

**55400A**

**SYNCHRONIZATION SUPPLY UNIT**

**TL1 PROGRAMMING**

**REFERENCE MANUAL**

This manual provides reference information on the TL1 programming language used with the 55400A synchronization supply unit (SSU).

This manual applies to the 55400A SSU system you have received unless update information is included with the equipment.

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#### Warning Symbols That May Be Used In This Book



Instruction manual symbol; the product will be marked with this symbol when it is necessary for the user to refer to the instruction manual.



Indicates hazardous voltages.



Indicates earth (ground) terminal.



or



Indicates terminal is connected to chassis when such connection is not apparent.



Indicates Alternating current.



Indicates Direct current.

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# In This Manual

This preface contains the following information:

- Manual Organization page i
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## Manual Organization

The information in this manual is intended for anyone wanting to learn how to use Transaction Language (TL1) commands to operate the 55400A synchronization supply unit (SSU). The primary audience is Control Center personnel responsible for provisioning and monitoring the 55400A from a remote or local terminal.

**Use One of Symmetricom's Graphical User Interface Network Management Software Applications Instead of Typing TL1 Commands**

To simplify tasks of configuration, commissioning, monitoring, and troubleshooting, you can use the 55450A Local Craft Terminal Software, or 55450AM Remote Management Software, or 55451A OSMF for NT Software, or 55452A OSMF for UX Software — this way, you don't have to learn and type the TL1 commands. (Refer to the *55400A SSU System Manual for more information on these software products.*)

Here is a brief summary of the entire manual by chapter and appendix to acquaint you with the information covered in this manual.

### Table of Contents

**In This Manual** (this preface) introduces you to the manual.

#### **Chapter Introduction —**

Provides an overview of the system and the commands that can be used with the 55400A.

#### **Chapter Getting Started —**

Describes what to do when you first start using TL1 commands to communicate with the 55400A.

#### **Chapter Automatic Messages—**

Describes the messages that can be displayed automatically by the 55400A.

**Chapter Synchronization Modes and Input Qualification —**

Provides information about the synchronization modes and how they affect input channel qualification.

**Chapter TL1 Command Reference —**

Provides detailed descriptions of the TL1 commands that can be used with the 55400A.

**Chapter TL1 Keyword Reference —**

Provides detailed descriptions of the TL1 keywords that can be used with the TL1 Provisioning commands.

**Chapter Events and Alarms —**

Provides detailed descriptions of the alarmed and non-alarmed events that can be encountered when using the 55400A.

**Chapter Performance Monitoring —**

Provides detailed descriptions of the input-signal performance measurements that are constantly being computed by the 55400A.

**Chapter Modem Control —**

Describes how to setup, connect, and operate a Modem with the 55400A.

**Chapter Network Parameters —**

Describes how to set the network communication parameters.

**Appendix A Downloading Firmware —**

Describes how to use the Download Commands to download new firmware to the 55400A.

**Appendix B Example SSU TL1 Commands —**

Provides examples on how to use TL1 commands to remotely perform some of the common network management tasks. Example commands are provided in the appropriate places throughout this manual. This appendix should make it easier to quickly look up an example based on the task that you need performed by the 55400A.

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## Related Documentation

### Supplied Manual

- *55400A SSU System Manual* — provides an in-depth guide to installing, operating, and troubleshooting the 55400A hardware.
- *55400A Mini SSU Supplemental Manual*, P/N 097-55409-01 (only supplied with your order of the Mini SSU)
- *55450A Local Craft Terminal Software / 55450AM Remote Management Software User's Manual*, P/N 097-55450-01 (only supplied with your order of the 55450A or 55450AM)
- *55452A Open Synchronization Management Framework Software User's Guide*, P/N 097-55452-07 (only supplied with your order of the 55452A)
- *55452A Open Synchronization Management Framework Software System Administrator's Guide*, P/N 097-55452-08 (only supplied with your order of the 55452A)

### Other Documents

- *Synchronizing Telecommunications Networks: Basic Concepts — Application Note 1264-1*
- *Synchronizing Telecommunications Networks: Synchronizing SDH/SONET — Application Note 1264-2*
- *Synchronizing Telecommunications Networks: Fundamentals of Synchronization Planning — Application Note 1264-3*

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## 1.1 Chapter Contents

1.1.1 This chapter briefly describes the 55400A synchronization supply unit (SSU) and the TL1 commands that can be used with the 55400A.

1.1.2 This chapter is organized as follows:

- About the 55400A SSU System page 1-3
- About the Transaction Language 1 (TL1) Commands page 1-4
- Network Management Tasks Performed Using TL1 page 1-5
  - Security Management Commands page 1-5
  - Configuration Management Commands page 1-5
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  - Firmware Downloading Commands page 1-6
- About the Security Feature page 1-7
  - Security Disabled at Factory page 1-7
  - Security Switch and Database page 1-7
- Manual Assumptions page 1-8
- List of Terms page 1-9

## 1.2 About the 55400A SSU System

1.2.1 The 55400A is a synchronization supply unit that can monitor up to nine different reference sources and deliver as many as 400 outputs to different points on the network.

1.2.2 The 55400A system distributes precise timing synchronization signals for 2048 kbps or 2048 kHz primary rate networks. It can be configured as a master subrack with associated expansion subracks. In this configuration, its capacity allows the economical distribution of up to 400 output signals throughout a large facility.

1.2.3 The redundant architecture and “hot-swapping” features of the 55400A minimize interruptions to the network being synchronized. The active input can be switched on-line without any phase hits for the output signals. Redundant pairs of input references and output cards offer one-to-one protection, and redundant power supplies further enhance mission critical synchronization.

1.2.4 Major components include the Input Track and Hold Cards (ITH), Output Cards, and the Information Management Card (IMC). The IMC card supports local and remote system alarm reporting, and performance monitoring using industry standard TL1 commands. These and other components are discussed in the *55400A SSU System Manual* (097-55401-15). Figure 1-1 shows a block diagram of the 55400A. Notice that the system contains redundant ITH cards and can contain redundant (protected) output cards.

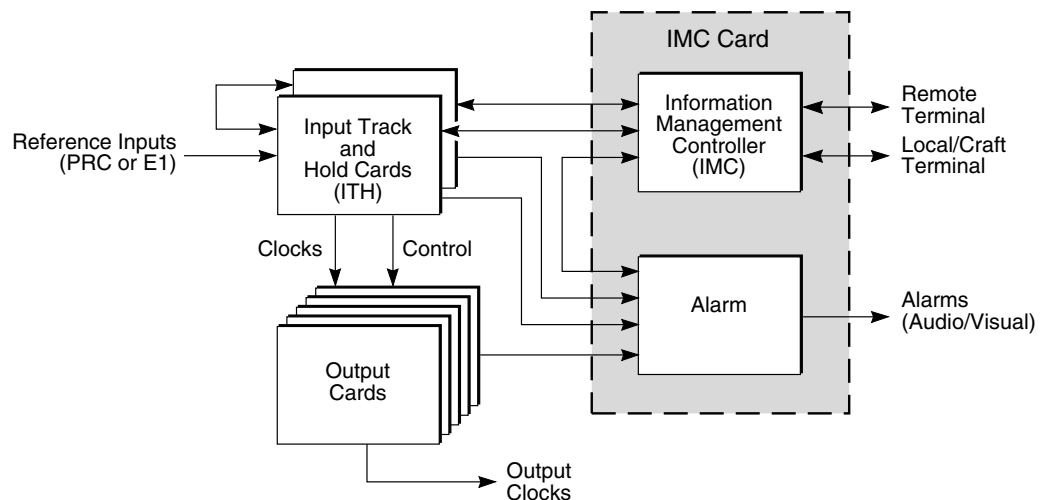


Figure 1-1. 55400A SSU Unit Block Diagram

1.2.5 In order to distribute timing signals reliably throughout the network, the 55400A must select the most qualified input signal to be distributed. The 55400A is configured at the factory with default system settings that make up the selection criteria for an input signal (For example, all inputs are enabled.). You can either use the default system settings or you can change them depending on your network needs. Refer to “Customizing System Settings” on page -21 in Chapter for more information.

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## **1.3 About the Transaction Language 1 (TL1) Commands**

1.3.1 Transaction Language 1 (TL1) commands are used as a standard throughout the telecommunications industry. You enter TL1 commands to communicate with the 55400A through the local or remote communication port (RS-232C) connected to a computer running a terminal emulation program (Windows Terminal, for example). Access to the 55400A is controlled by the Security switch on the IMC card. If this switch is OFF (No Password Required, default setting), you can enter any TL1 command without logging on. If the switch is set ON (Password Required), you must log on before entering any TL1 commands. See “About the Security Feature” on page -7.

**Use One of Symmetricom’s Graphical User Interface Network Management Software Applications Instead of Typing TL1 Commands**

To simplify tasks of configuration, commissioning, monitoring, and troubleshooting, you can use the 55450A Local Craft Terminal Software, or 55450AM Remote Management Software, or 55451A OSMF for NT Software, or 55452A OSMF for UX Software — this way, you don’t have to learn and type the TL1 commands. (Refer to the *55400A SSU System Manual* for more information on these software products.)

1.3.2 Two users may communicate with the system at the same time: one communicating through the local port and the other communicating through the remote port.

1.3.3 TL1 commands are used to perform the management tasks. These tasks are discussed in the following section.

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## 1.4 Network Management Tasks Performed Using TL1

1.4.1 TL1 commands are used to perform the following management tasks:

- Security management
- Configuration management
- System Administration management
- Performance monitoring
- Fault management
- Firmware downloading

1.4.2 TL1 commands are fully described in Chapter .

### ***1.4.2.1 Security Management Commands***

Security management commands are used when the Security switch on the IMC card has been set to ON (Password Required). These commands are used to protect system resources and information from unauthorized users by requiring users to log on before entering TL1 commands. There are three levels of security: SECURITY, ADMIN, and USER. There is an internal switch on the IMC card that enables or disables this security feature. Refer to the *55400A SSU System Manual* for the location and use of this switch. When the system is first shipped, the security feature is disabled. You must use the TL1 security commands to set up a new user, then set the switch to the Password Required setting before access to the 55400A can be controlled. See “About the Security Feature” on page -7 for complete information on the Security feature. See “Enabling the Security Feature” on page -9 in Chapter for procedure on enabling security. These commands are listed in Table 5-3 and described in the “Description of 55400A TL1 Commands” section of Chapter .

### ***1.4.2.2 Configuration Management Commands***

Configuration management commands, also known as Provisioning commands, in conjunction with “Keywords” (see tables 6-1 through 6-7 in Chapter ) are used to set up and configure the 55400A when it is first installed or when you want to change the system configuration. The system is shipped with factory board switch and jumper settings and software defaults. Refer to the *55400A SSU System Manual* for more information on the switch and jumper settings. Some of these settings can be changed by using the configuration management commands. These settings are listed in “Setting Up TL1 Communication” starting on page -5 of Chapter .

### ***1.4.2.3 System Administration Management Commands***

System administration commands are used to set and retrieve system information and force certain changes in system operation. These commands are listed in Table 5-6 and described in the “Description of 55400A TL1 Commands” section of Chapter .

#### ***1.4.2.4 Performance Monitoring Commands***

The 55400A is constantly measuring network performance. You can retrieve this information by using TL1 commands. Once you've collected this information and analyzed it, you can use the Performance Monitoring commands to help you improve network performance and identify possible future problems. These commands are listed in Table 5-5 and described in the "Description of 55400A TL1 Commands" section of Chapter .

#### ***1.4.2.5 Fault Management Commands and Automatic Messages***

Fault management is used to monitor alarms, maintain network performance, and to operate the 55400A as a whole and each essential component individually. Alarmed and non-alarmed events are configured by using the Provisioning commands to set thresholds, values, and conditions. The system is constantly testing network performance and itself to make sure it is operating properly and within the limits of the user-configurable system settings. If a fault is encountered, an alarm LED displays red on the front panel, an external indicator can be activated (if connected), and a message (automatic message) is displayed (if connected to a terminal).

Trouble events occurring in the 55400A and events occurring on the network are classified as alarmed or non-alarmed events and cause a message to be displayed and recorded in the system logs. In general, an alarmed event causes a standing condition and has immediate or potential impact on the operation of the 55400A or network performance.

Automatic Messages are described in Chapter of this manual. The events and alarms are described in Chapter .

#### ***1.4.2.6 Firmware Downloading Commands***

You can download new firmware to the 55400A through the local or remote communication port. TL1 commands are used to download new firmware to the IMC, ITH1, and ITH2 cards. These commands and procedure are described in Appendix A.



## 1.5 About the Security Feature

1.5.1 This section provides complete information on the Security feature of the 55400A.

### 1.5.1.1 *Security Disabled at Factory*

When shipped from the factory, the 55400A comes with the security feature *disabled*. The Security Switch on the IMC card is set to OFF—No Password Required. If the security feature is disabled, logging on is not necessary to enter TL1 commands. If it is important to protect the 55400A's resources and information from unauthorized users, enable the security feature to require users to log on before entering TL1 commands. A user must be added to the Security Database to be able to log on to the system. Security on the 55400A is controlled by:

- The Security Switch on the IMC Card
- The Security Database

### 1.5.1.2 *Security Switch and Database*

When shipped from the factory, the *Security Switch* on the IMC card is set OFF to the No Password Required setting, and the *Security Database* contains no user entries. In order to enable the security feature, you must first:

- add a new user (yourself) to the Security Database, then
- set the Security switch to the Password Required setting.

These procedures are described in “Enabling the Security Feature” on page -9.

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**CAUTION** Add a new user to the Security Database *before* setting the Security Switch on the IMC card to Password Required. If you set the IMC card switch first, you will *not* be able to log on to the 55400A.

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The 55400A Security Database can contain as many as ten users. Each user has a unique user name and password. A user password can be a string of up to ten characters where:

- At least two characters must be nonalphabetic.
- At least one special character must be included. A special character may be any printing character *except* a letter of the alphabet, a number, a comma, a colon or a semicolon. Passwords are case sensitive.

A security level is also assigned to each user to control which commands they can use. Each command has an associated security level. Therefore, you can use only those commands equal to or below your security level. Table 1-1 lists the possible levels of security.

**Table 1-1. Command Security Levels**

<b>Security Access</b>	<b>Security Enabled</b>	<b>Description</b>
None	No	No log on—can use command without logging on.
USER	Yes	Must log on— can only use USER (retrieving information) commands.
ADMIN	Yes	Must log on—can only use ADMIN (changing the configuration) commands. Can also use USER commands
SECURITY	Yes	Must log on—can use all commands including commands that modify the Security Database and download firmware.

## **1.6 Manual Assumptions**

1.6.1 This manual contains information for the Control Center Administrator who has experience working with synchronization supply units and TL1 commands. Information is relevant to the 55400A installed according to the instructions in the *55400A SSU System Manual*. The user may not have direct access to the 55400A, but may be remotely connected via the remote port.

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## 1.7 List of Terms

1.7.1 The terms listed in Table 1-2 relate to the 55400A and are used throughout this manual.

**Table 1-2. List of Terms**

<b>Term</b>	<b>Definition</b>
ACO	Alarm Cutoff
AIS	Alarm Indication Signal
ALM	Alarm
BITS	Building Integrated Timing Supply
CAS	Channel Associated Signaling
CCS	Common Channel Signaling
CRC4	Cyclic Redundancy Check
DCE	Data Communication Equipment
DDFS	Direct Digital Frequency Synthesizer
DSCTIME	Discontinuity Time
DTE	Data Terminal Equipment
ED	Edit
E1	CEPT 2048 kbps signal
EVT	Event
FFOFF	Fractional Frequency Offset
GPS	Global Positioning System
IMC	Information Management Card
ITH	Input Track and Hold Card
LMRTIE	Latest Maximum Relative Time Interval Error
LNC	Local Node Clock
LOS	Loss of Synchronization
MRTIE	Maximum Relative Time Interval Error
MTIE	Maximum Time Interval Error
NE	Network Equipment
NEM	Network Equipment Manufacturer
NIMC	Network Information Management Card
NTP	Network Timing Protocol
OOF	Out of Frame

**Table 1-2. List of Terms (continued)**

Term	Definition
PDH	Pleisiosynchronous Digital Hierarchy
REPT	Report
SCPI	Standard Commands for Programmable Instruments
SPRD	Spread
SSM	Synchronization Status Message
SSMB	Sync Status Message Byte
SSU	Synchronization Supply Unit
ST2	ANSI Stratum 2
TDEV	Time Deviation
TL1	Transaction Language 1
TNC	Transit Node Clock
TRSC	Traffic Re-Sync Card
TSG	Timing Signal Generator
WTRSS	Wait Time to Restore Sync Source



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## 2.1 Chapter Contents

2.1.1 This chapter provides basic information that helps you understand the 55400A system and the Transaction Language 1 (TL1) commands, which are needed to establish communications, and perform the necessary startup tasks.

2.1.2 This chapter is organized as follows:

- Introduction page 2-3
- Basic System Example page 2-4
- Setting Up TL1 Communication page 2-5
  - To Set Up TL1 Communication page 2-5
  - To Establish Communication With the 55400A page 2-6
  - To Verify the Communication Link page 2-8
- Startup Tasks page 2-9
  - Enabling the Security Feature page 2-9
  - Logging On page 2-10
  - Setting Date and Time page 2-11
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- Customizing System Settings page 2-21
  - ITH Card Switch Settings That Can Be Changed by TL1 Commands page 2-22
  - Operation with Mixed ITH Card Oscillators page 2-22

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## 2.2 Introduction

2.2.1 The operation of the 55400A is designed to be as automatic as possible. However, there are situations where you may want to change the configuration, enable security, set up new users, retrieve system information and performance monitoring information. The tasks described here are those most commonly encountered by new users.

2.2.2 Once the 55400A is connected through the local or remote port to a computer running the 55450A Local Craft Terminal Software or a terminal emulation program (such as Windows Hyper Terminal), you will be able to see the Automatic Messages displayed and to issue Transaction Language 1 (TL1) commands. Automatic Messages are described in Chapter , and TL1 commands are described in Chapter of this manual.

2.2.3 This chapter provides examples of tasks a new user might want to perform from a remote terminal when the 55400A is first installed. It includes the following topics:

- Basic System Example
- Setting Up Remote Communications
- Displaying Automatic Messages
- Events and Alarms
- Startup Tasks
- Customizing System Settings

**Example Commands are Underlined in this Chapter**

The examples in this chapter are brief. Refer to Chapter for more detailed information about the commands used in the examples. Refer to Appendix B for more example commands. *User* input in this chapter is underlined.

