	YES	NO	YES
EXNC2L1	MAJOR	YES	NO	YES
EXNC2L2	MAJOR	YES	NO	YES
EXOTHCLK	MINOR	YES	NO	YES
EXPWRA	MAJOR	YES	NO	YES
EXPWRB	MAJOR	YES	NO	YES
IMCCRST	NONALM	YES	NO	YES
IMCNC DN	MINOR	YES	NO	YES
IMCNCUP	MINOR	YES	NO	YES
IMCNVFL	MAJOR	YES	NO	YES
IMCRST	NONALM	NO	NO	NO
IMCPRFL	MAJOR	YES	NO	YES
INDISQ	MINOR	YES	YES (Cannot be set to FAIL)	YES
INEXPH	NONALM	YES	YES (Cannot be set to FAIL)	YES
INMEAS	NONALM	YES	YES (Cannot be set to FAIL)	YES
INMSDLY	NONALM	YES	YES (Cannot be set to FAIL)	YES
INPAIS	NONALM	YES	YES (Cannot be set to FAIL)	YES
INPLOS	NONALM	YES	YES (Cannot be set to FAIL)	YES
INPOOF	NONALM	YES	YES (Cannot be set to FAIL)	YES
INPSSM	NONALM	YES	YES (NONE or NONALM only)	YES
INPULL	NONALM	YES	YES (Cannot be set to FAIL)	YES
LOGCLRD	NONALM	YES	NO	NO
LSTCFG C	NONE	NO	NO	NO
MEASRNG	NONALM	YES	YES (Cannot be set to FAIL)	YES
MEASRP	NONALM	YES	YES (Cannot be set to FAIL)	YES
MEASRST	NONALM	YES	YES (NONE or NONALM only)	YES

Table L. TimeHub 5500 Events (cont'd)

Event Code	Default Alarm Severity	Default Log	Configurable Alarm Severity	Configurable Log Settings
MODMONL	NONE	NO	NO	NO
MODMRDY	NONE	NO	NO	NO
NETCLOS	NONALM	NO	NO	NO
NORESP	NONE	NO	NO	NO
OCCRDIN	NONALM	YES	NO	YES
OCCRDNP	MAJOR	YES	NO	YES
OCCRDRM	NONALM	YES	NO	YES
OPCDFL	MAJOR	YES	NO	YES
OPCDIN	NONALM	YES	NO	YES
OPCDMS	MAJOR	YES	NO	YES
OPCDNA	MAJOR	YES	NO	YES
OPCDNP	MAJOR	YES	NO	YES
OPCDPMM	MAJOR	YES	NO	YES
OPCDRM	NONALM	YES	NO	YES
OPPRFL	FAIL	YES	NO	YES
OPPTFL01	MAJOR	YES	NO	YES
.
.
.
OPPTFL40	MAJOR	YES	NO	YES
OPTALMEXT	MAJOR	YES	NO	YES
OSTBYCLK	MAJOR	YES	NO	YES
PTAVAIL	NONALM	YES	NO	YES
PTHRUMD	FAIL	YES	NO	YES
RACKDUP	MAJOR	NO	NO	NO
RACKOOR	MAJOR	NO	NO	NO
RCKALM1	MAJOR	YES	NO	YES
RCKALM2	MAJOR	YES	NO	YES
RCKALM3	MINOR	YES	NO	YES
RCKALM4	MINOR	YES	NO	YES

Table L. TimeHub 5500 Events (cont'd)

Event Code	Default Alarm Severity	Default Log	Configurable Alarm Severity	Configurable Log Settings
RCKALM5	MAJOR	YES	NO	YES
RCKALM6	MAJOR	YES	NO	YES
RCKALM7	MINOR	YES	NO	YES
RCKALM8	MINOR	YES	NO	YES
RCKALM9	MINOR	YES	NO	YES
RCKALM10	MINOR	YES	NO	YES
SEACTV	MINOR	YES	YES	YES
SGLSWMM	NONALM	NO	NO	NO
SNAUTO	NONALM	YES	NO	YES
SNDRIFT	NONALM	YES	YES	YES
SNFAIL	FAIL	NO	NO	NO
SNFRCD	NONALM	YES	NO	YES
SNFREE	MAJOR	YES	YES	YES
SNHAVL	NONALM	YES	YES (NONE or NONALM only)	YES
SNHOLD	MAJOR	YES	YES (Cannot be set to FAIL)	YES
SNMAN	NONALM	YES	NO	YES
SNOPER	NONALM	YES	YES (NONE or NONALM only)	YES
SNPWRA	MAJOR	YES	NO	YES
SNPWRB	MAJOR	YES	NO	YES
SNSAVL	NONALM	YES	YES (NONE or NONALM only)	YES
SNSCSUS	MINOR	YES	YES	YES
SNSSM	NONALM	YES	YES (NONE or NONALM only)	YES
SNTRCK	NONALM	YES	YES (NONE or NONALM only)	YES
SRINVMM	MAJOR	NO	NO	NO
SWDL	NONE	NO	NO	NO
TRAOOR	NONALM	YES	YES (NONE or NONALM only)	YES
TRCBLOS	NONALM	YES	YES (NONE or NONALM only)	YES
TRCHSLP	NONALM	YES	YES (NONE or NONALM only)	YES
TRCLOS	NONALM	YES	YES (NONE or NONALM only)	YES
TRCOOF	NONALM	YES	YES (NONE or NONALM only)	YES

Table L. TimeHub 5500 Events (cont'd)

Event Code	Default Alarm Severity	Default Log	Configurable Alarm Severity	Configurable Log Settings
TRCSLIP	NONALM	YES	YES (NONE or NONALM only)	YES
UNKALM	FAIL	NO	NO	NO
UNKSTAT	MAJOR	NO	NO	NO
XFER	MINOR	YES	YES	YES

Log Types

The TimeHub 5500 maintains two separate logs:

- Event
- Automatic Output (AO)

Event logging in either log is controlled by the following properties:

- ALM: specifies the severity of the event, and controls whether an event generates an automatic message and is recorded in the AO Log
- LOG: controls which events are recorded in the Event Log.

Note: Logging of an event is completely independent of the setting of its ALM property.

Event Log

The event log is a chronological record of both alarmed and non-alarmed events, and is maintained independently on each clock card. This log may be used to determine the sequence of events leading up to a network or system problem.

The user can configure which events are entered in the log. Events placed in the log are those which have their LOG property set to Y and can include both alarmed and non-alarmed events as well as those not initially reported (i.e., those with ALM property set to NONE).

Each log holds a maximum of 1000 events; as more events are received, the earliest logged events are discarded. Events are retrieved in groups of ten events at a time. These logs are stored in battery-backed-up RAM, and are retrieved in reverse chronological order using the Retrieve Log (RTRV-LOG) command.

The event logs on both clock cards may be cleared using the Initialize Event Log (INT-LOG) command.

The log can be retrieved separately from each clock card. Although output card events are maintained by the management card, the clock cards will enter a non-alarmed event into the event log when they detect an output card event.

Automatic Output Log

The automatic output (AO) log is a record of all automatic messages that have been generated, and is maintained on the management card. This log may be used to retrieve any automatic output messages that may have been missed when first transmitted. All messages are sequentially numbered.

These messages include alarmed and non-alarmed events, automatic updating of performance monitoring data (if enabled), and users' logging status. This log contains the most recent 100 messages or 10000 characters of information

(whichever is less), and is retrieved in chronological order. No battery backup is provided.

Automatic messages may be retrieved from the AO log using the Retrieve Automatic Messages (RTRV-AO) command.

Event Types

There are two types of events:

- State events: an ongoing condition
- Transient events: a transient occurrence, not an ongoing condition

State Events

State events have an active (set) and cleared state. Depending on the configuration of the severity (ALM) property of the event, alarms can be generated or cleared, and TL1 reports can be issued whenever these events change their state.

Values for the state event ALM property are as follows:

- NONE: Alarms or reports are not generated by either setting or clearing this event.

Note: The RTRV-COND-TSG command can be used to retrieve all active state events, including those with the ALM property set to NONE.