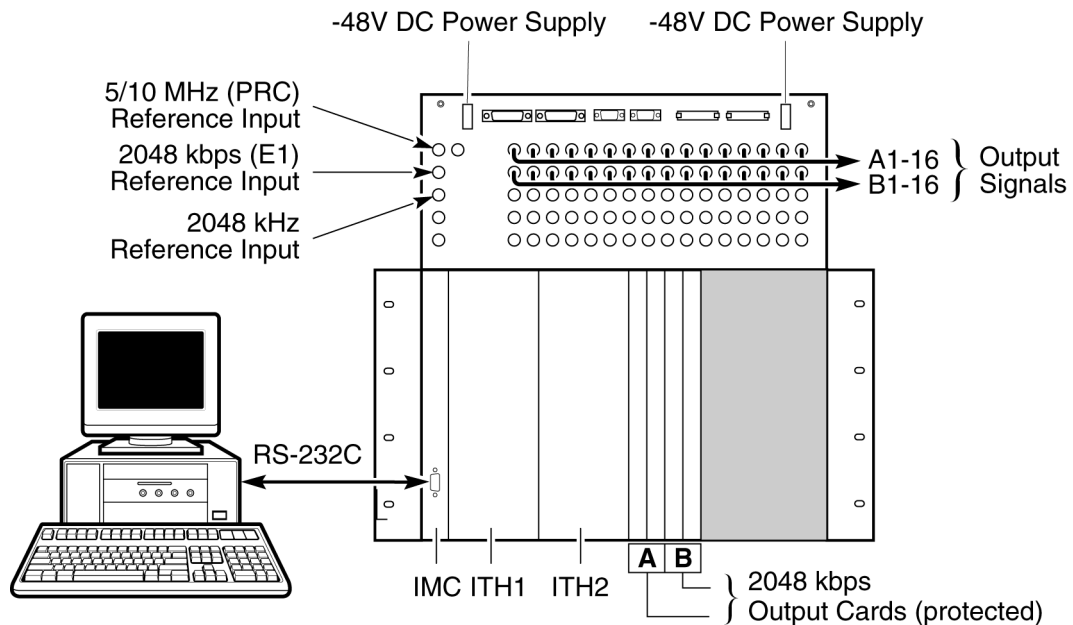
## 2.3 Basic System Example

2.3.1 The command examples in this chapter assume that you have installed the 55400A according to the instructions in the *55400A SSU System Manual*.

### An IMC Card is Needed for TL1 Command Use

If you do not have an IMC card, you CANNOT use TL1 commands.

2.3.2 An example of a basic 55400A system is shown in Figure 2-1.



**Figure 2-1. 55400A System Example**

2.3.3 The LEDs on the front of the SSU display information about the state of the IMC card, ITH cards, and the Output Cards. The IMC card's **Alarm Cutoff** button silences alarms. The IMC card's **Reset Comm Port** button resets the configuration of the Communication ports (Remote and Local) to match the switch settings on the IMC card.



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## **2.4 Setting Up TL1 Communication**

2.4.1 There are two communication ports (remote and local/craft) available on the 55400A which enable two users to be logged on at the same time, one at each port.

### ***2.4.1.1 To Set Up TL1 Communication***

To set up remote communication, set communication parameters of a terminal emulation program (such as the 55450A local craft terminal software) to match those of the 55400A. The default, factory-set 55400A parameters are:

- Baud Rate = 9600
- Data Bits = 8
- Stop Bits = 1
- Parity = None
- Flow Control = None
- Connector = Typically COM 1

Change the 55400A communications parameters using:

- one of the Graphical User Interface Network Management softwares (see the *55400A SSU System Manual* for more information on these software packages)
- the hardware switches on the IMC
- the TL1 commands (after establishing a communications link with the 55400A)

### 2.4.1.2 To Establish Communication With the 55400A

#### Remote Connection for the LAN and TP4 IMC Cards Differs from the X.25 IMC Card

All IMC cards provide an RS-232 Local port. However, the type of *remote* communication port depends on the specific IMC model. On the LAN IMC and the TP4 IMC cards, the remote connector on the subrack is disabled, and the remote LAN or TP4 connection is made at the front panel of the IMC or TP4 card.

However, for the X.25 card, the remote connector on the *subrack* is used to make remote the X.25 connection.

#### Establishing Communication Using the TL1 Commands

The **Local** port of the 55441A Information Management Card (IMC) and the **Remote Comm Port** of the connector panel of the Master Subrack shown in Figure 2-1 provides ports for computer communication with the 55400A. Both of these ports are active only when the IMC card is present.

The **Local** (RS-232C) and **Remote Comm Port** (RS-232D) serial data ports facilitate status reporting and control. The **Local** port (for local use) is wired as a DCE (Digital Communication Equipment). The **Remote Comm Port** (for remote use) is wired as a DTE (Data Terminal Equipment).

#### Establishing Communication Using the Graphical User Interface Network Management Software Applications

The easiest way to send commands to the 55400A is to use the 55450A Local Craft Terminal or 55450AM Remote Management Software. Perform the following steps:

- 1 Install the 55450 software.
- 2 Connect a 9-pin RS-232 serial port cable from the PC serial port connector to the **Local** port connector on the IMC card.

The cable should be a “straight through” type for modem communications, such as the 34398A cable with the 34399A 9 pin (male) to 9 pin (male) adapter.

- 3 Run the 55450 software.
- 4 Click **Yes** at the “**Do you want to open COM1 now?**” prompt.

If the “**Error received during attempt to communicate. Try to reconnect?**” prompt appears, click **No** and select the **Communication** tab. Then change the communications settings (port and baud rate) as appropriate and click the **Connect** checkbox.

- 5 After a communications link has been established, TL1 commands can be entered on the Communication form by clicking the bottom line in the white display box and then typing the command at the cursor.

### **Establishing Communication Using Hyper Terminal**

Another way to send TL1 commands to the 55400A is via a terminal emulator, such as the Hyper Terminal application in Windows® NT (or Windows® 95). The steps are:

- 1** In Windows NT (or Windows 95), main window, click the **Start** button then select **Programs**.
- 2** Select **Accessories, Hyperterminal, and Hyper Terminal**.
- 3** The **Connection Description** dialog box is displayed.
- 4** In the “Name” window, type **55400A** (for example), select one of the icons (the first one will do), then click **OK**.
- 5** The **Connect To** dialog box is displayed.
- 6** In the “Connect using” window, select the appropriate port or connector (COM1 or COM2), then click **OK**.
- 7** The **COM1 (or COM2) Properties** dialog box is displayed. This dialog box allows you to configure the RS-232 port of your PC.
- 8** Set the RS-232 port of your PC to match the following default values of the 55400A:

Baud Rate: 9600

(See the installation section in the *55400A SSU System Manual* that describes the IMC switch settings for S3-1 and S3-2 to verify that the IMC data rate switches are set for the same value.)

Parity: None

Data Bits: 8

Stop Bits: 1

Flow control (pacing): None.

FDuplex (Echo): On

### ***2.4.1.3 To Verify the Communication Link***

After communication parameters are set up for one port, you can verify that communication link between the 55400A and the computer is working. Enter a “;” (semicolon). A response indicates that communication between the computer and the 55400A has been established. For example:

```
i  
SSU 00-00-00 00:00:00  
M 0 DENY  
"IICT"  
/*Input, Invalid Correlation Tag (CTAG)*/  
i
```

If there is no response, refer to the *55400A SSU System Manual* to check the system installation and setup.

If installation and setup is okay, then refer to the maintenance and repair information in the *55400A SSU System Manual*.

---

## 2.5 Startup Tasks

2.5.1 This section gets you started and familiar with the initial tasks that need to be performed when you install a new (shipped from the factory) 55400A SSU into your network synchronization system.

### 2.5.1.1 Enabling the Security Feature

To enable the Security feature of the 55400A, you will need to:

- set the IMC card's Security Switch S4-1 to OFF (setting when shipped from the factory),
- delete any users in the current Security Database (optional),
- add a new user, and
- set the Security switch S4-1 ON ( Enable security, Password Required).

#### To Delete Security Database Users (Optional)

---

#### **NOTE**

This step is necessary *only* for reconfiguring an existing Security Database when you want to delete all users.

Use the DLT-SECU command. Refer to Chapter for more command information.

---

#### **NOTE**

The DLT-SECU command can only be executed if the Security switch is set to disable security.

For example:

```
DLT-SECU:::SC1;
    SSU 00-00-00 00:00:00
M 0 COMPLD
;
```

#### To Add a New User

Add a new user with the highest level of security (SECURITY) to the Security Database (See the ENT-USER-SECU command in Chapter .). For example:

```
ENT-USER-SECU:::FRED:SC1:::FRED.2,,SECURITY;
    SSU 00-00-00 00:00:00
M sc1 COMPLD
;
```

FRED is the username and FRED.2 is the user password in this example.

### To Set the Security Switch

- 1 Remove the IMC card.
- 2 On the IMC card, set the Security switch (S4-1) to ON (Enable Security — Password Required).
- 3 Insert the IMC card. Refer to the *55400A SSU System Manual* for more detailed information.

#### You Need to Log Onto the System to Use TL1 Commands

After setting the Security switch (S4-1 on the IMC) to Enable Security, log onto the system to use any of the TL1 commands.

Any command entered before logging on will be denied. For example:

```
RTRV-HDR:::SC1;
M SC1 DENY
  "PICC"
  /*Sorry, you are not authorized to execute this command. */
;
```

The error response is displayed because you did not log on before entering the RTRV-HDR command. Table 5-2 on page -12 lists the system error codes (such as PICC).

### 2.5.1.2 Logging On

If the security feature is enabled, you must log on before you can access the 55400A and enter TL1 commands. Enter your user name and password (see the ACT-USER command in Chapter ). For example:

```
ACT-USER:::FRED:SC1:::FRED.2;
SSU 00-00-00 00:00:00
M SC1 COMPLD
  "FRED: 00-00-00 00:00:00,0"
;
```

The logon event displays an Automatic Message (identified by the "A") on the terminal you are using.

```
SSU 00-00-00 00:00:00
A 0009 REPT EVT SESSION
  "LOCAL"
  /* NOTICE: This is a private computer system.
  Unauthorized access or use may lead to prosecution. */
;
```

**A Second User Logging Onto the Same Port Automatically Logs Off the First User.**

A second user logging onto the *same* port automatically logs off the first user. Two users can be logged onto the system at the same time: one at the remote port, and one at the local port.

Once you are logged on to the system, you can execute any of the commands equal to or below your security access level. For example, if you have SECURITY access, you can execute all TL1 commands. If you have ADMIN access, you can execute all ADMIN and USER level commands. If you have USER access, you can only execute USER level commands.

The Security Administrator can configure specific commands such that they can be executed by anyone without the need to log on. By default, only the ACT-USER and CANC-USER commands are so configured.

**2.5.1.3 Setting Date and Time**

All 55400A system messages include the system date and time. When shipped from the factory, the date and time have not been set up for your time zone. One of the first tasks a user should perform on a new 55400A is setting the system date and time (see the ED-DAT command in Chapter 4). For example, to set the date and time for January 2, 1998 at 3:30:45pm, send:

```
ED-DAT:::SC1::98-01-02,15-30-45;
```

```
SSU 98-01-02 15:30:45
```

```
M SC1 COMPLD
```

```
;
```

**2.5.1.4 Enabling and Disabling Input Channels**

The 55400A factory default has been configured in Automatic Synchronization mode with all input channels enabled. See “Automatic Mode (SYNCMDE=AUTO)” on page -6 in Chapter for more information on Automatic mode. If you did not connect all the input channels on your system (like the basic system example shown in this chapter), an alarm and an Automatic Message will display for each unconnected input channel. To clear the alarm condition and the Automatic Messages, disable the input channels that are not being used (see the ED-SYNC command in Chapter ). For example:

```
ED-SYNC-TSG::ITH-3:SC1:::ENABLE=N;
```

```
SSU 98-01-02 15:30:45
```

```
M SC1 COMPLD
```

```
;
```

This example disables input channel 3.

### 2.5.1.5 Changing Input Priority

The factory default is Automatic Synchronization mode with all of the input channels enabled, and each channel assigned a priority equal to its channel number plus 1. See “input priority” on page -6 in Chapter for more information on input channel priorities. For example:

Input Channel	Priority
PRC 0	1
1	2
2	3
3	4
4	5

The channel with the lowest numerical priority has the highest input priority when all other factors are equal. See “Disqualifying an Input Channel” on page -4 in Chapter for more information on input channel qualification. When two channels are assigned the same priority, the lowest numbered channel is selected for the input reference.

Use the ED-SYNC command to change the selection priority for an input channel. See the ED-SYNC command in Chapter for more information.

```
ED-SYNC::ITH-1:SC1:::PRIORITY=5;
```

```
SSU 98-01-02 15:30:45
```

```
M SC1 COMPLD
```

```
;
```

The priority on the input channel 1 is now set to 5.

### 2.5.1.6 Changing Output Card Parameters

Like input channels, output cards have default system settings. All output cards and ports are enabled when shipped from the factory. You can disable an output card port by using a TL1 command (see the ED-SYNC-TSG command in Chapter ). For example:

```
ED-SYNC-TSG::OUTA-3:SC1:::SQUELCH=Y;
```

```
SSU 98-01-02 15:30:45
```

```
M SC1 COMPLD
```

```
;
```

This command disables port 3 of Output Card A.



### 2.5.1.7 Logging Off

Use the CANC-USER command to log off of the system (see the CANC-USER command in Chapter ). For example:

```
CANC-USER:::SC1;
      SSU 98-01-02 15:30:45
M SC1 COMPLD
      FRED
;
```

When logging off, an Automatic Message will display at the port you were using.

```
      SSU 98-01-02 16:30:45
A 0010 CANC
      FRED
;
```

The following system information is saved even if system power is interrupted:

- The Event Log
- System Configuration
- Security Database

---

#### **NOTE**

---

All the Automatic Messages stored in the Automatic Output Log are deleted when the IMC is powered down.

For more detailed information about the commands used to perform these tasks, see Chapter . For more informaion about the event log and the Automatic Output log, see “Retrieving System Logs” on page -18.

---

## 2.6 Retrieving System Information and Status

2.6.1 This section describes how to use TL1 commands to retrieve information/status of the 55400A SSU system.

---

### **NOTE**

If the Security feature is enabled, you will need to log on to the system before sending retrieval commands. See "Logging On" on page -10.

#### ***2.6.1.1 Retrieving Inventory Information***

If you want to verify what equipment and version is included in your system, you can use a TL1 command (see RTRV-NETYPE-ALL in Chapter ). For example:

```

RTRV-NETYPE-ALL:::SC1;

IP SC1
<
  SSU 00-00-00 00:00:00
M  sc1 RTRV
  "TSG:Symmetricom,55400,TSG"
  "S0-IMC:,55442/004,,R3833C"
  "S0-ITH1:,55411,,R3833C"
  "S0-ITH2:,55411,,R3833C"
  "S0-OUT9E:,55481"
  "S0-OUT10E:,55481"
>IP SC1
<
  SSU 00-00-00 00:00:00
M SC1 RTRV
  "S1-IMC:,55443,,R3833C"
  "S1-ITH1:,55419,,R3833C"
  "S1-ITH2:,55419,,R3833C"
  "S1-OUT5C:,55481"
  "S1-OUT6C:,55481"
>
  SSU 00-00-00 00:00:00
M SC1 COMPLD
  "S2-IMC:,55443,,R3833B"
  "S2-ITH1:,55419,,R3833B"

```

```
"S2-ITH2: , 55419 , , R3833B"  
"S2-OUT9E: , 55482"  
"S2-OUT10E: , 55482"  
;
```

**The information retrieved from the response message in this example includes:**

- expansion subrack number (Sn-)
- company, model number, equipment type
- IMC card model number and firmware revision
- ITH1 card model number and firmware revision
- ITH2 card model number and firmware revision
- Output card(s) and model number

### 2.6.1.2 Retrieving System Information

You can also find out the state of the ITH cards, input signals, and output cards by using a TL1 command (see RTRV-COND-TSG in Chapter ). For example:

```
RTRV-COND-TSG:::SC1;  
  
IP SC1  
<  
SSU 00-00-00 00:00:00  
  
M SC1 RTRV  
"S0-ITH2:NA,SNHAVL,NSA,,,,,\"Holdover available\""  
"S0-ITH2:NA,ITHACTV,NSA,,,,,\"ITH Active\""  
"S0-ITH2-1:NR,INPLOS,NSA,,,,,\"Input Loss of signal\""  
"S0-ITH2-2:NR,INPLOS,NSA,,,,,\"Input Loss of signal\""  
"S0-ITH2-1:MN,INDISQ,NSA,,,,,\"Input disqualified\""  
"S0-ITH2-2:MN,INDISQ,NSA,,,,,\"Input disqualified\""  
"S0-ITH2-0:NA,SNTRCK,NSA,,,,,\"Tracking this input\""  
  
>IP SC1  
<  
SSU 00-00-00 00:00:00  
  
M SC1 RTRV  
"S1-ITH2:NA,ITHACTV,NSA,,,,,\"ITH Active\""
```

```
>
SSU 00-00-00 00:00:00
M SC1 RTRV
"S3-ITH2:NA,ITHACTV,NSA,,,,,\"ITH Active\""
>
SSU 00-00-00 00:00:00
M SC1 RTRV
"TSG:NR,CFGCHD,NSA,,,1,,,\"Configuration changed\""
"TSG:NR,LSTCFG,NSA,,,1,,,\"Latest Configuration Change\""
>
SSU 00-00-00 00:00:00
M SC1 COMPLD
;
```

**The information retrieved from the response message in this example includes:**

- which expansion subrack (Sn-)
- which ITH card is active
- input channel information (disqualified alarms, tracking)
- Configuration change information

### 2.6.1.3 Retrieving Configuration Information

The 55400A has been configured at the factory with default system settings. These settings control the operation and the information retrieved by the 55400A. Before using the 55400A to distribute input signals, you can check the default system settings to make sure they are suited for your network needs (see the RTRV-SYNC and RTRV-EQPT commands in Chapter ). For example:

```
RTRV-SYNC::ITH-0:SC1::PARAMETER=PRIORITY&ENABLE;  
  
SSU 98-02-22 12:06:51  
M SC1 COMPLD  
  "ITH-0::PRIORITY = 1"  
  "ITH-0::ENABLE = Y"  
  
;
```

This example shows that input channel 0 is enabled and has a priority equal to one. You can use this command to retrieve configuration information about each input channel to find out if you want to change these settings. The settings that can be changed using TL1 commands are listed in the section “Customizing System Settings” on page -21.