- NONALM: Both setting and clearing this event generates a RPT EVT TSG message indicating the change in state. No alarms are generated.
- MINOR: Setting this event generates a minor alarm indication and a RPT ALM TSG message. Clearing this event clears the associated alarm indication and generates another RPT ALM TSG message indicating the clearing of the alarm.
- MAJOR: Setting this event generates a major alarm indication and a RPT ALM TSG message. Clearing this event clears the associated alarm indication and generates another RPT ALM TSG message indicating the clearing of the alarm.
- FAIL: This setting is similar to MAJOR, except that if no standby unit is available to take over operation for the failed unit (or the standby unit also has a fail condition), the alarm level is escalated to critical. If a major alarm is indicated and the standby unit later becomes unavailable (is removed or a fail condition occurs), this alarm will be escalated to critical, with a new message generated.

Events related to input signals are normally only reported by the active clock card to avoid duplicate reports from the two clock cards (refer to the Report All keyword in the Keywords chapter).

Events related to operating conditions on a clock card, which are unrelated to input signals, are reported by a card, regardless of whether the card is active.

Transient Events

Transient events do not have an ongoing state. Therefore, they cannot generate alarms.

Values for the transient event ALM property are as follows:

- NONE: Alarms or reports are not generated by either setting or clearing this event.
- NONALM: Both setting and clearing this event generates a RPT EVT TSG message indicating the change in state. No alarms are generated.

Some of these events are reported by only the active clock card; others are reported regardless of whether the card is active.

Retrieving State Events

Use the Retrieve Condition (RTRV-COND) command to retrieve a list of all currently active state events. (Refer to the Retrieve Condition command in the Commands chapter.)

Note: Transient events cannot be retrieved.

One of the following codes will be included to indicate the severity of the event:

- CR: Critical alarm
- MJ: Major alarm
- MN: Minor alarm
- NA: Non-alarmed
- NR: Not reported

Use the Retrieve Alarm Condition (RTRV-ALM) command to retrieve a list of all currently active alarms. (Refer to the Retrieve Alarm Condition command in the Commands chapter.)

The Retrieve Alarm Condition command is similar to the Retrieve Condition command, except that it only reports events which are causing alarms (e.g., critical, major, and minor).

Displaying Event Properties

Use the Retrieve Equipment (RTRV-EQPT) command to display the properties of an event. The command format is:

```
RTRV-EQPT[-TSG]:[<tid>]:<aid>:<ctag>:::PARAMETER=<event>;
```

Parameter	Value	Description
<event>		Refer to the Event Code column in Table M.

Changing Event Properties

Use the Edit Equipment (ED-EQPT) command to change the properties of an event. The command format is:

```
ED-EQPT[-TSG]:[<tid>]:<aid>:<ctag>:::<event>=LOG-a&ALM-b;
```

Parameter	Value	Description
<event>		Refer to the Event Code column in Table M.
a	Y	Event is recorded in the event log
	N	Event is not recorded in the event log
b	NONE	Alarm severity
	NONALM	
	MINOR	
	MAJOR	
	FAIL	

Troubleshooting with Error Messages

Use the information in Table M to troubleshoot the system based on the error message.

Note: For details on removing or replacing cards, refer to the Maintenance chapter in the 5500 TimeHub System Manual.

Table M. Message Troubleshooting

Error Message/ Condition Description	Event Code	Meaning	Action
<i>Fail Alarms</i>			
CLK card missing	CLKGONE	The management card cannot detect the presence of the indicated clock card.	<ol style="list-style-type: none"> 1. If the active clock card is indicated in the event, press the Force Active pushbutton on the standby clock card. 2. Remove, then insert, the clock card indicated in the event. 3. If the condition does not clear, replace the indicated clock card.
CLK failed*	CLKFAIL	A hardware or firmware failure has occurred on the indicated clock card.	<ol style="list-style-type: none"> 1. If the active clock card is indicated in the event, press the Force Active pushbutton on the standby clock card. 2. Remove, then insert, the clock card indicated in the event. 3. If the condition does not clear, replace the indicated clock card.
CLK Warmup*	CLKWARM	The clock card is warming up, and the card is not yet active.	None required.
Event signalling 24 hours in holdover mode	EXCD24HR	The indicated clock card has been in holdover for over 24 h.	<p>Check whether both clock cards are in holdover. If both cards are in holdover, troubleshoot the input signal source. If only one card is in holdover:</p> <ol style="list-style-type: none"> 1. Ensure that the clock card still qualifying input signals is the active card. 2. If the clock card entered holdover because the performance measurements disqualified the inputs, use the Initialize Register (INIT-REG) command to clear the performance measurements for each disqualified input.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Expected connector card mismatch	ECCRDMM	A different connector card exists than the one specified through the TL1 command.	<ol style="list-style-type: none"> 1. Use the Retrieve Equipment command to determine how the output port group was configured (RTRV-EQPT::OUTa-PGb:<ctag>::PARAMETER=ECONCRD;, where a is the output card pair and b is the port group). 2. Change the connector card type, or reconfigure the output port group using the Edit Equipment command (ED-EQPT::OUTa-PGb:<ctag>::ECONCRD=c;, where a is the output card pair, b is the port group, and c is the connector card type). Refer to the Keywords chapter for details on the Output Connector Card Type (ECONCRD) keyword.
Expected output protection mismatch	EPROTMM	There are less than two output driver cards in the indicated output card pair.	<ol style="list-style-type: none"> 1. Use the Retrieve Equipment command to determine whether the output driver card slot was configured for protection (RTRV-EQPT::OUTa:<ctag>::PARAMETER=EPROT;, where a is the output card pair). 2. Install another output driver card in the slot pair, or reconfigure the output driver card protection using the Edit Equipment command (ED-EQPT::OUTa:<ctag>::EPROT=b;, where a is the output card pair and b is the protection requirement). Refer to the Keywords chapter for details on the Protection (EPROT) keyword.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Output card failed	OPCDFL	A hardware or firmware failure has occurred on the indicated output driver card(s) or active clock card.	If only one output driver card is indicated: <ol style="list-style-type: none"> 1. Remove, then insert, the indicated output driver card. 2. If the condition does not clear, replace the card. If more than one output driver card is indicated: <ol style="list-style-type: none"> 1. Press the Force Active pushbutton on the standby clock card. 2. Remove, then insert, the clock card that was active when the event occurred. 3. If the condition does not clear, replace the failed clock card.
Output card not accessible	OPCDNA	The clock cards cannot communicate with the indicated output driver card.	<ol style="list-style-type: none"> 1. Remove, then insert, the indicated output driver card. 2. If the condition does not clear, replace the card.
Output card not present	OPCDNP	The management card cannot detect the presence of a required output driver card.	<ol style="list-style-type: none"> 1. Install the missing output driver card. 2. If the condition does not clear, replace.
Output Service on Slot Pair Affected	OPPRFL	A port alarm condition exists on different output ports of output cards in the indicated output card group. For example, if one output card in group C is detecting a port alarm on port 12 and the other output card is detecting a port alarm on port 15, this alarm will be reported.	Most likely there is an actual port failure on these cards. However, it is possible that the condition is due to external conditions. See description in "Major Alarms" portion of this table for message "Alarms on same ports - check external conditions", event code OPTALMEXT.
Sync failure	SNFAIL	An alarm signal is present within the shelf that has not been identified by the card generating the alarm signal.	<ol style="list-style-type: none"> 1. Remove, then insert, the indicated failed card. 2. If the condition does not clear, replace the card.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
<i>Major Alarms</i>			
Output PortXX Fail (where XX is the number of the port and can range from 01 to 40)	OPPTFLXX (XX is a number in range from 01 to 40)	An output port alarm has been detected on the specific port identified. For example, OPPTFL32 indicates that a port alarm has been detected on port 32. The specific output card is identified by the <aid> in the alarm message.	<p>If event codes OPPRFL or OPTALMEXT are also present it is likely that the cause of the port alarm is associated with an external condition rather than an actual fault with this output port. See descriptions of those events in this same table.</p> <ol style="list-style-type: none"> 1. Attempt remote clearing of the port alarm using the CLRPTALL keyword (see description in Keyword section). 2. Try replacing the output card that has indicated the fault. If the replacement card indicates the same fault, it is likely that an external condition exists that is causing the reporting of the fault. <p>For further details, see "Output Port Alarms in TimeHub 5500" in the Functional Description section in Chapter 1 of the TimeHub 5500 System Guide.</p>
Alarms on same ports - check external conditions	OPTALMEXT	A port alarm has occurred on the same port on both output cards in the indicated card group. For example, port 18 on both output cards in master shelf output group C are both detecting a port alarm.	<ol style="list-style-type: none"> 1. Most likely there is an external cause for the port alarms since it is unlikely to experience a true port failure on the same port of both output cards. Check external conditions associated with this connection. If problem is due to external condition, alarms will clear when external cause is removed. 2. Attempt remote clearing of the port alarm using the CLRPTALL keyword (see description in Keyword section). 3. If no external cause is found, it is possible that both cards experienced a failure (most likely due to some external event). Try replacing one of the output cards to see if it also detects a failure. <p>For further details, see "Output Port Alarms in TimeHub 5500" in the Functional Description section in Chapter 1 of the TimeHub 5500 System Guide.</p>