### 2.6.1.4 Retrieving Performance Monitoring Information

The 55400A is constantly measuring the performance of the network. These measurements are described in the section “Measurement Summary” on page -4 of Chapter . The system can retrieve performance monitoring information automatically or when needed by using a TL1 command (default is when needed). You can request that the system automatically retrieve performance monitoring information. See the section “Automatically Displaying Measurement Data” on page -16 in Chapter . You can retrieve current performance monitoring information about an input channel by using the RTRV-PM-TSG command. For example:

```
RTRV-PM-TSG::ITH-4:SC1::MRTIE;  
  
SSU 98-09-05 12:07:38  
M SC1 COMPLD  
  "ITH1-4:MRTIE-1S,2.000000,COMPL,,75-MIN"  
  "ITH1-4:MRTIE-1M,2.000000,COMPL,,75-MIN"  
  "ITH1-4:MRTIE-15M,2.000000,COMPL,,75-MIN"  
  "ITH1-4:MRTIE-30M,2.000000,COMPL,,75-MIN"  
  "ITH1-4:MRTIE-1H,2.000000,COMPL,,75-MIN"  
  "ITH1-4:MRTIE-2H,NA,NA,,75-MIN"  
  "ITH1-4:MRTIE-8H,NA,NA,,75-MIN"  
  "ITH1-4:MRTIE-24H,NA,NA,,75-MIN"  
  
;
```

The example indicates that MRTIE data has been collected over the past 75 minutes (known as 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, 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 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.

**NOTE**

Once the measurement time reaches 24 hours, data prior to 24 hours will be lost as new data is collected. The <ITH1-4> field indicates that this data was collected by the ITH card 1 for input 4.

**2.6.1.5 Retrieving System Logs**

The 55400 maintains two logs to track system activity. They are:

- The Automatic Output (AO) Log records recent Automatic Messages in sequential order (Use the RTRV-AO command.). The AO Log can be used for viewing messages that may have been missed while the communications terminal was disconnected.
- The Event Log records events in sequential order (Use the RTRV-LOG command.) This log is battery backed up. The Event Log provides a method of reviewing network performance and therefore, may provide clues to the cause of reduced network performance. The user can configure which events are to be recorded in the Events Log.

Chapter contains a more detailed explanation of these logs.

Use the RTRV-AO command to display all of the Automatic Output Log entries (see the RTRV-AO command in Chapter ):

```
RTRV-AO:::SC1;
SSU 98-09-06 12:14:37
** 0014 REPT ALM TSG
"ITH1:MJ,SNHOLD:SA,,,,:\Holdover mode\","
;
```

**NOTE**

When you retrieve the Automatic Output Log, the messages will scroll by very fast. If you want to see each message, specify a small range of message numbers (for example, using the ATAGSEQ parameter; see the RTRV-AO command in Chapter ) or you can log the messages to a file by using your terminal emulation program. See your terminal emulation program manual for specific instructions.

Use the RTRV-LOG to display the Event Log, starting with the most recently logged event (see the RTRV-LOG command in Chapter ):

```
RTRV-LOG: : ITH:SC8::EVTTOP;  
  
>IP SC8  
    SSU 1998-11-30 14:27:22  
M SC8 COMPLD  
    "EVTTOP"  
/*  
    "ITH2:NA,SNSAVL,NSA,11-27,03-42-56:\SmartClock available\""  
    "ITH2:NA,SNOPER,NSA,11-25,19-45-00:\Sync in normal operating mode\""  
    "ITH2-4:MN,INDISQ,NSA,11-25,14-08-48:\Input disqualified\""  
    "ITH2-3:MN,INDISQ,NSA,11-25,14-08-48:\Input disqualified\""  
    "ITH2-2:MN,INDISQ,NSA,11-25,14-08-48:\Input disqualified\""  
    "ITH2-1:MN,INDISQ,NSA,11-25,14-08-48:\Input disqualified\""  
*/  
;  
;
```

### 2.6.1.6 Retrieving Alarm Information

To review the active alarms on the system, you can use a TL1 command (see the RTRV-ALM-TSG command in Chapter ). For example, the following command provides the same information as the RTRV-COND command except that only alarmed conditions are reported:

```
RTRV-ALM-TSG: : SC1;  
  
    SSU 98-01-02 16:30:45  
M SC1 RTRV  
    "ITH-1:MN,INDISQ,NSA,,:\Input disqualified\""  
    >  
    SSU 98-01-02 16:30:45  
M SC1 COMPLD  
    "ITH2:MJ,SNFAIL,SA,,:\Sync failure\"";
```

---

**NOTE**

If available, the Event Message will include a problem code. This code can be used to help Symmetricom service personnel diagnose system problems.

---

## 2.7 Displaying Automatic Messages

2.7.1 After remote communication is established, Automatic Messages can be displayed. Automatic Messages report alarmed or non-alarmed events. In general, alarmed events cause a standing condition and have immediate or potential impact on the operation or performance of the 55400A.

**Table 2-1. Automatic Messages Display**

Condition	Message Displayed
User logs off	CANC
An alarmed event occurs. See default settings for alarmed events in Chapter .	REPT ALM TSG
A non-alarmed event occurs. See Chapter .	REPT EVT TSG
User logs on	REPT EVT SESSION
A performance monitoring measurement has been updated. See Chapter .	REPT PM TSG

2.7.2 Refer to Chapter for more information about Automatic Messages and to Chapter for more information about alarmed and non-alarmed events.

2.7.3 You can use the Provisioning Commands (ED-EQPT) to change the conditions under which a message displays. Refer to Chapter for command descriptions.

### 2.7.3.1 Alarmed Events

Events can be configured to cause an alarm which displays the Automatic Message REPT-ALM-TSG. For example:

```
SSU 98-01-02 16:31:00
** 0014 REPT ALM TSG
"ITH-1:MJ,SNHOLD:SA,,,,:\ "Holdover mode\","
;
```

Message (0014) indicates the loss of all trackable inputs and the automatic switching to Holdover mode (SNHOLD). Entering Holdover mode generates a Major Alarm (MJ) and affects the operation of the network (SA).

---

**NOTE**

The system is shipped with all input channels enabled. Each unconnected input channel generates a Minor Alarm when the 55400A is first powered on. This alarm indicates that an input signal has not been detected on an input channel that is enabled. To clear this alarm, use the ENABLE and MONITOR keywords to disable every input channel that does not have an input signal connected. Refer to Chapter for more information on the ENABLE and MONITOR keywords.

---



If a REPT ALM TSG displays, take corrective action based on the alarm condition as described in the *55400A SSU System Manual*.

### 2.7.3.2 Non-Alarmed Events

The REPT EVT TSG Automatic Message reports non-alarmed events. For example:

```
SSU 95-09-06 12:12:21
A 0011 REPT EVT TSG
  "ITH1-4:SNTRCK:CL,,,,:\"ENDED Tracking this input\","
;
SSU 95-09-06 12:12:21
A 0012 REPT EVT TSG
  "ITH1-0:SNTRCK:SC,,,,:\"Tracking this input\","
;
```

This pair of messages indicates that the unit has stopped tracking input 4 and is now tracking input 0.

---

## 2.8 Customizing System Settings

2.8.1 The 55400A is configured at the factory with default system settings. The *55400A SSU System Manual* contains a detailed description of these settings. Some of the system settings can be configured by using the Provisioning commands while others must be set on the card itself. The tables in this section list the card switch setting and the corresponding keyword that can be used to change the setting. Refer to Chapter for more information about the keywords listed in these tables.

2.8.2 It is possible for you to change certain system settings using TL1 commands and to have them revert back to their original factory default setting. This can happen at power-up of the 55400A. System configuration may be reset to default values as defined by switches and jumpers on the internal cards under the following conditions:

- Hardware switch set to force reading switches
- Failure of non-volatile RAM
- Download of new firmware
- Pressing the Reset Comm button on the front panel of the IMC (only effects comm settings)

2.8.3 Refer to the *55400A SSU System Manual* for more information.

### ***2.8.3.1 ITH Card Switch Settings That Can Be Changed by TL1 Commands***

The ITH card switch settings that can be changed by using a TL1 command (ED-SYNC) and keyword are listed in the table below.

**Table 2-2. ITH Card Switch Settings**

<b>Default Setting</b>	<b>Keyword</b>
Input mode is 2048 kHz	FORMAT
All inputs are enabled	ENABLE
2048 kbps signal mode is CAS	SIGMODE
2048 kbps CRC4 checking is enabled	CRC4
PRC input frequency is 10 MHz	PRC5MHZ
Input priority	PRIORITY
Tracking is Revertive	REVERT

### ***2.8.3.2 Operation with Mixed ITH Card Oscillators***

If you wish to mix oscillators, Table 2-3 lists the oscillator combinations that are supported (see also Table 2-4 on page -23).

**Table 2-3. Supported Combinations of Mixed ITH Card Oscillators**

<b>Primary</b>	<b>Secondary (contains inferior oscillator)</b>
55414 Stratum 2 ITH Rubidium Card	55411 Stratum 2 ITH Card
55414 Stratum 2 ITH Rubidium Card	55415 Enhanced Transit Node ITH Card
55411 Stratum 2 ITH Card	55412 Transit Node ITH Card
55411 Stratum 2 ITH Card	55413 Local Node ITH Card
55415 Enhanced Transit Node ITH Card	55412 Transit Node ITH Card
55415 Enhanced Transit Node ITH Card	55413 Local Node ITH Card

Three different commands are used to configure the "inferior" oscillator. When the inferior oscillator becomes the active ITH, a non-logged, minor alarm event is generated by that card. Normal operation dictates that once the superior ITH card is operating normally again, an automatic switching will take place to make the superior card active. All these configurations involve the setting of the mixed oscillator switch (S4-7) on the inferior card.

Table 2-4 lists additional combinations of oscillators that are supported, but they are of such a similar performance that technically they are not considered different. However, it is still necessary to treat the lesser oscillator as the inferior and use the mixed oscillator commands to configure pull-in range, tracking time constant, and SSM value. The mixed oscillator switch (S4-7) should be left in the ON position for both cards. No event is generated when the lesser oscillator card is active. And no automatic switching takes place from the lesser ITH card to the greater.

**Table 2-4. Greater/Lesser Combinations of Mixed ITH Card Oscillators**

Primary	Secondary (contains inferior oscillator)
55411 Stratum 2 ITH Card	55415 Enhanced Transit Node ITH Card
55412 Transit Node ITH Card	55413 Local Node ITH Card

**2.8.3.3 IMC Card Switch Settings That Can Be Changed by TL1 Commands**  
*The IMC card switch settings that can be changed by using a TL1 command (ED-SYNC) and keyword are listed in Table 2-5. Pressing the Reset Comm button on the front panel of the IMC will*

**Table 2-5. IMC Card Switch Settings**

Name	Keyword
Local/remote echo mode	LCLECHO, RMTECHO
Local/remote serial port baud rate is 9600	LCLBAUD, RMTBAUD
Local/remote serial port flow control is disabled	LCLFLOW, RMTFLOW

*reset the Local port parameters to the values set by the hardware switches.*

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---

## **3.1 Chapter Contents**

3.1.1 This chapter describes the messages that can be displayed automatically on a remote or local terminal connected to the 55400A.

3.1.2 This chapter is organized as follows:

- About Automatic Messages page 3-3
- Automatic Message Syntax page 3-4
  - Alarmed Automatic Messages page 3-4
  - Non-Alarmed Automatic Messages page 3-4
- Message Summary page 3-5
- Description of the Automatic Messages page 3-5

---

## 3.2 About Automatic Messages

3.2.1 Automatic Messages, as their name indicates, automatically report network and system alarmed and non-alarmed events. Events are conditions that are detected by the 55400A. The ALM property of each event determines how it is reported, if at all. For most events, this property is user configurable (see Chapter ). Therefore, you can control which Automatic Messages are generated by the system. These messages keep you up to date with the state of the network and the 55400A. This chapter describes the Automatic Messages that can be displayed on a remote or local terminal connected to the 55400A.

3.2.2 As soon as a terminal emulation program is set up to communicate with the 55400A, Automatic Messages can be displayed to notify you of system events. These messages are automatically generated by the 55400A, saved in the Automatic Output (AO) Log, and sent to the communications ports (and displayed if there is a terminal connected to the port). There are various types of Automatic Messages:

- Alarmed event messages use the RPT ALM TSG header, include the character(s), \*\*, \*, or \*C at the beginning of the second line, and are saved in the Automatic Output (AO) Log.
- Non-alarmed event messages use the RPT EVT TSG header, include the letter A at the beginning of the second line, and are saved in the Automatic Output (AO) Log. This includes transient events. In contrast, responses to commands include the letter M at the beginning of the second line.

---

### 3.3 Automatic Message Syntax

3.3.1 This section shows the information that is displayed in the different types of Automatic Messages.

#### 3.3.1.1 Alarmed Automatic Messages

3.3.1.2 This message would display when the 55400A enters Holdover mode.

```
SSU 95-09-06 12:14:37
** 0014 REPT ALM TSG
   ITH-1:MJ,SNHOLD:SA,,,,:\ "Holdover mode\","
;
```

Where:

- Line 1 = header (System Identifier, date, time)
- Line 2 = message type = alarmed (\*\* Major alarm), the message number (0014), and the message itself (REPT ALM TSG)
- Line 3 = affected unit (ITH-1), a Major Alarm (MJ), the keyword (SNHOLD), the Service Affecting indication (SA), and the message content (Holdover mode)

#### 3.3.1.3 Non-Alarmed Automatic Messages

The following messages indicate automatic switching from using input port 4 to using input port 0 (PRC) as the reference signal. Both of these are non-alarmed events.

```
SSU 95-09-06 12:12:21
A 0011 REPT EVT TSG
   ITH1-4:SNTRCK:CL,,,,:\ "ENDED Tracking this input\","
;
```

```
SSU 95-09-06 12:12:21
A 0012 REPT EVT TSG
   ITH1-0:SNTRCK:SC,,,,:\ "Tracking this input\","
;
```

Where:

SNTRCK = <event> See Chapter .

CL, SC = <condeff>. See Table 5-1 on page -7 section in Chapter .



---

## 3.4 Message Summary

3.4.1 Table 3-1 lists the Automatic Messages that can be displayed.

**Table 3-1. Automatic Message Summary**

---

<b>Message</b>	<b>Description</b>	<b>Comment</b>
CANC	Reports user logged off	Sent only to affected port
REPT ALM TSG	Reports alarm events	Sent to both ports
REPT EVT SESSION	Reports user logged on	Sent only to affected port
REPT EVT TSG	Reports non-alarmed events	Sent to both ports
REPT PM TSG	Reports performance monitoring data	Sent to both ports

---

## 3.5 Description of the Automatic Messages

3.5.1 The following sections describes each of the Automatic Messages.

---

## 3.6 CANC

The CANC message is generated when a user logs off the system or when the user has been automatically logged off by another user (with SECURITY access). It is sent only to the affected port.

### Example

```
SSU 96-01-02 16:30:45
A 0010 CANC
FRED
```

This message reports that the current user, FRED, has just logged off the system.

---

## 3.7 REPT ALM TSG

The REPT ALM TSG message is generated by the 55400A to report the occurrence of 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 55400A. The system is shipped from the factory with default settings that specify what conditions cause an alarm. You can change these settings by using the ED-EQPT command (see Chapter of this manual).

### Examples

The following message indicates that the 55400A has just automatically switched to Holdover mode (see Chapter for more information about Holdover mode). Entering Holdover mode generates a Major Alarm.

```
SSU 95-09-06 12:14:37
** 0014 REPT ALM TSG
   "ITH1:MJ,SNHOLD,SA,,,,:\ "Holdover mode\","
;

```

Where:

\*\* = Alarm severity:

\*\* = Major Alarm

\* = Minor Alarm

\*C= Critical Alarm

A = Alarm cleared—no alarm

MJ = <ntfncde> Major Alarm. See Table 5-1 on page -7 in Chapter .

SNHOLD = <event> See Chapter .

SA = <srveff> See Table 5-1 on page -7 in Chapter .

---

### NOTE

If available, the Event Message will include a problem code as shown below. This code can be used to help Symmetricom service personnel diagnose system problems.

```
SSU 95-09-06 12:14:37
** 0014 REPT ALM TSG
   "ITH1:MJ,ITHOFFL,SA,07-31,12-00-39:\ "ITH Offline (Code 3)\","
;

```

---

## 3.8 REPT EVT SESSION

The REPT EVT SESSION message is generated when you log on. It is sent only to the port that you are using.

### Example

```
SSU 96-01-02 15:30:45
A 0009 REPT EVT SESSION
  "LOCAL"
  /* NOTICE: This is a private computer system.
  Unauthorized access or use may lead to prosecution. */
;
```

---

## 3.9 REPT EVT TSG

The REPT EVT TSG message is generated by the 55400A to report the occurrence of a non-alarmed event. Examples of non-alarmed events are: a change of status or the occurrence of a system irregularity, which by itself is not severe enough to warrant an alarm notification (such as performance threshold crossing; see Chapter ).

### Examples

The following messages indicate automatic switching from using input port 4 to using input port 0 (PRC) as the reference signal. Both of these are non-alarmed events.

```
SSU 95-09-06 12:12:21
A 0011 REPT EVT TSG
  "ITH1-4:SNTRCK:CL,,,,:\"ENDED Tracking this input\","
;
SSU 95-09-06 12:12:21
A 0012 REPT EVT TSG
  "ITH1-0:SNTRCK:SC,,,,:\"Tracking this input\","
;
```

Where:

SNTRCK = <event> See Chapter .

CL, SC = <condeff>. See Table 5-1 on page -7 in Chapter .

---

### 3.10 REPT PM TSG

The system has been configured at the factory to display performance monitoring information on demand. If you want the system to automatically display performance monitoring information, you must set up the system by using TL1 commands (see “Setting Up/Displaying Measurement Properties” on page -13 in Chapter ).

If you have set up the system to automatically display performance monitoring information, the REPT-PM-TSG message displays with the performance monitoring information when the measurements are available. For example:

#### Example

```

SSU 96-01-02 15:30:45
A 0009 REPT PM TSG
" ITH1-4:MRTIE-1S,2.000000,COMPL,,,75-MIN"
" ITH1-4:MRTIE-15M,2.000000,COMPL,,,75-MIN"
" ITH1-4:MRTIE-30M,2.000000,COMPL,,,75-MIN"
" ITH1-4:MRTIE-1H,2.000000,COMPL,,,75-MIN"
" ITH1-4:MRTIE-2H,NA,NA,,,75-MIN"
" ITH1-4:MRTIE-8H,NA,NA,,,75-MIN"
" ITH1-4:MRTIE-24H,NA,NA,,,75-MIN"

```

The example indicates that MRTIE data has been collected over the past 75 minutes (known as measurement time), and MRTIE values have been calculated for observation times of 1 second, 15 and 30 minutes, and 1 hour. The values for 2, 8, and 24 hour intervals will be available as the unit continues to collect data.

---

Synchronization Modes and Input  
Qualification

---

## 4.1 Chapter Contents

4.1.1 This chapter also discusses the how the 55400A chooses an input signal as a synchronization source and how it qualifies and disqualifies inputs.