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
CLK offline*	CLKOFFL	The indicated clock card is offline.	<ol style="list-style-type: none"> 1. If the TRACK MODE Warmup lamp is lit on the indicated clock card, wait at least 20 min for the card to warm up. 2. If the condition does not clear, press the Force Active pushbutton on the clock card that is not offline. 3. Issue the following commands to reset the offline card: <ol style="list-style-type: none"> a. ACT-SWDL::CLKa:<ctag>;, where a is the offline card b. CANC-SWDL::CLKa:<ctag>;, where a is the offline card 4. If the condition does not clear, replace the offline clock card.
Error in Link 1 from CLK1	EXNC1L1	<p>The expansion controller card reporting this condition is not getting a good Link 1 connection from master shelf CLK1 (leftmost clock card in master shelf). There are three conditions required for a good link:</p> <ol style="list-style-type: none"> 1. Proper clock signal must be received from CLK1 via Link 1. 2. Proper framing single must be received from CLK1 via Link 1. 3. Communication must be received from CLK1 via Link 1. 	<ol style="list-style-type: none"> 1. This error is expected if there is no CLK1 in the master shelf 2. Make sure the Link 1 cable is properly attached both at the master and expansion shelf. Also, make sure that the last expansion shelf has a termination module on the Link 1 Output. 3. If problem persists, fault can be isolated to either CLK1 card in master shelf, link 1 cable, or expansion controller card by individually replacing each.
Error in Link 1 from CLK2	EXNC2L1	<p>The expansion controller card reporting this condition is not getting a good Link 1 connection from master shelf CLK2 (rightmost clock card in master shelf). There are three conditions required for a good link:</p> <ol style="list-style-type: none"> 1. Proper clock signal must be received from CLK2 via Link 1. 2. Proper framing single must be received from CLK2 via Link 1. 3. Communication must be received from CLK2 via Link 1. 	<ol style="list-style-type: none"> 1. This error is expected if there is no CLK2 in the master shelf. 2. Make sure the Link 1 cable is properly attached both at the master and expansion shelf. Also, make sure that the last expansion shelf has a termination module on the Link 1 Output. 3. If problem persists, fault can be isolated to either CLK2 card in master shelf, link 1 cable, or expansion controller card by individually replacing each.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Error in Link 2 from CLK1	EXNC1L2	The expansion controller card reporting this condition is not getting a good Link 2 connection from master shelf CLK1 (leftmost clock card in master shelf). There are three conditions required for a good link: 1. Proper clock signal must be received from CLK1 via Link 2. 2. Proper framing single must be received from CLK1 via Link 2. 3. Communication must be received from CLK1 via Link 2.	1. This error is expected if there is no CLK1 in the master shelf. 2. Make sure the Link 2 cable is properly attached both at the master and expansion shelf. Also, make sure that the last expansion shelf has a termination module on the Link 2 Output. 3. If problem persists, fault can be isolated to either CLK1 card in master shelf, link 2 cable, or expansion controller card by individually replacing each.
Error in Link 2 from CLK2	EXNC2L2	The expansion controller card reporting this condition is not getting a good Link 2 connection from master shelf CLK2 (rightmost clock card in master shelf). There are three conditions required for a good link: 1. Proper clock signal must be received from CLK2 via Link 2. 2. Proper framing single must be received from CLK2 via Link 2. 3. Communication must be received from CLK2 via Link 2.	1. This error is expected if there is no CLK2 in the master shelf. 2. Make sure the Link 2 cable is properly attached both at the master and expansion shelf. Also, make sure that the last expansion shelf has a termination module on the Link 2 Output. 3. If problem persists, fault can be isolated to either CLK2 card in master shelf, link 2 cable, or expansion controller card by individually replacing each.
Expansion CLK card missing	EXCLKGONE	The indicated expansion controller card is not present in the indicated expansion shelf. This controller card is expected to be present because the ECLKEXP keyword setting for this expansion shelf controller card location has been set to Y (see ECLKEXP keyword description).	1. If there really isn't supposed to be an expansion controller card in this location, set the ECLKEXP keyword to N. This will cause the alarm to clear. 2. If there is supposed to be an expansion controller card in this location, insert an expansion controller card and the alarm will clear. 3. If there is an expansion controller card in this location and the alarm is being reported, the controller card may need to be replaced. Try removing and inserting the card to see if condition persists.