4.1.2 This chapter is organized as follows:

- Overview of Synchronization Modes and Input Qualification page 4-3
- Qualifying an Input Channel page 4-3
- Disqualifying an Input Channel page 4-4
- Synchronization Modes page 4-6
  - Automatic Mode (SYNCMDE=AUTO) page 4-6
  - Automatic Mode Revertive/Non-Revertive page 4-7
  - Manual Mode (SYNCMDE=MANUAL) page 4-7
  - Manual Mode Revertive/Non-Revertive page 4-7
  - Forced Mode (SYNCMDE=FORCED) page 4-7
  - Forced Mode Revertive/Non-Revertive page 4-7
  - SSM Mode (SYNCMDE=SSM) page 4-7
  - Output Time Slot Zero (TS0 ) Bits page 4-8



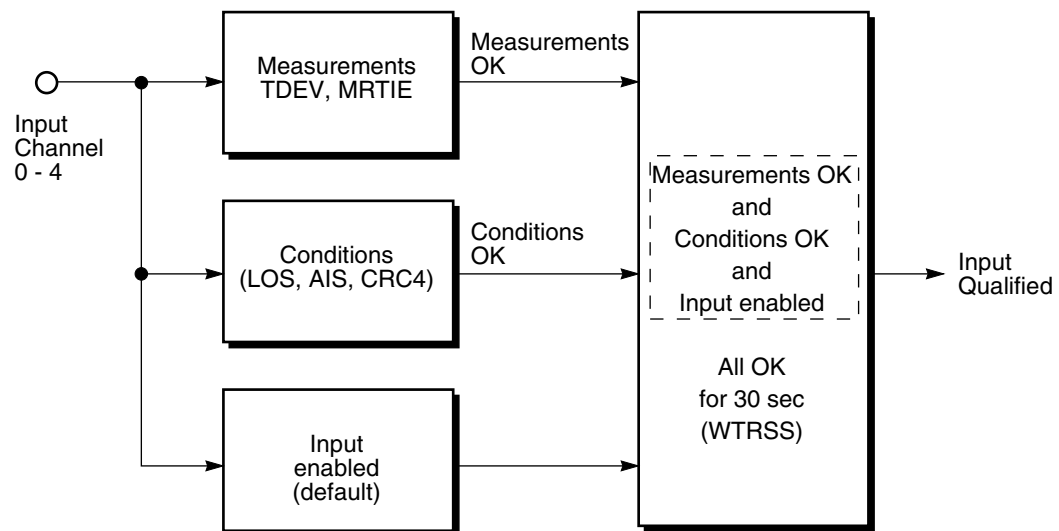
## 4.2 Overview of Synchronization Modes and Input Qualification

4.2.1 The 55400A chooses an input as a synchronization source by taking into account the following information:

- Qualified input channels, if any
- Current system synchronization mode

## 4.3 Qualifying an Input Channel

4.3.1 Input channels are considered as possible reference sources once they become qualified. The following figure shows how the 55400A qualifies or disqualifies an input channel. Note that not all of the Measurements or Conditions are shown in Figure 4-1. They are subject to user configuration.



**Figure 4-1. Input Channel Qualification**

4.3.2 More than one (of the nine possible) or no input channel may be qualified as a possible reference source. An input channel that has been qualified and used as the synchronization source may become disqualified because *measurements* or *conditions* change (for example, the Measurements OK and Conditions OK lines in Figure 7-1 changing to not OK). In the case where there are no qualified input channels, the system switches to Holdover mode.

4.3.3 If an input channel that has been used as a reference source becomes disqualified, and other qualified channels are available, the synchronization mode determines which channel will now be tracked.

### ***4.3.3.1 SSM Channel Qualification***

The following information is used to qualify an input channel when the system is in SSM synchronization mode.

- If the input is an E1 input, the keyword `CRC4 = Y`, and the keyword `SSMENB = Y`, then the SSM value will be read from the E1 input. In all other cases, the SSM value is given by the `QLEVEL` keyword.
- The input will not be SSM qualified if the SSM value does not meet its `QCUTOFF` value.
- The input must meet all the qualification requirements of automatic mode (in addition to the above conditions) in order to be SSM qualified.

## **4.4 Disqualifying an Input Channel**

4.4.1 As shown in Figure 4-1, an input channel can be automatically disqualified by the 55400A if one the following events occur:

- A measurement crosses a threshold (described in “Setting Up/Displaying Measurement Properties” on page -13). See also `MEASDLY` keyword in Chapter .
- A condition (such as AIS) is detected (described in Chapter ).
- The input is disabled (described in Chapter ).
- All conditions are not okay for the value of `WTRSS` wait time (described in Chapter ).

4.4.2 One way to disqualify an input channel is to disable it. For example:

```
ED-EQPT::ITH-1:SC1:::ENABLE=N;
SSU 96-01-02 15:30:45
M sc1 COMPLD
;
```

**Disqualifying an Input Channel**

4.4.3 The occurrence of certain events such as Loss of Signal (LOS) will also force the system to automatically disqualify an input.

```
SSU 96-02-26 12:58:30
** 0014 REPT ALM TSG
   "ITH1-0:MN,INDISQ:NSA,02-26,12-58-30:\\"Input disqualified\\""
;
SSU 96-02-26 12:58:30
** 0015 REPT EVT TSG
   "ITH1-0:SNTRCK,CL,02-26,12-58-30:\\"ENDED Tracking this input\\""
;
SSU 96-02-26 12:58:30
** 0016 REPT ALM TSG
   "ITH1-0:MJ,SNHOLD:SA,02-26,12-58-30:\\"Holdover mode\\""
;
```

4.4.4 Once input channels have been qualified, the next step in selecting the synchronization source is to determine the synchronization mode. Synchronization modes are described in the next section.

---

## 4.5 Synchronization Modes

4.5.1 From among the channels that are determined to be qualified, the 55400A selects the channel to be tracked according to the following synchronization modes.

- Automatic (default)
- Manual
- Forced
- Synchronization Status Message (SSM)

4.5.2 When shipped from the factory, the system is configured in Automatic mode. You can change the synchronization mode by using the ED-EQPT command with the SYNCMDE keyword. For example:

```
ED-EQPT::ITH:SC1:::SYNCMDE=MANUAL;
```

4.5.3 This example shows how to tell the system to use the manually selected channel as specified by the MANUAL keyword. Refer to the Manual mode described later in this chapter.

### 4.5.3.1 Automatic Mode (SYNCMDE=AUTO)

4.5.4 Automatic mode is the default synchronization mode of the 55400A. The chosen synchronization source will be the highest priority channel (at the time the selection algorithm is executed) from among those determined to be qualified. If more than one qualified channel has the same priority, the lower numbered channel is selected. The default values for input channel priority are:

Input Channel	Priority
PRC 0	1
1	2
2	3
3	4
4	5

4.5.5 You can change the input channel priority by using the ED-SYNC command. For example:

```
ED-SYNC::ITH-3:SC1:::PRIORITY=1;
```

4.5.6 This example shows how to set input channel 3 to a priority of 1 (the highest priority).

4.5.7 If no channel is qualified, the 55400A enters Holdover mode.

#### ***4.5.7.1 Automatic Mode Revertive/Non-Revertive***

If using revertive mode (keyword REVERT=Y) then the selection algorithm will be re-examined each time any channel changes its qualification status. Thus, the tracked channel will always be the highest priority channel from among those determined to be qualified. Among qualified channels with the same priority, the lower numbered channel will always be selected.

If using non-revertive mode (keyword REVERT=N) the tracked channel will not change unless the currently tracked channel becomes disqualified. If that happens, the selection algorithm will again be executed, and the newly selected channel will be tracked until it becomes disqualified. If in holdover mode (i.e., if no channel is qualified), and a channel then becomes qualified, the unit will switch to tracking that channel, even though the mode is non-revertive.

#### ***4.5.7.2 Manual Mode (SYNCMDE=MANUAL)***

The channel specified by the MANCHAN keyword, will be tracked if it is qualified. If the specified channel is not qualified, then the unit will behave as if it is in Automatic Mode. If the channel specified by the MANCHAN keyword then becomes available, the unit will switch back to tracking that channel.

#### ***4.5.7.3 Manual Mode Revertive/Non-Revertive***

Note that the unit will always track the MANCHAN specified channel if that channel is qualified, regardless of the setting of the REVERT keyword. However, while the MANCHAN channel is disqualified, the REVERT keyword will affect channel selection, as described above under Automatic Mode, but only until the MANCHAN channel again becomes qualified (at which time the unit will unconditionally switch back to tracking that channel).

#### ***4.5.7.4 Forced Mode (SYNCMDE=FORCED)***

The channel specified by the MANCHAN keyword, will be tracked if it is qualified. If the specified channel is not qualified, then the unit will enter holdover mode, and remain in Holdover until the specified channel again becomes available. The FORCED Synchronization Mode is used primarily for testing purposes.

#### ***4.5.7.5 Forced Mode Revertive/Non-Revertive***

The REVERT keyword has no effect on Forced Mode. The unit will always track the MANCHAN specified channel when it is qualified, and will enter holdover mode only while the MANCHAN specified channel is not qualified.

#### ***4.5.7.6 SSM Mode (SYNCMDE=SSM)***

The SSM channel selection algorithm allows for both revertive and non-revertive influence. There are three values that help choose between SSM qualified channels.

- The SSM value for each qualified channel takes highest precedence. The final choice will be from an SSM qualified channel with the lowest SSM value.

- The SSMPRI keyword value for each SSM qualified channel allows specification of priority groups. These values do not need to be unique. When there are several channels at the lowest SSM value, the SSMPRI can be used to choose between them. If there are several channels with the lowest SSM value, then only those channels with the lowest SSMPRI values are used. If there are several of those, the currently used channel wins (this gives the non-reversion ability).
- If there are several channels with the lowest SSM value and the lowest SSMPRI value and the current channel is not one of them, then the PRIORITY values are used to choose within the set.

If no channels are SSM qualified, the system will go into holdover until an SSM qualified channel becomes available.

#### ***4.5.7.7 Output Time Slot Zero (TS0 ) Bits***

When in SSM mode, the output TS0 bits (Sa4-Sa8) of the non-frame aligned word are controlled by the SSM algorithm. They will reflect the SSM value of the chosen channel, whether that channel was chosen by the SSM algorithm or by the automatic mode used when no channels are SSM qualified. If Holdover is used in SSM mode, then the TS0 bits will reflect the HFQLEVEL.



---

## 5.1 Chapter Contents

5.1.1 This chapter describes the TL1 commands that can be used to operate and monitor the 55400A.

5.1.2 This chapter is organized as follows:

- Overview of the TL1 Commands page 5-3
- TL1 Command Syntax page 5-4
- General TL1 Command Rules page 5-5
- Description of Key Parameter Blocks page 5-5
  - Command Block <cmd blk> page 5-5
  - Target Identifier <tid> page 5-6
  - Access Identifier <aid> page 5-6
  - Correlation Tag <ctag> page 5-6
  - General Block <gen blk> page 5-7
  - Specific Block <spec blk> page 5-7
  - Keyword Block <keywd blk> page 5-7
  - Parameter Definitions page 5-7
- System Response page 5-9
  - Acknowledgment page 5-10
  - Normal Response page 5-10
  - Error Response page 5-11
- Error Codes page 5-12
- Command Summary by Task/Default Security Access Level page 5-13
- Summary of Command Security Levels page 5-16
- Types of Commands and Level of Access page 5-17
  - Tasks Icons page 5-17
  - Access Level Icons page 5-17
- Description of 55400A TL1 Commands page 5-18



---

## 5.2 Overview of the TL1 Commands

5.2.1 TL1 commands are used throughout the telecommunications industry to communicate with network elements, like the 55400A. These commands are entered through the local or remote port to:

- change configuration,
- retrieve system status information,
- retrieve performance monitoring information, and
- update user's and command security information (if the security feature is enabled).

5.2.2 You enter TL1 commands after you've established communication with the 55400A from a computer running a terminal emulation program.

5.2.3 This chapter describes the 55400A TL1 commands. It includes the following information:

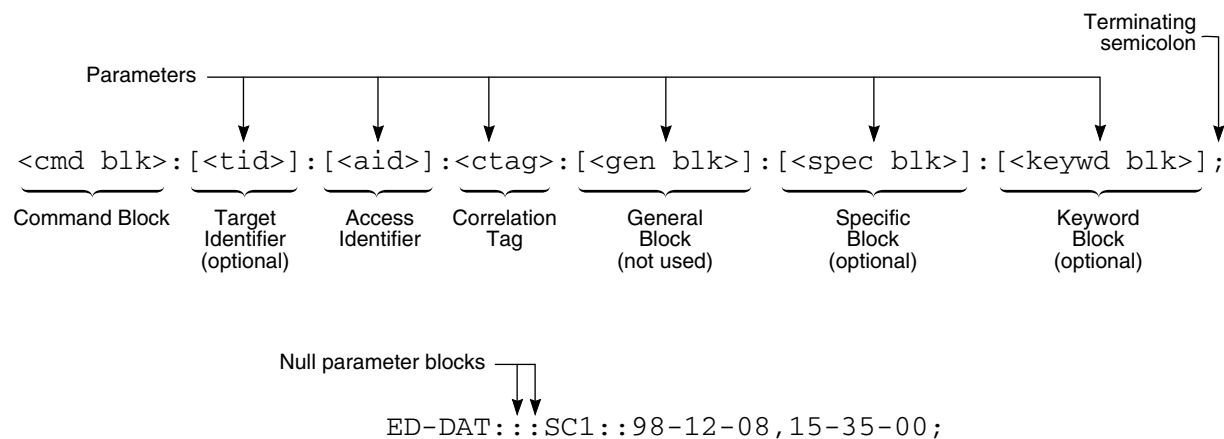
- Command Syntax
- General Command Rules
- Description of Blocks
- Command Parameter Definition
- Error Codes
- Response Format
- Command Summary
- Individual Command Description

**Example Commands are Underlined in this Chapter**

In the example commands, *user* input is underlined.

## 5.3 TL1 Command Syntax

5.3.1 TL1 commands consist of a series of “blocks” separated by colons. The command is terminated with a semicolon. The general format of a command is shown in Figure 5-1. A command can only be entered at the semicolon “;” prompt, the “>” prompt, or the “<” prompt.



Where:

- <cmd blk> = Command Block
- <tid> = Target Identifier (optional)
- <aid> = Access Identifier (optional for some commands)
- <ctag> = Correlation Tag
- <gen blk> = General Block (not used)
- <spec blk> = Specific Block (optional for some commands)
- <keywd blk> = Keyword Block (<keyword> = <value>)

**Figure 5-1. TL1 Command Format**

5.3.2 In most cases, some of these blocks will be empty, in which case you only need to enter a colon to specify that there is no input for this block. It is common to see adjacent colons in a TL1 command.

5.3.3 All of the blocks listed above are described in the section “Description of Key Parameter Blocks” starting on page -5.

## 5.4 General TL1 Command Rules

5.4.0.1 These general rules apply to 55400A TL1 commands:

- Empty blocks at the end of a command line may be omitted.
- The DEL character deletes all inputs up to that point.
- In general, commands are case insensitive. Exceptions are the password and ctag fields, where case is preserved.
- Carriage Return (CR) and Line Feed (LF) are ignored on input. All commands must terminate with a semicolon.
- In general, extra spaces may be inserted for readability, except within an identifier. Note, however, that in some cases hyphens are treated as part of the identifier and extra spaces are therefore not allowed around these hyphens (examples are the hyphens in the command and montype fields. Also, spaces in the middle of some identifiers (such as sid, ctag, and password) may be treated as part of the identifier.
- The “< >” (e.g., <tid>, < ctag>, etc.) indicates that you must enter a value or name.
- An element or parameter inside brackets “[ ]” is optional.

## 5.5 ITH Card Types

5.5.1 Responses to TL1 commands can include six card identification numbers.

HP55411	HP55412
HP55413	HP55414
HP55415	HP55429

## 5.6 Description of Key Parameter Blocks

5.6.1 This section describes some of the main parameter blocks contained in the industry standard TL1 command. Specific details and exceptions are provided under the description of each command. Table 5-1 on page -7 lists and describes more of the parameter blocks.

### 5.6.1.1 Command Block <cmd blk>

The Command Block tells the system what operation you want it to perform. TL1 commands consist of a verb followed by one or two modifiers. The verb and modifier(s) are separated by hyphens. For example:

ED-DAT (Edit Date)

RTRV-PM-TSG (Retrieve Performance Monitoring Information)

### 5.6.1.2 Target Identifier <tid>

The Target Identifier provides an *optional* means of ensuring that a command has been directed to the correct network element. Each 55400A is assigned a System Identifier (<sid>). The default value for this System Identifier is SSU (Synchronization Supply Unit), but you may change this to any arbitrary string of 20 or fewer alphanumeric characters (using the SET-SID command). If a Target Identifier (<tid>) is included in a command, it will be compared against the System Identifier (<sid>) of the 55400A, and the command will only be executed if these match. If they do not match, the command will be rejected.

If the <tid> is empty, no comparison will take place and the command will be unconditionally executed.

### 5.6.1.3 Access Identifier <aid>

The Access Identifier identifies the particular part of the 55400A which is affected by the command.

Examples:

ITH-n	The command affects Input <i>n</i> on the Input Track and Hold (ITH) cards.
ITH	The command either affects both ITH cards, or, in some cases, the active ITH card.
IMC	The command affects the IMC card.
Sn-OUTx	The command affects operation of Output card <i>x</i> on subrack <i>n</i> .
Sn-OUTx-y	The command affects Output <i>y</i> on Output card <i>x</i> on Subrack <i>n</i> .

Note that in a single subrack system it is permissible to leave out Sn-.

Some commands do not require an <aid>. Specific values of the <aid> block are provided later in the description for each command.

Some commands allow you to specify multiple inputs or a range of inputs. For example, the following example shows how to enable input channels 0 thru 4:

```
ED-SYNC::ITH-0&&4:SC1:::ENABLE=Y;
```

The following example shows how to enable input channels 0, 2, and 4.

```
ED-SYNC::ITH-0&2&4:SC1:::ENABLE=Y;
```

### 5.6.1.4 Correlation Tag <ctag>

The Correlation Tag is used to connect commands with their responses and acknowledgments. It is an arbitrary, user defined string of up to six alphanumeric characters. In particular, it may be a number of up to six digits in length. It may not be the number zero. All commands must provide a valid Correlation Tag. Any

responses or acknowledgments produced by the command will include the original Correlation Tag. For example, it may be convenient to use initials with sequential numbers for each command to associate commands and responses belonging to a specific user.

### 5.6.1.5 General Block <gen blk>

---

**NOTE**


---

The General Block is *not* used with any 55400A commands. This block must always be empty.

### 5.6.1.6 Specific Block <spec blk>

The Specific Block contains additional information needed for the execution of the command. If used, this information is included in the description of the command.

### 5.6.1.7 Keyword Block <keywd blk>

The Keyword Block is generally used only with the Provisioning commands such as ED-SYNC, ED-EQPT, RTRV-SYNC, and RTRV-EQPT. In these cases, it is used instead of the Specific Block, which is empty. The Keyword Block takes this form: <keyword>=<value>. If used, this information is included in the description of the command.

### 5.6.1.8 Parameter Definitions

Table 5-1 lists the parameters that can be used with TL1 commands.

**Table 5-1. Parameter Definitions**

Parameter	Description	Primary Use
<aid>	Access Identifier When used in a command, the aid is the equipment that the command affects. When output in a response, the aid is the equipment reporting the condition.	Command, Response
<almcde>	Alarm severity code	Automatic Message
<atag>	Automatic Message Tag—a number assigned to sequence and correlate automatic messages.	Automatic Message
<chap>	Channel Access Privileges—ENABLED or DISABLED	Command, Response
<conddescr>	Trouble Condition Description—describes the trouble condition or state reported.	Automatic Message
<condeff>	Condition Effect—the effect of a standing condition: raised (SC), cleared (CL), or Transient (TC).	Automatic Message
<condtype>	Condition Type or event. See Chapter 6.	Command, Response, Automatic Message

**Table 5-1. Parameter Definitions (Continued)**

<b>Parameter</b>	<b>Description</b>	<b>Primary Use</b>
<ctag>	Correlation Tag—an arbitrary string of 1 to 6 alphanumeric characters. It must not be the number 0.	Command, Response
<date>	Current Date	Command, Response
<errcde>	Error Code. See appendix A.	Response
<montype>	Monitored Parameter Type. See Chapter 7.	Command, Response Automatic Message
<monval>	Monitored Value—the value of a monitored parameter. See Chapter 7.	Command, Response Automatic Message
<ntfncde>	Notification Code—reports the status of a condition. Valid value are: CR—Critical Alarm MJ—Major Alarm MN—Minor Alarm CL—Cleared NA—Non-Alarmed NR—Not Reported (Event log only or RTRV-COND only)	Automatic Message Responses
<pid>	Password Identifier. Passwords can be a string of up to ten characters that meet the following TL1 rules: At least two characters must not be letters of the alphabet. At least one special character must be included. A special character is any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon. The password is case sensitive.	Command
<sid>	System Identifier—the 55400A sending the response or automatic message.	Response
<srveff>	Service Effecting—the effect on service caused by the alarm or status condition. Valid values are: SA—Service Affecting NSA—Non-Service Affecting	Command, Response
<start retrieving messages>	EVTTOP = Start retrieving messages from the top of the log (reverse chronological order) EVTCONT = Continue retrieving messages from where you left off. EVTALL = Retrieve all messages.	Command, Response

**Table 5-1. Parameter Definitions (Continued)**

Parameter	Description	Primary Use
<tid>	Target Identifier—the 55400A (target) to which a command is directed. The <tid> is comprised of a maximum of 20 ASCII characters limited to letters, digits, and hyphens. The value of <tid> may be null.	Command
<uid>	User identifier—The unique name of the user which he uses to log on to the 55400A. A string of up to ten alphanumeric characters. The user name is not case sensitive.	Command, Response

---

## 5.7 System Response

5.7.1 There are several types of system responses that can be displayed after you enter a command. System responses are only sent to the terminal you are using. The types of responses are:

- Acknowledgment
- Normal Response
- Error Response

5.7.2 A Normal or Error response is returned when the 55400A receives a command. Both kinds of responses include the source identifier (the sender of the response), the date and time, and the correlation tag <ctag> of the given command.

5.7.3 For a rejected command, the <ctag> may not be available for inclusion in the response. In this case, the single character “0” (zero) will be output for the <ctag>.

<b>Example Commands are Underlined in this Section</b>
--------------------------------------------------------

In the example commands, <i>user</i> input is <u>underlined</u> .
-------------------------------------------------------------------

5.7.4 The response header consists of the 55400A Source Identifier <sid>, the date, and the time on a 24-hour clock. For example, the following is a valid response to the RTRV-HDR command:

```
RTRV-HDR:::SC1;
SSU 96-01-02 15:30:45
M SC1 COMPLD
;
```

#### **5.7.4.1 Acknowledgment**

If a normal response or an error response cannot be sent within two seconds of receipt of an input command, an appropriate 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.

Example:

```
IP SC1
<
```

If IP is sent, a normal response or an error response will follow.

However, if NA is sent, no further response is expected. The command should be re-sent.

**ALARM ACKNOWLEDGMENT.** The 55400A does not require acknowledgment of alarms. You can retrieve the current state of the unit at any time using the RTRV-ALM-TSG and RTRV-COND-TSG commands. You can also issue the OPR-ACO-ALL command, which has the same effect as pressing the Alarm Cutoff button on the front panel of the IMC card (It does not clear the alarm condition, but will silence any audible alarms.).

#### **5.7.4.2 Normal Response**

A normal response is displayed when the command has been completed or the information requested is returned. This response carries the COMPLD message. For example:

```
ED-DAT:::SC1:::96-01-02,15-30-45;
SSU 96-01-02 15:30:45
M SC1 COMPLD
;
```



### ***5.7.4.3 Error Response***

An error response is displayed when a command is denied. The response carries the DENY message. The Error Code, "PICC" refers to the reason the error is displayed. Error codes are listed in Table 5-2 on page -12.

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

```
M SC1 DENY
```

```
"PICC"
```

```
/*Sorry, you are not authorized to execute this command. */
```

```
;
```

---

## 5.8 Error Codes

5.8.1 Table 5-2 lists all of the error codes that you might see when using the 55400A. Error codes are displayed in error responses.

**Table 5-2. Error Codes**

<b>Code</b>	<b>Description/Cause</b>	<b>Action</b>
IBEX	Block, extra	Check command syntax
IDNV	Input, data not valid	Reenter valid data
IIAC	Input, invalid access identifier (AID)	Reenter valid AID
IICM	Invalid command	Check command syntax
IICT	Input, invalid Correlation tag (CTAG)	Reenter valid CTAG
IIPG	Input, invalid parameter grouping	Check command syntax
IISP	Input, invalid syntax or punctuation	Reenter valid syntax or punctuation
IITA	Input, invalid target identifier (TID)	Reenter valid TID
INUP	Input, non-null unimplemented parameter	Check command syntax
IPMS	Input, parameter missing	Check command syntax
IPNV	Input, parameter not valid	Reenter valid parameter
ISCH	Input, syntax, invalid character	Reenter valid syntax
ISPC	Input, syntax, invalid punctuation	Reenter valid syntax
PICC	Privilege, illegal command code	User not authorized
PIUC	Privilege, illegal user code	User not authorized
PIUI	Privilege, illegal user identity	User not authorized
SARB	Status, all resources busy	Try again later
SROF	Status, requested operation failed	Check command description
SSRE	Status, system resources exceeded	Try again later

## 5.9 Command Summary by Task/Default Security Access Level

5.9.1 Tables 5-3 through 5-9 list the 55400A TL1 commands by task and include their default security access level (see Table 5-10 on page -16 for security level information). The commands are described in detail and are presented in alphabetical order in the section “Description of 55400A TL1 Commands” starting on page -18.

**Table 5-3. Security Task/Command Summary**

<b>Security Tasks</b>	<b>Command</b>	<b>Security (see Table 5-10)</b>
Activates user (log on).	ACT-USER	None
Reinstates a previously inhibited user.	ALW-USER-SECU	Security
Forces log off of a user at a COM port.	CANC-CID-SECU	Security
Cancels user (log off).	CANC-USER	None
Forces log off of a user .	CANC-USER-SECU	Security
Clears all authorized users from system.	DLT-SECU	Security
Deletes user's security parameters.	DLT-USER-SECU	Security
Disables/enables logging on from a specific communication port.	ED-CID-SECU	Security
Changes security level of a command.	ED-CMD-SECU	Security
Edits user's own password.	ED-PID	User
Edits user's security parameters.	ED-USER-SECU	Security
Enters user's security parameters. Authorize a new user.	ENT-USER-SECU	Security
Inhibits a user from logging on.	INH-USER-SECU	Security
Retrieves state of a communications port.	RTRV-CID-SECU	Security
Retrieves security level of a command.	RTRV-CMD-SECU	User
Retrieves list of users logged on.	RTRV-STATUS	User
Retrieves your own security level.	RTRV-USER	User
Retrieves all user's security levels.	RTRV-USER-SECU	Security

**Table 5-4. Provisioning Task/Command Summary**

<b>Provisioning Tasks</b>	<b>Command</b>	<b>Security</b> (see Table 5-10)
Edits equipment (card) parameters.	ED-EQPT-TSG	Admin
Edits input/output channel parameters.	ED-SYNC-TSG	Admin
Retrieves equipment parameters.	RTRV-EQPT-TSG	User
Retrieves input/output channel parameters.	RTRV-SYNC-TSG	User
Sets oven synchronization.	SET-SYNCN	Admin

**NOTE**

All commands ending with -TSG (Timing Signal Generator) can be entered without the -TSG.

**Table 5-5. Performance Monitoring Task/Command Summary**

<b>Performance Monitoring Tasks</b>	<b>Command</b>	<b>Security</b> (see Table 5-10)
Restarts measurement.	INIT-REG-TSG	Admin
Retrieves alarmed condition of equipment.	RTRV-ALM-TSG	User
Retrieves attribute (notification code) of event.	RTRV-ATTR-TSG	User
Retrieves condition of equipment in TSG.	RTRV-COND-TSG	User
Retrieves 24-hour phase (CTIE period) history data.	RTRV-PM-HIST	User
Retrieves performance monitoring data.	RTRV-PM-TSG	User
Retrieves threshold setting of monitored parameter(s).	RTRV-TH-TSG	User
Sets attribute (notification code) of event.	SET-ATTR-TSG	Admin
Sets threshold level for a monitored parameter.	SET-TH-TSG	Admin

**Table 5-6. System Administration Task/Command Summary**

<b>System Administration Tasks</b>	<b>Command</b>	<b>Security</b> (see Table 5-10)
Sets system date and time.	ED-DAT	Admin
Clears the Event Log.	INIT-LOG	Admin
Operates the alarm cutoff button.	OPR-ACO-ALL	Admin
Removes equipment.	RMV-EQPT	Security
Retrieves Automatic Output (AO) Log of automatic messages.	RTRV-AO	User
Retrieves system header information.	RTRV-HDR	User
Retrieves Event Log.	RTRV-LOG	User
Retrieves 55400A information.	RTRV-NETTYPE	User
Retrieves card (IMC, ITH, OUTPUT) information.	RTRV-NETTYPE-ALL	User
Sets system identification code.	SET-SID	Admin
Forces switch in active ITH card.	SW-DX-EQPT	Admin

**Table 5-7. Modem Command Summary**

<b>Modem Tasks</b>	<b>Command</b>	<b>Security</b> (see Table 5-10)
Specifies the modem setup string.	SET-MODEM-TSG	Admin
Retrieves user-specified modem setup string.	RTRV-MODEM-TSG	Admin

**NOTE**

All commands ending with -TSG (Timing Signal Generator) can be entered without the -TSG.

**Table 5-8. Network WKG (Working)/AUX (Auxiliary) Command Summary**

<b>Network Memory Tasks</b>	<b>Command</b>	<b>Security</b> (see Table 5-10)
Copies data from the WKG memory to the AUX memory.	CPY-MEM	Admin
Copies data from the AUX memory to the WKG memory.	CPY-MEM-SECU	Security

**Table 5-9. Firmware Download Command Summary**

<b>Firmware Download Tasks</b>	<b>Command</b>	<b>Security (see Table 5-10)</b>
Enters bulk transfer mode.	ACT-BTT	Security
Activates download mode of operation.	ACT-SWDL	Security
Cancels bulk transfer mode.	CANC-BTT	Security
Returns to normal mode of operation.	CANC-SWDL	Security
Copies firmware from main to backup memory or backup memory to main memory.	COPY-SFWR	Security
Erases firmware from main memory.	DLT-SFWR	Security
Takes the entire SSU offline to download new firmware.	RMV-EQPT	Security
Verifies firmware integrity.	VRF-SFWR	Security

## 5.10 Summary of Command Security Levels

Descriptions of the difference security levels of TL1 commands are provided in Table 5-10. Refer to the section “Enabling the Security Feature” in Chapter of this manual for details.

**Table 5-10. Commands Security Level (Default)**

<b>Security Level*</b>	<b>Primary Use</b>
NONE	Commands that can be executed without logging on. If the Password Required switch is OFF, then all commands behave as if their Security Level were NONE.
USER	Commands that only allow retrieving information.
ADMIN	Commands that allow changing the configuration.
SECURITY	Commands that modify the Security Database. These commands also are used to download new firmware.

\* In most cases, the security level of a command can be re-configured.

---

## 5.11 Types of Commands and Level of Access

5.11.1 Four groups of network management tasks can be accomplished with TL1 commands, and three levels of access.

### 5.11.1.1 Tasks Icons



Security Commands



Provisioning Commands



Performance Monitoring Commands



System Administration Commands

### 5.11.1.2 Access Level Icons



Security Access Level



Administration Access Level



User Access Level

---

#### **NOTE**

The ACT-USER and CANC-USER commands do not have a default security access level associated with them. Any user may use these commands.

---

---

## **5.12 Description of 55400A TL1 Commands**

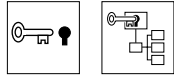
5.12.1 Each command is fully described in paragraphs 5.13 through 5.66 in this section. Please note that values for optional parameters are omitted.

5.12.2 The command parameters are listed and defined in Table 5-1 on page -7.



---

## 5.13 ACT-BTT (Activate Bulk Text Transfer Mode)

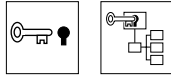


ACT-BTT instructs an EEPROM card to enter into bulk text transfer mode prior to downloading segments of firmware.

See Appendix A, “Downloading Firmware,” for a complete description of this download command.

---

## 5.14 ACT-SWDL (Activate Software Download Mode)



ACT-SWDL places an EEPROM card in the firmware download mode prior to a firmware download.

See Appendix A, “Downloading Firmware,” for a complete description of this download command.

---

## 5.15 ACT-USER (Activate User)



ACT-USER starts a session with the 55400A by logging on to the 55400A. This command does not have a default security access level.

### Syntax

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

### Values

<aid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive.

<pid> = User password. Passwords can be a string of up to ten characters that meet the following TL1 rules:

- At least two characters must be nonalphabetic.
- At least one special character must be included. A special character is any printing character that is *not* a letter of the alphabet, a number, a comma, a colon, or a semicolon. The password is case sensitive.

### Example

The following example shows what command Fred would use to log on to the 55400A.

```
ACT-USER::FRED:SC1::FRED.1;
SSU 96-01-02 15:30:45
M SC1 COMPLD
"FRED: 1995-12-29 1:30:04,2"
```

The response indicates that the previous logon for FRED was at 1:30:04 a.m. on December 29, 1996, and since then there have been two unsuccessful attempts at logging on (using the wrong password). The following Automatic Message is displayed only at the terminal that Fred is using.

```
SSU 96-01-02 15:30:45
A SC1 REPT EVT SESSION
"LOCAL"
/* NOTICE: This is a private computer system.
Unauthorized access or use may lead to prosecution. */
;
```

**ACT-USER (Activate User)**

Issue 2: Jul 00

---

**NOTE**

If you log onto a system via the same port that another user is already logged onto, you will automatically log the previous user off the system. An Automatic Message will display stating that the previous user was logged off. Two users can be logged onto the system at the same time; one at the remote port and one at the local port. Automatically logging off another user only happens when two users log onto the same port.

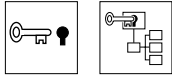
---

**Related Commands**

CANC-USER (Cancel User)

---

## 5.16 ALW-USER-SECU (Reinstate User)



ALW-USER-SECU reinstates a user who was previously inhibited from logging on (by using the INH-USER-SECU command).

### Syntax

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

### Values

<uid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive.

### Example

The following example shows how to reinstate user FRED after he was inhibited from logging on.

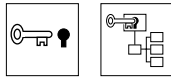
```
ALW-USER-SECU :: SC1 :: FRED;
```

### Related Commands

INH-USER-SECU (Inhibit User Security)

---

## 5.17 CANC-BTT (Cancel Bulk Transfer Mode)

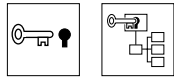


CANC-BTT cancels the bulk transfer mode. It signifies that all data segments have been sent.

See Appendix A, “Downloading Firmware,” for a complete description of this download command.

---

## 5.18 CANC-CID-SECU (Cancel Port)



CANC-CID-SECU terminates a current session on the 55400A. It can be used to remotely cancel a session on the local port. If you specify your own port, you will be logged off.

### Syntax

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

### Values

<aid> = REMOTE or LOCAL

### Example

The following example shows how to cancel a session on the local port.

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

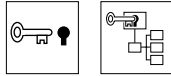
### Related Commands

CANC-USER (Cancel User)

CANC-USER-SECU (Cancel User Security)

---

## 5.19 CANC-SWDL (Change to Normal Mode)



CANC-SWDL returns to the normal mode of operation, executing code from the Main memory.

See Appendix A, “Downloading Firmware,” for a complete description of this download command.



---

## 5.20 CANC-USER (Cancel User)



CANC-USER terminates a session with the 55400A by logging off. The default security access level is NONE.

### Syntax

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

### Values

<aid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive. (optional)

### Example

To log off the 55400A:

```
CANC-USER:::SC1;
SSU 96-01-02 16:30:45
M SC1 COMPLD
;
```

When logging off, an Automatic Message will be generated and only sent to the port that you are using.

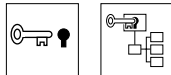
```
SSU 96-01-02 16:30:45
A SC1 CANC
FRED
;
```

### Related Commands

ACT-USER (Activate User)

---

## 5.21 CANC-USER-SECU (Cancel User Security)



CANC-USER-SECU terminates the session of another user on the 55400A. It can be used to terminate the session of an unauthorized user. The <aid> must be specified. If you specify your own user name, you will be logged off. Normally a user will use the CANC-USER command to log off. An Automatic Message will be displayed on the user's terminal.

### Syntax

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

### Values

<aid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive.

### Example

The following example shows how to terminate MARTHA's session.

```
CANC-USER-SECU: :MARTHA:SC1;
```

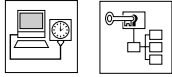
### Related Commands

CANC-CID-SECU (Cancel Port Security)

CANC-USER (Cancel User)

---

## 5.22 COPY-SFWR (Copy Software from Main to Backup Memory)

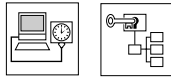


COPY-SFWR copies the current firmware from the Main memory to the Backup memory (or vice versa) in an EEPROM card and requests the EEPROM card to validate the checksum of the memory transfer.

See Appendix A, “Downloading Firmware,” for a complete description of this download command.

---

## 5.23 CPY-MEM (Copy Network Memory)



In the NIMC, the CPY-MEM copies data from the WKG memory to the AUX memory.

The default security level of this command is ADMIN.

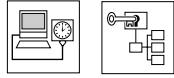
See Chapter , “Network Parameters,” for a complete description of this network command.