Freerun mode*	SNFREE	The clock card is generating a reference output, but there are no qualified inputs, and holdover mode is not available.	If the clock card has just been inserted, wait for an input to qualify. If not, correctly configure the input signal format.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Holdover mode*	SNHOLD	The indicated clock card is in holdover.	If both cards are in holdover, troubleshoot the input signal source. If only one card is in holdover: 1. Ensure that the clock card still qualifying input signals is the active card. 2. If the clock card entered holdover because the performance measurements disqualified the inputs, use the Initialize Register (INIT-REG) command to clear the performance measurements for each disqualified input. Refer to the Commands chapter for details on the INIT-REG command.
Power supply A failed	SNPWRA	The -48V A input failed.	Troubleshoot and repair the A -48 V battery input.
Power Supply A in expansion failed	EXPWRA	The -48V A input of the indicated expansion shelf is not functioning.	1. A typical reason for this is that the "A" power supply is not connected or it is connected but the power source is not functioning. 2. If the "A" power supply is connected and it has not been successfully powered before, check that terminal connections (-48, gnd, rtn) are correct. 3. Check the "A" fuse LED on the front of the shelf. If it is lit, the fuse has blown. The fuse is replaceable. Replace, but if fuse continues to go out, shelf may require service.
Power supply B failed	SNPW RB	The -48V B input failed.	Troubleshoot and repair the B -48 V battery input.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Power Supply B in expansion failed	EXPWRB	The -48V A input of the indicated expansion shelf is not functioning.	<ol style="list-style-type: none"> 1. A typical reason for this is that the "B" power supply is not connected or it is connected but the power source is not functioning. 2. If the "B" power supply is connected and it has not been successfully powered before, check that terminal connections (-48, gnd, rtn) are correct. 3. Check the "B" fuse LED on the front of the shelf. If it is lit, the fuse has blown. The fuse is replaceable. Replace, but if fuse continues to go out, shelf may require service.
Rack alarms	RACKALM1 RACKALM2 RACKALM3 RACKALM4 RACKALM5 RACKALM6 RACKALM7	Equipment external to the shelf is generating the indicated rack alarm.	Troubleshoot the external equipment generating the alarm.
Rack number out of range	RACKOOR	The rack identification switch has been set to an invalid number.	Set the switch on the backplane, behind the management card to 0.
Unidentified alarm detected	UNKALM	A major alarm condition exists in the shelf.	<ol style="list-style-type: none"> 1. Wait approximately 1 min for the condition to clear. 2. If the condition does not clear, remove, then insert, the indicated failed card. 3. If the condition does not clear, replace the card.
<i>Minor Alarms</i>			
Inferior CLK is active*	SECACTV	The clock card designated with the inferior oscillator is active because the Force Active pushbutton was pressed or the superior clock card failed.	<ol style="list-style-type: none"> 1. Force the primary clock card active: use the Switch Duplex Equipment (SW-DX-EQPT) command, or press the Force Active pushbutton. 2. If the condition does not clear, replace the clock card with the superior oscillator.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Input disqualified*	INDISQ	A reference input has been disqualified by the clock card.	<ol style="list-style-type: none"> 1. Set the input signal format to the correct setting if needed (ED-SYNC::CLK-a:<ctag>:::ESF=b,, where a is the input channel number of the clock card, and b is Y or N, where Y is ESF and N is D4). 2. If the condition does not clear, troubleshoot the specified input span signal (check the source).
Istate not identical*	XFER	The parameter settings in the two clock cards are not identical.	Wait approximately 10 min for the information to be transferred.
Rack alarms	RACKALM8	Equipment external to the shelf is generating an alarm.	Troubleshoot the external equipment generating the alarm.
SmartClock suspended*	SNSCSUS	During holdover, the oscillator frequency has drifted outside the pull-in range and the oscillator is no longer using the SmartClock algorithm.	End holdover mode by configuring the shelf to qualify an input signal.