### **Related Command**

CPY-MEM-SECU (Copy Network Memory Security)

---

## 5.24 CPY-MEM-SECU (Copy Network Memory Security)



In the NIMC, the CPY-MEM-SECU 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 default security level of this command is ADMIN.

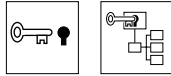
See Chapter , “Network Parameters,” for a complete description of this network command.

### **Related Command**

CPY-MEM (Copy Network Memory)

---

## 5.25 DLT-SECU (Delete Security)



DLT-SECU deletes all information in the Security Database. It is typically used after the initial installation of a 55400A. All existing user names and passwords are deleted.

---

**NOTE**

This command can only be executed if the Security switch on the IMC card is in the OFF position (No Password Required).

Not only does this command clear the Security Database, it also enables both communication ports. See ED-CID-SECU (Edit Port Security).

---

### Syntax

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

### Example

The following example shows how to clear the Security Database.

```
DLT-SECU:::SC1;
```

### Related Commands

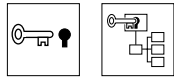
ED-USER-SECU (Edit User Security)

RTRV-USER-SECU (Retrieve User Security)

ED-CID-SECU (Edit Port Security)

---

## 5.26 DLT-SFWR (Erase Firmware from Main Memory)

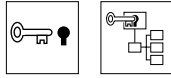


DLT-SFWR erases the Main memory of an EEPROM card before downloading new firmware onto it.

See Appendix A, “Downloading Firmware,” for a complete description of this download command.

---

## 5.27 DLT-USER-SECU (Delete User Security)



DLT-USER-SECU deletes a user's access privileges by removing the user's login name and password from the Security Database.

### Syntax

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

### Values

<aid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive.

### Example

The following example shows how to delete FRED from the Security Database.

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

### Related Commands

ED-USER-SECU (Edit User Security)

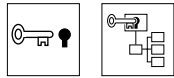
ENT-USER-SECU (Enter User Security)

INH-USER-SECU (Inhibit User Security)



---

## 5.28 ED-CID-SECU (Edit Port Security)



ED-CID-SECU disables or enables logging on at a specific communication port.

---

### NOTE

A user (with the proper security level) at either port can disable the execution of commands at the other port. However, an internal hardware switch on the IMC card can be set to force enabling of the Local port (no such capability exists with respect to the Remote port). Refer to the *55400A SSU System Manual* for more information.

---

### Syntax

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

### Notes

- It is not possible to disable your own port.
- Disabling a port to which a user is logged on will cause the user to be logged off.
- Disabling a port does not prevent Automatic Messages from being sent to the port.
- Any command sent to a disabled port will be denied.
- The Password Required switch has no bearing on whether or not a communications port is enabled.
- The DLT-SECU command will also enable both communication ports.
- A Hardware Override Switch on the IMC card can be set which overrides the disabling of the Local port (no such switch exists for the Remote 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. Refer to the *55400A SSU System Manual*.
- It is possible to enable your own port. This is useful if the Hardware Override switch has been used to force enabling of the port. For example, if the local port has been inadvertently left disabled, follow these steps:
  1. Set the Hardware Override switch on the IMC card to force enabling of the local port.
  2. Log on (if necessary) to the local port.
  3. Use the ED-CID-SECU command to enable the local port.
  4. Set the Hardware Override Switch back to its normal position.

**Values**

<aid> = REMOTE or LOCAL

<chap> = ENABLED or DISABLED (Channel Access Privileges) See the *Parameters* section at the end of this chapter.

**Example**

The following example shows how to disable the Remote port.

```
ED-CID-SECU: :REMOTE:SC1: :DISABLED;
```

**Related Commands**

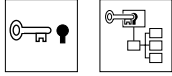
CANC-CID-SECU (Cancel Port Security)

RTRV-CID-SECU (Retrieve Port Security)

DLT-SECU (Delete Security)

---

## 5.29 ED-CMD-SECU (Edit Command Security)



ED-CMD-SECU changes the security level of a command.

### Syntax

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

---

**WARNING** DO NOT CHANGE THE SECURITY 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 IT IS POSSIBLE TO SET THE SECURITY SWITCH TO THE “NO PASSWORD REQUIRED” POSITION, AND THEN CHANGE THE ACT-USER COMMAND’S SECURITY LEVEL BACK TO NONE.

---

### Values

<aid> = Command name

<security level> = SECURITY, ADMIN, USER, NONE

### Example

The following example shows how to change the security level of the ED-DAT command from ADMIN (default) to SECURITY.

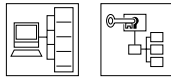
```
ED-CMD-SECU::ED-DAT:SC1::SECURITY;
```

### Related Commands

RTRV-CMD-SECU (Retrieve Command Security)

---

## 5.30 ED-DAT (Edit Date)



ED-DAT enters the system date and time. If power is removed from the SSU, the date and time will default to 00-00-00 00-00-00 and will not increment. The ED-DAT command must be used to set the system data and time.

### Syntax

```
ED-DAT: [<tid>] :: <ctag> :: <yy> - <mm> - <dd> , <hh> - <mm> - <ss> ;
```

### Values

YY-MM-DD = new date

HH:MM:SS = new time (on a 24-hour clock)

Where:

- YY Last two digits of the year
- MM Month with range of 01 to 12
- DD Day of month with a range of 01 to 31
- HH Hour of day with a range of 00 to 23
- MM Minute of hour with a range of 00 to 59
- SS Second of minute with a range of 00 to 59

### Examples

The following example shows how to set the date to August 27, 1998 and the time to 10:03:29 a.m.

```
ED-DAT:::SC1::98-8-27,10-3-29;
```

```
SSU 98-08-27 10:03:29
```

```
M SC1 COMPLD
```

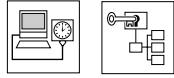
```
;
```

### Related Commands

RTRV-HDR (Retrieve Header)

---

## 5.31 ED-EQPT-TSG (Edit Equipment)



ED-EQPT-TSG is a Provisioning command used to change default settings or modify equipment (card) parameters. It is NOT used for keyword relating to a specific input or output port (see ED-SYNC command). The TSG suffix is optional.

### Syntax

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

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

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

### Values

<aid> = ITH-n, where n is the number of the input channel.

IMC card = IMC

Sn-OUTx, where n is the number of the subrack and x is the letter of the output card (A, B, C, or D).

<keyword> = <value> See Chapter .

<event> = <value> See Chapter .

<measurement> = <value> See Chapter .

---

### NOTE

In case of ITH and IMC cards, it is usually possible to omit the <aid>. For output cards, the <aid> must be included.

### Example

The following example shows how to set the input selection mode to manual and use input channel 2.

```
ED-EQPT::ITH:SC1::SYNCMDE=MANUAL,MANCHAN=2;
```

To set the input Loss of Signal event to generate a non-alarmed report:

```
ED-EQPT::ITH:SC1::INPLOS=ALM-NONALM;
```

To set the Input Loss of Signal event to be logged and to generate a Major alarm:

```
ED-EQPT::ITH:SC1::INPLOS=ALM-MAJOR&LOG-Y;
```

To set the Output card to produce an AIS (Alarm Indication Signal):

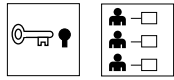
```
ED-EQPT::S1-OUTA:SC1::AIS=Y;
```

The following example specifies the SPRD-12S measurement threshold to be 500 ppm (THR-500) and to display the measurement each time it is recalculated (PM-Y). If the threshold is exceeded, display an Automatic Message (RPT-Y).

ED-EQPT::ITH:SC1:::SPRD-12S=THR-500&RPT-Y&PM-Y;

---

## 5.32 ED-PID (Edit Password)



ED-PID edits a user's own password in the Security Database.

### Syntax

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

### Values

<aid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive.

<oldpid> = User's old password

<newpid> = User's new password

Passwords can be a string of up to ten characters that meet the following TL1 rules:

- At least two characters must not be letters of the alphabet.
- At least one special character must be included. A special character is any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon. The password is case sensitive.

### Example

The following example shows what command FRED would use to change his password from TANK.1 to CAR.2.

```
ED-PID::FRED:SC1::TANK.1,CAR.2;
```

### Related Commands

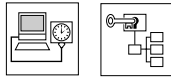
ACT-USER (Activate User)

RTRV-USER (Retrieve User)

ED-USER-SECU (Edit User Security)

ENT-USER-SECU (Enter User Security)

## 5.33 ED-SYNC-TSG (Edit Sync)



ED-SYNC-TSG is a Provisioning command used to change default 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 TSG suffix is optional.

### Syntax

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

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

### Values

<aid> = ITH-n, where n is the number of the input channel.

Sn-Outx-p — where n is a subrack number, x is the letter of the output card, and p is the output port number.

<keyword> = <value> See Chapter .

<measurement> = <value> See Chapter .

### Example

The following example shows how to turn off output channel 3 of output card A in subrack 1.:

```
ED-SYNC::S1-OUTA-3:SC1:::SQUELCH=Y;
```

The following example shows how to set the priority of input channel 5 and to enable the input channel.

```
ED-SYNC::ITH-5:SC1:::PRIORITY=1,ENABLE=Y;
```

The following example shows how to enable input channels 0 through 4, inclusive.

```
ED-SYNC::ITH-0&&4:SC1:::ENABLE=Y;
```

The following example shows how to set the threshold for the 1 second TDEV measurement on input channel 3 to 100 ns.

```
ED-SYNC::ITH-3:SC1:::TDEV-1S=THR-100;
```

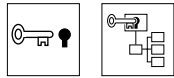
The following example specifies the LMRTIE-15M threshold to be 500 nanoseconds for input channel 3 (THR-500). In addition it tells the system to display the measurement every 15 minutes (as it occurs) (PM-Y). If the threshold is exceeded, display an Automatic Message (RPT-Y) and disqualify this channel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

```
ED-SYNC::ITH-3:SC1:::LMRTIE-15M=THR-500&CRI-Y&RPT-Y&PM-Y;
```



---

## 5.34 ED-USER-SECU (Edit User Security)



ED-USER-SECU changes the user name, security level or password in the Security Database.

### Syntax

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

### Values

- <aid> = Old user name
- <newuid> = New user name
- <newpid> = New user password
- <uap> = USER, ADMIN, or SECURITY

Passwords can be a string of up to ten characters that meet the following TL1 rules:

- At least two characters must not be letters of the alphabet.
- At least one special character must be included. A special character is any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon. The password is case sensitive.

### Example

The following example shows how to change the password and user name of FRED to FREDJR with a new password of TANK.1.

```
ED-USER-SECU: :FRED:SC1: :FREDJR,TANK.1,,USER;
```

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

### Related Commands

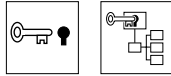
DLT-USER-SECU (Delete User Security)

ENT-USER-SECU (Enter User Security)

RTRV-USER-SECU (Retrieve User Security)

---

## 5.35 ENT-USER-SECU (Enter User Security)



ENT-USER-SECU sets up a new user in the Security Database. Up to ten users may be entered into the Security Database.

### Syntax

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

### Values

<aid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive.

<pid> = User password—A string of up to ten characters meeting the following TL1 rules:

At least two characters must not be letters of the alphabet.

At least one special character must be included. A special character is any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon. The password is case sensitive.

<uap> = USER, ADMIN, or SECURITY

### Example

The following example shows how to set up a new user (MARTHA) with a password (CHESS.1) and with the security level of ADMIN.

```
ENT-USER-SECU: :MARTHA:SC1: :CHESS.1, , ADMIN;
```

### Related Commands

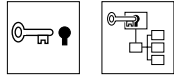
DLT-USER-SECU (Delete User Security)

ED-USER-SECU (Edit User Security)

RTRV-USER-SECU (Retrieve User Security)

---

## 5.36 INH-USER-SECU (Inhibit User Security)



INH-USER-SECU temporarily inhibits a user from logging on. To enable the previously inhibited user to log on, use the ALW-USER-SECU (Allow User Security) command. If the INH-USER-SECU command is issued to inhibit a user who is currently logged on, the command will be denied.

### Syntax

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

### Values

<uid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive.

### Example

To temporarily inhibit FRED from logging on:

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

### Related Commands

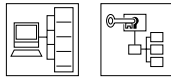
ALW-USER-SECU (Allow User Security)

CANC-USER-SECU (Cancel User Security)

DLT-USER-SECU (Delete User Security)

---

## 5.37 INIT-LOG (Initialize Event Log)



INIT-LOG clears the Event Log on both ITH cards, or on a specific ITH card.

---

**NOTE**

This command normally clears the Event Logs on both ITH cards. However, it is possible to specify a particular ITH card for diagnostic purposes, in which case the other ITH card will not be affected.

---

**Syntax**

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

**Values**

<aid> = ITH, ITH1, or ITH2

**Example**

The following example shows how to clear the Event log on both ITH cards.:

```
INIT-LOG::ITH:SC1::EVT;
```

The following example shows how to clear the Event log on just ITH card 1.

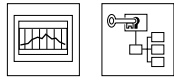
```
INIT-LOG::ITH1:SC1::EVT;
```

**Related Commands**

RTRV-LOG (Retrieve Log)

---

## 5.38 INIT-REG-TSG (Initialize Register)



INIT-REG-TSG clears all performance monitoring measurement data on a specific input channel and resumes taking performance monitoring measurements.

---

### NOTE

This command normally restarts the measurements on both ITH cards. It is possible to specify a particular ITH card, in which case the other ITH card will not be affected. However, this is not recommended.

SPRD is recalculated if a measurement is restarted on a channel that is included in the SPRD calculation.

---

### Syntax

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

### Values

<aid> = ITH-n, where n is the number of the input channel.

DISQ is used to restart measurements on a channel and disqualify the channel until a good measurement is completed (see MEASDLY).

#### For Firmware Versions R3833 and Higher:

The INT-REG-TSG command does not normally invoke the MEASDLY condition, which would cause the channel to be disqualified for a user-configured number of minutes. However, if the modifier DISQ is included in the <spec blk>, the MEASDLY will be included.

Example:

```
INIT-REG-TSG::ITH-4:<ctag>::DISQ;
```

### Example

The following example shows how to clear and restart all performance monitoring measurements on input channel 1.

```
INIT-REG-TSG: : ITH-1 : SC1 ;
```

### Related Measurements

FFOFF (Fractional Frequency Offset)

LMRTIE (Latest Maximum Relative Time Interval Error)

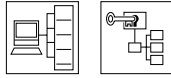
MRTIE (Maximum Relative Time Interval Error)

SPRD (Frequency spread Between Channels)

TDEV (Time Deviation)

MEASDLY (Measurement Delay)

## 5.39 OPR-ACO-ALL (Operate Alarm Cutoff)



OPR-ACO-ALL enables the Alarm Cutoff function. In effect, this command operates the Alarm Cutoff button on the IMC card.

### How the Alarm Cutoff Function Works

The Alarm Cutoff function will silence any audible alarms connected to the SSU via the J3 Alarm Connector. The Alarm Cutoff function will also clear any latched alarms, provided the condition which caused the alarm is no longer present. *However, if the condition is still present, the alarm WILL NOT clear and the Alarm Cutoff LED will remain lit.*

To determine what condition is causing a persistent alarm, send the RTRV-ALM-TSG or RTRV-COND-TSG command. The response message will describe the event which is causing the alarm. *Once you have taken action to correct the condition, the alarm will clear when the Alarm Cutoff button is pressed (or when the OPR-ACO-ALL command is sent).* This sequence may need to be repeated if multiple conditions are present.

### More on the Alarm Cutoff Function

The Alarm Cutoff function will remove alarms associated with output cards that have been removed. However, the RTRV-COND command will still report a non-alarmed condition showing that these cards are missing. The RMV-EQPT command deletes the cards from the inventory of expected cards, and thus the missing card condition will no longer be reported. If the card is actually present when the command is executed, or is later inserted, it will be added back to the inventory.

Also note that if a missing card is part of a protected pair (as indicated by a switch setting on the other card), this command will be ignored and the alarm will continue to be active.

### Syntax

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

### Example

The following example shows how to execute the Alarm Cutoff function.

```
OPR-ACO-ALL:::SC1;
```

### Related Commands

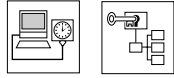
RTRV-ALM-TSG (Retrieve Alarm Condition)

RTRV-COND (Retrieve Condition)

RMV-EQPT (Remove Equipment)

---

## 5.40 RMV-EQPT (Remove Equipment)



RMV-EQPT is used to prevent a removed output card from being reported as missing.

### Syntax

```
RMV-EQPT::<aid>:<ctag>;
```

### Value

<aid> = Sn-OUTx, where n is the subrack number and x is the letter of the output card.

### Example

If the output card or cards in slot B of subrack 3 have been removed, the following command will prevent them from being reported as missing whenever a RTRV-COND command is executed:

```
RMV-EQPT::S3-OUTB:ABC001;  
  
SSU 99-03-01 07:50:31  
M ABC001 COMPLD  
;
```

If the output card or cards in slot A of subrack 1 have been removed, the following command will prevent them from being reported as missing whenever a RTRV-COND command is executed:

```
RMV-EQPT::S1-OUTA:ABC001;  
  
SSU 99-03-01 07:52:31  
M ABC001 COMPLD  
;
```

---

**NOTE**

Operating the Alarm Cutoff button or executing the OPR-ACO-ALL command will remove alarms associated with output cards that have been removed. However, the RTRV-COND command will still report a non-alarmed condition showing that these cards are missing. The RMV-EQPT command will delete the card from the inventory of expected cards, preventing the card from being reported as missing. If the card is actually present when the command is executed, or is later inserted, it will be added back to the inventory.

This command may take up to 30 seconds to complete in subrack systems.

If a missing card is part of a protected pair (as indicated by a switch setting on the other card), this command will be ignored, and the alarm will continue to be active.

---

**RMV-EQPT Has Another, Unrelated Use**

This command has another, unrelated, use in connection with firmware download. See the description of RMV-EQPT (Remove Equipment) in Appendix A, "Downloading Firmware."

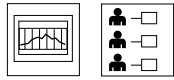
**Related Commands**

None



---

## 5.41 RTRV-ALM-TSG (Retrieve Alarm Condition)



RTRV-ALM-TSG retrieves alarm information.

If no ITH card is specified (the usual case), this command retrieves equipment related alarms from both ITH cards and from the output cards, but only retrieves input signal related alarms from the active ITH card (this prevents double reporting of input signal related alarms).

If an ITH card is specified, this command retrieves both equipment and signal related alarms from that ITH card, regardless of whether it is the active card or not. Alarms from other cards will not be reported.

### Syntax

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

### Values

<aid> = ITH, ITH1, and ITH2

### Example

The following example shows how to retrieve all active alarms from the system.

```
RTRV-ALM-TSG:::SC1;  
  
SSU 98-01-02 16:30:45  
M SC1 RTRV  
"S0-ITH-1:MN,INDISQ,NSA,,:\Input disqualified\  
"S0-ITH-2:MN,INDISQ,NSA,,:\Input disqualified\  
"S0-ITH-3:MN,INDISQ,NSA,,:\Input disqualified\  
"S0-ITH-4:MN,INDISQ,NSA,,:\Input disqualified\  
>  
  
SSU 98-01-02 16:30:45  
M SC1 COMPLD  
"S0-ITH2:MN,SNFAIL,SA,,:\Sync failure\  
;  
;
```

---

### NOTE

If available, the Event Message will include a problem code. This code can be used to help Symmetricom service personnel diagnose system problems.

**Reporting Events Related to Input Signals**

Although events related to the input signals are normally only reported by the *active* ITH, they will be reported by the *standby* ITH under the following conditions:

- If the <aid> field of the RTRV command specifies the standby ITH.
- If the keyword RPTALL = YES (Revision 3703 and higher).
- If the RTRV-COND or RTRV-ALM command includes the modifier RTPALL in the second block after the <ctag> (Revision 3833 and higher).
- If the input related ALM is of a higher severity than any alarm currently being reported by the active ITH (Revision 3833 and higher).

**Related Commands**

RTRV-AO (Retrieve Automatic Messages)

RTRV-COND (Retrieve Condition)

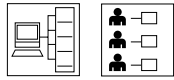
RTRV-LOG (Retrieve Event Log)

**Related Keyword**

RPTALL (Report All)

---

## 5.42 RTRV-AO (Retrieve Automatic Messages)



RTRV-AO displays the Automatic Messages ( REPT ALM and REPT EVT) currently stored in the Automatic Output Log. These messages can be selectively retrieved by number or type, or by both number and type.

### Syntax

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

### Values

<keyword block> = ATAGSEQ for a list of message numbers  
MSGTYPE for a list by message type (ALM or EVT)

---

### NOTE

It is a good idea to specify a range of message numbers when retrieving Automatic Messages. Otherwise, the messages will scroll off the terminal screen before you can read them. When retrieving specific messages or ranges of messages, list them from the earliest to latest (9998&&0002 will retrieve 9998, 9999, 0001, and 0002). You can also use the terminal emulation program to log messages to a file. Refer to the terminal emulation program documentation. If no ATAGSEQ or MSGTYPE is specified, the entire contents of the log will be retrieved.

---

### Example

To retrieve all messages in the log:

```
RTRV-AO :: SC1 :: ATAGSEQ=FIRST&&LAST;
```

or

```
RTRV-AO :: SC1;
```

To retrieve messages 14, 17, and 25 through 30 from the log:

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

To retrieve all alarmed messages in the log.

```
RTRV-AO :: SC1 :: MSGTYPE=ALM;
```

To retrieve all non-alarmed messages between 4 and 10:

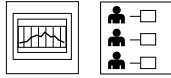
```
RTRV-AO :: SC1 :: ATAGSEQ=4&&10, MSGTYPE=EVT;
```

### Related Commands

RTRV-LOG (Retrieve Log)

---

## 5.43 RTRV-ATTR-TSG (Retrieve Attribute)



RTRV-ATTR-TSG retrieves the alarm level that will be generated by an event. The system is shipped from the factory with default event alarm levels. If you want to change the alarm level of an event, use the ED-EQPT or SET-ATTR-TSG command. To verify the alarm level set for a particular event:

### Syntax

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

### Values

<event> = See Chapter .

### Example

The following example shows how to retrieve the alarm level that will be generated by the INDISQ event.

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

### Related Commands

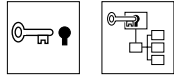
ED-EQPT (Edit Equipment)

RTRV-EQPT-TSG (Retrieve Equipment)

SET-ATTR-TSG (Set Attribute)

---

## 5.44 RTRV-CID-SECU (Retrieve Port Security)



RTRV-CID-SECU retrieves the enabled or disabled state of a communication port.

### Syntax

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

### Values

<aid> = LOCAL or REMOTE

### Example

The following example shows how to retrieve the state of the Remote port.

```
RTRV-CID-SECU::REMOTE:SC1;  
  
SSU 96-04-05 12:30:00  
M SC1 COMPLD  
"REMOTE:ENABLED"  
  
;
```

The response will indicate ENABLED, DISABLED, or HWENABLE. If the response contains HWENABLE, this indicates that the Force Local Port Enable (S4-3) switch on the IMC card is set to force enabling of the Local port. HWENABLE can only be reported for the Local port.

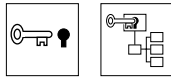
### Related Commands

CANC-CID-SECU (Cancel Port Security)

ED-CID-SECU (Edit Port Security)

---

## 5.45 RTRV-CMD-SECU (Retrieve Command Security)



RTRV-CMD-SECU retrieves the security level of a command.

### Syntax

```
RTRV-CMD-SECU::<aid>:<ctag>;
```

### Values

<aid> = Command name

### Example

The following example shows how to retrieve the security level of the SET-SID command.

```
RTRV-CMD-SECU::SET-SID:SC1;
```

```
SSU 96-04-05 12:30:00
```

```
M SC1 COMPLD
```

```
"SET-SID:ADMIN"
```

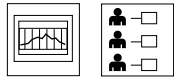
```
;
```

### Related Commands

ED-CMD-SECU (Edit Command Security)

---

## 5.46 RTRV-COND-TSG (Retrieve Condition)



RTRV-COND-TSG retrieves information about ITH cards, input signals, and output cards. The -TSG can be omitted.

If no ITH card is specified (the usual case), this command retrieves equipment related conditions from both ITH cards and from the output cards, but only receives input signal related conditions from the active ITH card (this prevents double reporting of input signal related conditions). The report includes all “state-type” conditions which are active, including alarmed, non-alarmed, and non-reported conditions.

If an ITH card is specified, this command retrieves both equipment and signal related conditions from that ITH card, regardless of whether it is the active card or not. Conditions from other cards will not be reported.

### Syntax

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

or

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

### Values

<aid> = ITH, ITH1, and ITH2

LSTCFG = latest configuration change (see page 5-60 for more specifics)

CFGCHD = configuration changed (see page 5-59 for more specifics)

### Example

The following example on the following page shows how to retrieve equipment related conditions from a SSU system.

**The information retrieved from the response message in the following example includes:**

- which expansion subrack (Sn-)
- which ITH card is active
- input channel information (disqualified alarms, tracking)
- Configuration change information

```
RTRV-COND-TSG:::SC1;  
  
IP sc1  
<  
SSU 00-00-00 00:00:00  
M sc1 RTRV  
"S0-ITH2:NA,SNHAVL,NSA,,,,,\"Holdover available\""  
"S0-ITH2:NA,ITHACTV,NSA,,,,,\"ITH Active\""  
"S0-ITH2-1:NR,INPLOS,NSA,,,,,\"Input Loss of signal\""  
"S0-ITH2-2:NR,INPLOS,NSA,,,,,\"Input Loss of signal\""  
"S0-ITH2-1:MN,INDISQ,NSA,,,,,\"Input disqualified\""  
"S0-ITH2-2:MN,INDISQ,NSA,,,,,\"Input disqualified\""  
"S0-ITH2-0:NA,SNTRCK,NSA,,,,,\"Tracking this input\""  
>IP sc1  
<  
SSU 00-00-00 00:00:00  
M sc1 RTRV  
"S1-ITH2:NA,ITHACTV,NSA,,,,,\"ITH Active\""  
>  
SSU 00-00-00 00:00:00  
M sc1 RTRV  
"S3-ITH2:NA,ITHACTV,NSA,,,,,\"ITH Active\""  
>  
SSU 00-00-00 00:00:00  
M sc1 RTRV  
"TSG:NR,CFGCHD,NSA,,,1,,,\"Configuration changed\""  
"TSG:NR,LSTCFG,NSA,,,1,,,\"Latest Configuration Change\""  
>  
SSU 00-00-00 00:00:00  
M sc1 COMPLD  
;
```



#### **Reporting Events Related to Input Signals**

Although events related to the input signals are normally only reported by the *active* ITH, they will be reported by the *standby* ITH under the following conditions:

- If the <aid> field of the RTRV command specifies the standby ITH.
- If the keyword RPTALL = YES (Revision 3703 and higher).
- If the RTRV-COND or RTRV-ALM command includes the modifier RTPALL in the second block after the <ctag> (Revision 3833 and higher).
- If the input related ALM is of a higher severity than any alarm currently being reported by the active ITH (Revision 3833 and higher).

#### **CFGCHD Condition**

The CFGCHD (Configuration Changed) Condition is unique to a particular communications port (local or remote). It is set whenever there is any change in the SSU setup other than those changes initiated by the particular port interrogating the condition. In particular, it is set if the other port issues a command changing the setup or if the unit's setup is reset as the result of insertion of an ITH card with its switch set to force a return to defaults. In addition, it is set whenever the IMC card is inserted into the subrack or power is initially applied. The fact that this flag is set does not assure that a change has occurred; it only signals the possibility that a change may have occurred.

#### **CFGCHD Does Not Relate to Automatic Changes in the SSU Operation**

CFGCHD does not relate to automatic changes in the SSU operation, such as might occur if signal is lost on an input port. The following commands can cause a change in the setup:

ED-EQPT	SET-ATTR-TSG
ED-SYNC	SET-TH-TSG

To clear the CFGCHD condition, use the following command (this only clears the CFGCHD with respect to the port receiving this command):

```
RTRV-COND:::ABC002::CFGCHD;
```

```
SSU 98-12-11 11:55:34
```

```
M ABC002 COMPLD
```

```
"TSG:NR,CFGCHD,12-11,11-54-59,3,,\"Configuration changed\""
```

```
;
```

where:

12-11,11-54-59 — is the date and time of last change from other port.

3 — this number will change whenever there is a configuration change from the other port. (Note: may increment by more than one.)

This command will report and then clear the condition.

**LSTCFG Condition**

The LSTCFG (Latest Configuration Change) condition is updated (it is never cleared) whenever there is any change in the SSU setup. In particular, it is set if either port issues a command changing the setup or if the unit's setup is reset as the result of insertion of an ITH card with its switch set to force a return to defaults. In addition, it is set whenever the IMC card is inserted into the subrack or power is initially applied. The fact that this flag is set does not assure that a change has occurred; it only signals the possibility that a change may have occurred.

**LSTCFG Does Not Relate to Automatic Changes in the SSU Operation**

LSTCFG does not relate to automatic changes in the SSU operation, such as might occur if signal is lost on an input port. The following commands can cause a change in the setup:

ED-EQPT	SET-ATTR-TSG
ED-SYNC	SET-TH-TSG

The LSTCFG condition can not be cleared. However, the following command can be used to retrieve this condition without also retrieving all other conditions:

```
RTRV-COND:::ABC001::LSTCFG;
```

```
SSU 98-12-11 11:54:25
```

```
M ABC001 COMPLD
```

```
"TSG:NR,LSTCFG,12-11,11-53-00,3,,\"Latest Configuration
```

```
changed\""
```

```
;
```

where:

12-11, 11-53-00 — is the date and time of last change.

3 — this number will change whenever there is a configuration change.  
(Note: may increment by more than one.)

This command will report just the LSTCFG condition.

**NOTE**

If available, the Event Message will include a problem code. This code can be used to help Symmetricom service personnel diagnose system problems.

**Related Commands**

ED-SYNC (Edit Sync)

ED-EQPT (Retrieve Equipment)

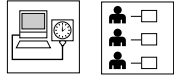
RTRV-ALM-TSG (Retrieve Alarm Condition)

SET-ATTR-TSG (Set Attribute)

SET-TH-TSG (Set Threshold)

---

## 5.47 RTRV-EQPT-TSG (Retrieve Equipment)



RTRV-EQPT-TSG retrieves equipment (card) parameters, and can only be used with keywords that relate to a card, not to a specific input or output port. The -TSG can be omitted.

### Syntax

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

### Values

<aid> = ITH (can be omitted)

Sn-OUTx, where n is the subrack number and x is the letter of the output card.

IMC Card: IMC (can be omitted)

<keyword> = See Chapter .

<event> = See Chapter .

<measurement> = See Chapter .

---

### NOTE

In the case of ITH and IMC cards it is usually possible to omit the <aid>. For output cards, the <aid> must be included (for example, OUTA).

### Example

To retrieve the selection algorithm setting:

```
RTRV-EQPT::ITH:SC1::PARAMETER=SYNCDME;
```

To retrieve the selection algorithm setting and the selected manual channel number:

```
RTRV-EQPT::ITH:SC1::PARAMETER=SYNCDME&MANCHAN;
```

To retrieve the properties for the Input Loss of Signal event:

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

To retrieve the Holdover Action setting for Output Card A:

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

**RTRV-EQPT-TSG (Retrieve Equipment)**

To retrieve the Holdover Action setting for Output Card A of subrack 2 and whether AIS is the normal output for Output Card A:

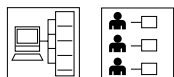
RTRV-EQPT::S2-OUTA:SC1:::PARAMETER=HLDACT&AIS;

To retrieve the threshold value for the SPRD-12S measurement:.

RTRV-EQPT::ITH:SC1:::PARAMETER=SPRD-12S;

---

## 5.48 RTRV-HDR (Retrieve Header)



RTRV-HDR retrieves and displays the response header information which includes the system identification (<sid>), date, and time for the unit. It is often used to verify operation of the communication link between the 55400A and the computer communication port.

### Syntax

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

### Example

The following example shows how to display system header information.

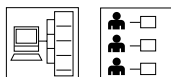
```
RTRV-HDR:::SC1;  
  
SSU 95-09-05 15:03:27  
  
M SC1 COMPLD;  
  
;
```

### Related Commands

None

---

## 5.49 RTRV-LOG (Retrieve Log)



RTRV-LOG displays all events in the Event Log. It does not erase the messages. The Event Log is a circular log that can save up to 1000 logged events in battery backed up RAM on each ITH card. Its primary use is to determine the sequence of events leading up to a network or system problem.

The Event Log is retrieved 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, as well as those not initially reported (those with ALM property set to NONE). Events are retrieved in groups of ten.

### Syntax

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

### Values

<aid> = ITH, ITH1, ITH2

<start retrieving messages> =

EVTTOP—Start retrieving the ten most recent events from the top of the Event Log (reverse chronological order).

EVTCONT—Continue retrieving the next ten log messages from where you last left off.

EVTALL—Start retrieving the entire Event Log.

---

### NOTE

Using EVTALL will retrieve the entire contents of the Event Log. This log can hold up to 1000 events consisting of 100 response blocks of ten events each. There is no way to abort the retrieval once started. EVTTOP and EVTCONT are recommended over EVTALL as a more controlled method of retrieving the Event Log.

If a particular ITH card is not specified ( ITH instead of ITH1 or ITH2), the log is retrieved from the active ITH card.

---

**RTRV-LOG (Retrieve Log)**

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**Example**

The following example shows how to display the ten most recent events in the Event Log.

```
RTRV-LOG::ITH:SC1::EVTTOP;  
  
SSU 96-02-28 10:58:58:  
M SC1 COMPLD  
"EVTTOP"  
/*  
"OUT3:NA,OPCDNA,SA,,:\\"Output Card Not Accessible\\""   
"OUT3:NA,OPCDIN,NSA,,:\\"Output Card Inserted\\""   
*/  
  
;
```

---

**NOTE**

If available, the Event Message will include a problem code. This code can be used to help Symmetricom service personnel diagnose system problems.

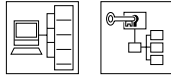
**Related Commands**

RTRV-AO (Retrieve Automatic Messages)

INIT-LOG (Initiate Log)

---

## 5.50 RTRV-MODEM-TSG (Retrieve Modem)



RTRV-MODEM-TSG identifies the modem type.

See Chapter , “Modem Control,” for a complete description of this modem command.

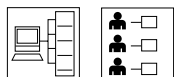
### **Related Command**

SET-MODEM-TSG (Set Modem)



---

## 5.51 RTRV-NETTYPE (Retrieve Equipment Type)



RTRV-NETTYPE retrieves basic information about the 55400A.

### Syntax

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

### Example

The following example shows how to retrieve basic information about the 55400A.

```
RTRV-NETTYPE:::SC1;  
  
SSU 96-02-28 11:58:58:  
M sc1 COMPLD  
"Symmetricom,55400,TSG,R3613"
```

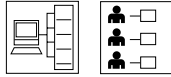
The information retrieved includes:

- company
- model number
- equipment type
- firmware revision of the IMC card

### Related Commands

RTRV-NETTYPE-ALL (Retrieve All equipment Types)

## 5.52 RTRV-NETTYPE-ALL (Retrieve All Network Equipment Types)



RTRV-NETTYPE-ALL retrieves inventory information about the 55400A.

### Syntax

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

### Example

The following example shows how to retrieve inventory information from a SSU system.

```
RTRV-NETTYPE-ALL:::SC1;
IP SC1
<
SSU 00-00-00 00:00:00
M SC1 RTRV
"TSG:Symmetricom,55400,TSG"
"S0-IMC:,55442/004,,R3833C"
"S0-ITH1:,55411,,R3833C"
"S0-ITH2:,55411,,R3833C"
"S0-OUT9E:,55481"
"S0-OUT10E:,55481"
>IP SC1
<
SSU 00-00-00 00:00:00
M SC1 RTRV
"S1-IMC:,55443,,R3833B"
"S1-ITH1:,55419,,R3833B"
"S1-ITH2:,55419,,R3833B"
"S1-OUT5C:,55481"
"S1-OUT6C:,55481"
>
SSU 00-00-00 00:00:00
M SC1 COMPLD
```

**RTRV-NETTYPE-ALL (Retrieve All Network Equipment Types)**

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```
"S3-IMC: , 55443 , , R3833B"
```

```
"S3-ITH1: , 55419 , , R3833B"
```

```
"S3-ITH2: , 55419 , , R3833B"
```

```
"S3-OUT9E: , 55482"
```

```
"S3-OUT10E: , 55482"
```

;

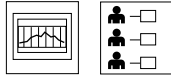
**The information retrieved from the response message in this example includes:**

- expansion subrack number (Sn-)
- company, model number, equipment type
- IMC card model number and firmware revision
- ITH1 card model number and firmware revision
- ITH2 card model number and firmware revision
- Output card(s) and model number

**Related Commands**

RTRV-NETTYPE (Retrieve Equipment Type)

## 5.53 RTRV-PM-HIST (Retrieve 24-Hour Phase History)



RTRV-PM-HIST retrieves and displays the CTIE (Continuous Time Interval Error) for one input channel.

### Only Available in Firmware Versions R3851B and Later

The RTRV-PM-HIST command is available only in firmware versions R3851B and later.

### Syntax

```
RTRV-PM-HIST: [<tid>]: ITH-n: <ctag>:: CTIE, , , [<tmper>], [<mondat>,
<montm>];
```

### Values

<aid> = ITH-n, where n is the number of the input channel.

<tmper> = Time period. It specifies the time length in seconds of CTIE to be retrieved. The valid range is 0 to 50000. If <tmper> is omitted, it is treated as 10.

<mondat> = Date of the beginning of the requested CTIE. The format is <yy>-<mm>-<dd> or <yyyy>-<mm>-<dd>,

where

<yy> = year. If the two-digit year is within 90 to 99 inclusively, it's treated as 1990 to 1999; otherwise, it's 20xx.

<mm> = month, with a range of 01 to 12.

<dd> = day of month, with range of 01 to 31.

<montm> = Time of the beginning of the requested CTIE. The format is <hh>-<mm>-<ss>,

where

<hh> = hour of the day, with a range of 00 to 23.

<mm> = minute of the hour, with a range of 00 to 59.

<ss> = second of the minute, with a range of 00 to 59.

If <mondat> and <montm> are omitted, the beginning point is the end of last retrieval. The point can be obsolete if it is older than current CTIE period. In this case, <mondat> and <montm> should be specified explicitly in the next retrieval.

**CTIE Data is Only Saved From the Active ITH Card**

CTIE is only saved from the active ITH card. The display of the data will indicate which ITH card provided the data. If a switch in active ITH cards occurred, the output data will be provided in multiple blocks (using the RTRV header) to correctly indicate the ITH card.

Because neither the phase samples nor the 1-second measurement intervals are synchronized between the ITH cards, a switch in active ITH cards can cause an offset in the captured data at the time of the switch. Although this will generally be a relatively minor error, you should note the occurrence of a switch in active ITH cards when analyzing CTIE data.

**Example**

In the following example, the RTRV-PM-HIST command includes a starting date.