Sourcing Other Clock	EXOTHCLK	The indicated expansion controller card is receiving a good clock signal from the master shelf (as well as associated framing and communication), but not from its normally preferred master shelf clock. For any expansion shelf, an expansion controller card in the leftmost slot (EC1) prefers to receive its master shelf clock from CLK1 (leftmost clock in master shelf). Similarly, an expansion controller card in the rightmost slot (EC2) prefers to receive its master shelf clock from CLK2 (rightmost clock in master shelf). Hence, an example where this alarm would occur is if an expansion controller card in EC1 is only getting clock information from CLK2 in the master shelf.	<ol style="list-style-type: none"> 1. This alarm is expected if there is no associated clock in the master shelf or if that clock is still warming up and the other clock has already completed warmup. 2. If there is an associated clock (for EC1 the associated clock is CLK1, for EC2 the associated clock is CLK2) in the master shelf that has completed warmup, there could be a fault with the expansion controller card. Check if there are other reported alarms associated with expansion links that could further diagnose the cause of the problem.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Unidentified alarm detected	UNKALM	A minor alarm condition exists in the shelf.	<ol style="list-style-type: none"> 1. Wait approximately 1 min for the condition to clear. 2. If the condition does not clear, remove, then insert, the indicated failed card. 3. If the condition does not clear, replace the card.
<i>Events</i>			
CLK active*	CLKACTV	The indicated clock card is the synchronization signal source for all output cards.	None required.
CLK communications failure*	CLKNCOM	A communications error exists between the clock cards.	<ol style="list-style-type: none"> 1. Remove, then insert, the indicated clock card. 2. If the condition does not clear, replace the card.
CLK disagree on channel quality*	CLKDISA	The clock cards are reporting different quality levels for the same reference input.	<ol style="list-style-type: none"> 1. Verify the input signal quality. 2. Use the Initialize Register (INIT-REG) command to restart the measurements. 3. Set the input signal format to the correct setting if needed (ED-SYNC::CLK-a:<ctag>::ESF=b;, where a is the input channel number of the clock card, and b is Y or N, where Y is ESF and N is D4). 4. If the condition does not clear, replace the clock card.
Drift Exceeds Limits*	SNDRIFT	The frequency of an input signal, as compared to the clock oscillator, has drifted beyond the acceptable limits.	<ol style="list-style-type: none"> 1. Investigate the upstream signal quality. 2. Verify that highest quality input is active. 3. Wait 3 days for the event to clear. 4. Remove, then insert, the indicated clock card. 5. If the condition does not clear, replace the card.
Expansion CLK inserted	EXCLKIN	An expansion controller card has been inserted into the indicated controller card location (EC1 or EC2) on the indicated expansion shelf.	None required.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Expansion CLK removed	EXCLKRM	An expansion controller card has been removed from the indicated controller card location (EC1 or EC2) on the indicated expansion shelf.	If this is to be a permanent removal it may be desired to set the associated ECLKEXP keyword value (see description in keyword chapter) to N. This will clear the EXCLKGONE alarm that will occur after the controller card is removed.
Holdover available*	SNHAVL	The clock card has collected enough tracking data to enter holdover mode if all inputs become disqualified.	None required.
IMC beginning reset	IMCRST	The network address parameters of the management card have been changed, and the management card is reinitializing.	None required.
Input SSM changed*	INPSSM	The SSM value of the indicated input has changed.	If it is no longer necessary to read the SSM value from the incoming signal, disable SSM reading for the indicated input (ED-SYNC::CLK-a:<ctag>::SSMENB=N;, where a is the indicated input).
Measurement range exceeded*	MEASRNG	The input frequency has drifted beyond the measurement range of the clock card.	<ol style="list-style-type: none"> Investigate the upstream signal quality. If possible, increase the input signal strength.
Measurement reported beyond threshold*	MEASRP	A performance measurement has crossed the indicated threshold.	<ol style="list-style-type: none"> Use the Edit Sync (ED-SYNC) command to increase the measurement threshold setting. Investigate the upstream equipment quality.
Network connection closing	NETCLOS	The Network IMC card is closing the network connection.	Wait for connection to close then reestablish the network connection.
Other CLK card inserted*	CLKCDIN	A second clock card has been inserted.	None required.
Output card inserted	OPCDIN	An output driver card has been inserted in the indicated location in the shelf.	None required.
SmartClock available*	SNSAVL	The clock card has been operating continuously for at least 32 h.	None required.
SSM algorithm executed*	SNSSM	The clock card is using SSM to determine which input should be tracked.	None required.

Table M. Message Troubleshooting (cont'd)

Error Message/ Condition Description	Event Code	Meaning	Action
Sync in normal operating mode*	SNOPER	The indicated time constant is being used by the clock card to track the active input.	None required.
Tracking this input*	SNTRCK	The clock card has begun tracking the indicated input.	None required.
Traffic value invalid for card*	TRAOOR	The value of the Traffic Data Pattern (TRAFFIC) keyword is invalid for the output driver card type.	Use the Edit Equipment command (ED-EQPT) to set the TRAFFIC keyword value to 255.

* This alarm can be set to other severities using the Edit Equipment (ED-EQPT) command.

Error Responses

Error responses appear when a command is denied. The error response format is shown below:

```
^^^<sid>^<date>^<time>
M^^<ctag>^DENY
^^^<errcde>
^^^/* <error message> */
;
```

DENY indicates that the command was denied due to an error. The error code <errcde> parameter indicates the error type or cause of the error.

Table N lists error codes, their description, and the action to take.

Table N. Error Code Troubleshooting

Error Code	Description	Action
IBEX	Block, extra	Check the command syntax.
IDNV	Input, data not valid	Enter valid data.
IIAC	Input, invalid access identifier (aid)	Enter the valid aid.
IICM	Invalid command	Check the command syntax.
IICT	Input, invalid correlation tag (ctag)	Enter the valid ctag.
IIPG	Input, invalid parameter grouping	Check the command syntax.
IISP	Input, invalid syntax or punctuation	Enter the valid syntax or punctuation.
IITA	Input, invalid target identifier (tid)	Enter the valid tid.
INUP	Input, non-null unimplemented parameter	Check the command syntax.
IPMS	Input, parameter missing	Check the command syntax.
IPNV	Input, parameter not valid	Enter the valid parameter.
ISCH	Input, syntax, invalid character	Enter the valid syntax.
ISPC	Input, syntax, invalid punctuation	Enter the valid syntax.
PICC	Privilege, illegal command code	The user is not authorized.
PIUC	Privilege, illegal user code	The user is not authorized.
PIUI	Privilege, illegal user identity	The user is not authorized.
SARB	Status, all resources busy	Try again later.
SROF	Status, requested operation failed	Check the command description.
SSRE	Status, system resources exceeded	Try again later.
IBEX	Block, extra	Check the command syntax.