```
RTRV-PM-HIST: : ITH-0:SC2: : CTIE, , , , 30, 99-02-18, 10-42-30;
```

```
MINI SSU 99-02-18 10:43:56
```

```
M SC2 COMPLD
```

```
"ITH1-0:CTIE, , , , 30, 99-02-18, 10-42-30"
```

```
"1:0"
```

```
"2:0"
```

```
"3:0"
```

```
"4:0"
```

```
"5:0"
```

```
"6:0"
```

```
"7:0"
```

```
"8:0"
```

```
"9:0"
```

```
"10:0"
```

```
"11:0"
```

```
"12:0"
```

```
"13:0"
```

```
"14:2"
```

```
"15:-2"
```

```
"16:0"
```

```
"17:0"
```

```
"18:0"
```

```
"19:0"
```

```
"20:0"
```

**RTRV-PM-HIST (Retrieve 24-Hour Phase History)**

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```

"21:2"
"22:-2"
"23:0"
"24:0"
"25:0"
"26:0"
"27:0"
"28:0"
"29:0"
"30:0"
;

```

In the following example, the RTRV-PM-HIST command has no starting date.

```
RTRV-PM-HIST::ITH-0:SC3::CTIE,,,,,30,,;
```

```

MINI SSU 99-02-18 10:44:08
M SC3 COMPLD
"ITH1-0:CTIE,,,,,30,99-02-18,10-43-00"
"31:0"
"32:0"
"33:0"
"34:2"
"35:-2"
"36:0"
"37:0"
"38:2"
"39:-2"
"40:0"
"41:2"
"42:-2"
"43:0"
"44:0"
"45:0"
"46:0"
"47:0"

```

**RTRV-PM-HIST (Retrieve 24-Hour Phase History)**

"48:2"

"49:-2"

"50:0"

"51:0"

"52:0"

"53:0"

"54:0"

"55:0"

"56:0"

"57:0"

"58:2"

"59:-2"

"60:0"

;

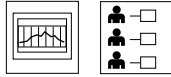
**Related Measurement**

CTIE (Continuous Time Interval Error)

**Related Keywords**

CTIEENB (Continuous CTIE Enable)

## 5.54 RTRV-PM-TSG (Retrieve Performance Monitoring Information)



RTRV-PM-TSG retrieves and displays the current set of performance monitoring data for one input channel.

### Syntax

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

```
RTRV-PM-TSG::<aid>:<ctag>::MRTIE;
```

```
RTRV-PM-TSG::<aid>:<ctag>::LMRTIE;
```

```
RTRV-PM-TSG::<aid>:<ctag>::TDEV;
```

```
RTRV-PM-TSG::<aid>:<ctag>::FFOFF;
```

```
RTRV-PM-TSG::<aid>:<ctag>::SPRD;
```

Note that no channel number is needed for Spread (SPRD). MRTIE and TDEV results are in nanoseconds. Fractional Frequency Offset and Spread results are in parts per million.

### Values

<aid> = ITH, ITH-n, where n is the number of the input channel.

<montype> = See Chapter 7.

### Example

The following example shows how to retrieve MRTIE information about input channel 4.

```
RTRV-PM-TSG::ITH-4:SC1::MRTIE;
```

```
SSU 98-09-05 12:07:38
```

```
M SC1 COMPLD
```

```
"ITH1-4:MRTIE-1S,2.000000,COMPL,,75-MIN"
```

```
"ITH1-4:MRTIE-1M,2.000000,COMPL,,75-MIN"
```

```
"ITH1-4:MRTIE-15M,2.000000,COMPL,,75-MIN"
```

```
"ITH1-4:MRTIE-30M,2.000000,COMPL,,75-MIN"
```

```
"ITH1-4:MRTIE-1H,2.000000,COMPL,,75-MIN"
```

```
"ITH1-4:MRTIE-2H,NA,NA,,75-MIN"
```

```
"ITH1-4:MRTIE-8H,NA,NA,,75-MIN"
```

```
"ITH1-4:MRTIE-24H,NA,NA,,75-MIN"
```

```
;
```



The example indicates that MRTIE data has been collected over the past 75 minutes (known as 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, 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 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.

---

**NOTE**

Once the measurement time reaches 24 hours, data prior to 24 hours will be lost as new data is collected. The <aid> field indicates that this data was collected by the ITH card 1.

It is possible to specify a specific measurement, such as TDEV-16S, if only that one value is desired (for example, RTRV-PM-TSG::ITH-4:SC1::MRTIE-16S;).

---

**Related Measurements**

FFOFF (Fractional Frequency Offset)

LMRTIE (Latest Maximum Relative Time Interval Error)

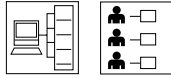
MRTIE (Maximum Relative Time Interval Error)

SPRD ((Frequency Spread Between Channels)

TDEV (Time Deviation)

---

## 5.55 RTRV-STATUS (Retrieve Status)



RTRV-STATUS retrieves the names of the users who are logged on, and those who have been inhibited from logging on.

### Syntax

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

### Example

The following example shows how to determine who is logged on to the 55400A.

```
RTRV-STATUS:::SC1;  
  
SSU 96-01-02 16:30:45  
  
M SC1 RTRV  
  
":LOCAL&REMOTE, FRED&MARTHA, RS&GH&KL"
```

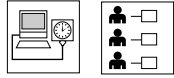
The above response indicates that users FRED and MARTHA are logged on at the LOCAL and REMOTE ports, respectively, and that users RS, GH, and KL have been inhibited from logging on.

### Related Commands

RTRV USER (Retrieve User)

---

## 5.56 RTRV-SYNC-TSG (Retrieve Sync)



RTRV-SYNC-TSG retrieves input and output port parameters

The -TSG suffix is optional.

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

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

### Values

<aid> = ITH-n, where n is the number of the input channel

Sn-Outx-p — where n is a subrack number, x is the letter of the output card, and p is the output port number.

<keyword> = See Chapter .

<measurement> = See Chapter .

### Example

The following example shows how to retrieve squelch information about Output Channel 3 on Output Card A in subrack 2.

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

To find out the priority of input channel 3:

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

To find out the priority of input channel 3 and whether it is Enabled:

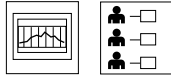
```
RTRV-SYNC::ITH-3:SC1:::PARAMETER=PRIORITY&ENABLE;
```

To find out the properties for a 1 second TDEV measurement on input channel 3:

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

---

## 5.57 RTRV-TH-TSG (Retrieve Threshold Information)



RTRV-TH-TSG retrieves the threshold of a measurement for a particular input channel.

### Syntax

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

### Values

<aid> = ITH-n, where n is the input port number. Use ITH for SPRD measurements only.

<montype> = See Chapter .

### Example

The following example shows how to retrieve the threshold value set for the LMRTIE-15M measurement on input channel 2.

```
RTRV-TH-TSG::ITH-2:SC1::LMRTIE-15M;
```

### Related Measurements

FFOFF (Fractional Frequency Offset)

LMRTIE (Latest Maximum Relative Time Interval Error)

MRTIE (Maximum Relative Time Interval Error)

SPRD (Frequency Spread Between Channels)

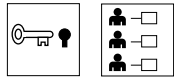
TDEV (Time Deviation)

### Related Commands

SET-TH-TSG (Set Threshold)

---

## 5.58 RTRV-USER (Retrieve User)



RTRV-USER retrieves the user's security level.

### Syntax

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

### Example

The following example shows how to retrieve the user's security level.

```
RTRV-USER:::SC1;  
  
SSU 96-01-02 16:30:45  
M SC1 RTRV  
"FRED:LOCAL, SECURITY"
```

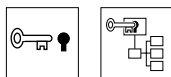
The above response indicates that your user name is FRED, logged on at the LOCAL port with the highest (SECURITY) security level.

### Related Commands

ACT-USER (Activate User)

---

## 5.59 RTRV-USER-SECU (Retrieve User Security)



RTRV-USER-SECU retrieves another user's security level, or all users' security levels.

### Syntax

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

### Value

<uid> = User name—A string of up to ten alphanumeric characters. The user name is not case sensitive.

### Example

The following example shows how to retrieve another user's security level.

```
RTRV-USER-SECU::FRED:SC1;  
  
SSU 96-01-02 16:30:45  
  
M SC1 RTRV  
  
"FRED: , SECURITY"
```

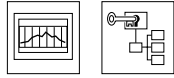
The above response indicates that FRED has the highest security level (SECURITY). If the <uid> field is empty, then information will be retrieved on all users.

### Related Commands

RTRV-USER (Retrieve User)

---

## 5.60 SET-ATTR-TSG (Set Attribute)



SET-ATTR-TSG sets the alarm level that an event will generate. When shipped from the factory, alarm levels are configured for each event. Use SET-ATTR-TSG to change the factory-default alarm level. To find out the existing event alarm level setting, use the RTRV-ATTR-TSG command. Note that the ED-EQPT and RTRV-EQPT commands can also be used.

### Syntax

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

### Values

<value> = See Chapter for the ALM property values.

<event> = See Chapter for Events.

### Example

The following example shows how to set a Major alarm if an INDISQ (Input Channel Disqualified) event occurs.

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

### Related Commands

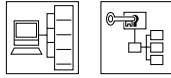
ED-EQPT-TSG (Edit Equipment)

RTRV-ATTR-TSG (Retrieve Attribute)

RRTV-EQPT-TSG (Retrieve Equipment)

---

## 5.61 SET-SID (Set System Identifier)



SET-SID sets the System Identification (SID) code to a given value. This is helpful if you have more than one system.

If a target identifier (<tid>) is included in a command, it will be compared against the System Identifier (SID) of the 55400A, and the command will only be executed if these match. If they do not match, the command will be rejected.

### Syntax

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

### Values

<sid> = System identification code—a string of 1 to 20 alphanumeric characters.  
Default value is SSU.

### Example

The following example shows how to set the system identification code to SSU2.

```
SET-SID:::SC1::SSU2;
```

### Related Command

RTRV-HDR (Retrieve Header)

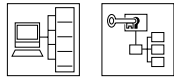
### Related Keyword

TIDQUIET (TID Quiet)



---

## 5.62 SET-MODEM-TSG (Set Modem)



SET-MODEM-TSG initializes the modem.

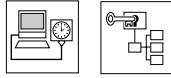
See Chapter , “Modem Control,” for a complete description of this modem command.

### **Related Command**

RTRV-MODEM-TSG (Retrieve Modem)

---

## 5.63 SET-SYNCN (Set Synchronization)



SET-SYNCN forces an ITH card to assume that the oven is fully warmed up. When power is first applied to an ITH card (when it is first inserted into the sub-rack), 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, you may wish to force the unit to its final tracking bandwidth without waiting the usual period of time.

---

**WARNING BE CAREFUL IN USING THIS COMMAND. THE OVEN SHOULD ACTUALLY BE WARMED UP BEFORE USING THIS COMMAND.**

---

### Syntax

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

### Values

<aid> = ITH1, ITH2

### Example

The following example shows how to force ITH card 1 to assume its oven is fully warmed up.

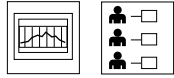
```
SET-SYNCN::ITH1:SC1::NORM;
```

### Related Commands

None

---

## 5.64 SET-TH-TSG (Set Threshold)



SET-TH-TSG changes the threshold of a measurement for a particular input channel. The system is configured at the factory with default settings for measurement criteria (measurement threshold). This command allows you to specify 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 Chapter .

### Syntax

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

### Values

<aid> = ITH-n, where n is the input port number

<montype> = See Chapter .

<value> = Threshold value (specific to the type of measurement). See Chapter .

n = nanoseconds for TDEV (range 0 to 800,000 ns) (Default = 0)

n = nanoseconds for MRTIE (range 0 to 1,900,000,000 ns) (Default = 0)

n = nanoseconds for LMRTIE (range 0 to 1,900,000,000 ns) (Default = 0)

n = ppm (parts per million) for SPRD (range 0 to 7,300,000 ppm) (Default = 0)

n = ppm (parts per million) for FFOFF (range 0 to 7,300,000 ppm) (Default = 0)

### Example

The following example shows how to set a threshold of 100 ns on the LMRTIE-15M measurement for input channel 2.

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

For SPRD measurements, no channel is specified.

**SET-TH-TSG (Set Threshold)**

**Related Commands**

RTRV-TH-TSG (Retrieve Threshold)

ED-SYNC (Edit Sync)

**Related Measurements**

FFOFF (Fractional Frequency Offset)

LMRTIE (Latest Maximum Relative Time Interval Error)

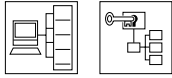
MRTIE (Maximum Relative Time Interval Error)

SPRD (Frequency Spread Between Channels)

TDEV (Time Deviation)

---

## 5.65 SW-DX-EQPT (Switch Duplex Equipment)



SW-DX-EQPT forces the system to switch the inactive ITH card to the active state. The effect is the same as pressing the Force Active button on the inactive ITH card. This command is provided primarily for testing purposes.

### Syntax

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

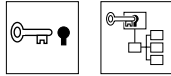
### Example

The following example shows how to switch from the active ITH card to the secondary ITH card.

```
SW-DX-EQPT::ITH:SC1;  
  
<IP SC1  
<  
    SSU 99-02-22 15:52:31  
M  sc1 COMPLD  
;  
    SSU 99-02-22 15:52:31  
A  0095 REPT EVT TSG  
    "ITH1:ITHACTV,SC,02-22,15-52-31:\"ITH Active\""
```

---

## 5.66 VRF-SFWR (Verify Firmware Integrity)



VRF-SFWR requests an EEPROM card to validate the checksum of the firmware in the Main memory.

See Appendix A, “Downloading Firmware,” for a complete description of this download command.

---

# 6

---

## TL1 Keyword Reference

Keywords Used With the Provisioning (Setup and Configuration) Commands

---

## **6.1 Chapter Contents**

6.1.1 This chapter provides a reference for the TL1 keywords that can be used with the provisioning commands to set up and configure the 55400A.

6.1.2 This chapter is organized as follows:

- Overview of TL1 Keywords page 6-3
- Task and Keyword Summary page 6-4
- Description of 55400A TL1 Keywords page 6-9



---

## **6.2 Overview of TL1 Keywords**

6.2.1 TL1 keywords are used with TL1 Provisioning commands to get the 55400A ready for use. Much of this work has already been done for you at the factory. However, you can customize your system configuration by using these keywords to meet your network needs. This section describes the keywords that can be used with the TL1 Provisioning commands. It includes a task/keyword summary and a detailed description of each keyword. Keywords that are used with events are described in Chapter . Keywords that are used with measurements are described in Chapter .

### 6.3 Task and Keyword Summary

Provisioning commands are used with keywords to perform administration tasks. Tables 6-1 through 6-7 list the 55400A TL1 keywords by task and include the command, the type of value, and the <aid> used with the keyword. The keywords are then listed in alphabetical order and described in detail.

**Table 6-1. Remote/Local Port Configuration Task/Keyword Summary**

Remote/Local Port Configuration Tasks	Keyword	Command	Value*	<aid>*
Specifies whether messages/commands be carried separately on two different ports or combined onto one port.	AOMERGE	ED-EQPT	Y/N	IMC
Sets the time interval a connection to the port will continue without the occurrence of an automatic output message.	INACTTIME	ED-EQPT	Int	IMC
Reports automatic output always or only when logged in on Local Port.	LCLAO	ED-EQPT	Enum	IMC
Sets Local port baud rate.	LCLBAUD	ED-EQPT	Enum	IMC
Sets local port echo.	LCLECHO	ED-EQPT	Y/N	IMC
Sets local port flow control.	LCLFLOW	ED-EQPT	Enum	IMC
Reports automatic output always or only when logged in on Remote Port.	RMTAO	ED-EQPT	Enum	IMC
Sets Remote port baud rate.	RMTBAUD	ED-EQPT	Enum	IMC
Sets remote port echo.	RMTECHO	ED-EQPT	Y/N	IMC
Sets remote port flow control.	RMTFLOW	ED-EQPT	Enum	IMC
Reports events from both ITH cards.	RPTALL	ED-EQPT	Y/N	IMC
Supports a low-level encryption for communications to and from the SSU.	SCRAMBLE	ED-EQPT	Y/N	IMC
Sets no response on bad <tid>.	TIDQUIET	ED-EQPT	Y/N	IMC
Forces single subrack system to show S0.	USESUBRCK	ED-EQPT	Y/N	IMC

\* Where:

Y/N = Yes or No

Enum = Enumeration (e.g., FORCED, MANUAL)

Int = Integer (e.g., 1, 2, 3, 4)

OUTx = Output card letter (applies to both cards in a protected pair)

OUTx-y = Output card letter and port number

IMC = IMC card

ITH = Applies to both cards

ITH-n = Input port number

Sn = Rack number

**Table 6-2. Input Port Configuration Task/Keyword Summary**

<b>Input Port Configuration Tasks</b>	<b>Keyword</b>	<b>Command</b>	<b>Value*</b>	<b>&lt;aid&gt;*</b>
Enables auto-upload of performance data.	AUTOPM	ED-SYNC	Y/N	ITH-n
Enables CRC4 input criteria.	CRC4	ED-SYNC	Y/N	ITH-n
Enables Continuous TIE (CTIE)	CTIEENB	ED-SYNC	Y/N	TH-n
Retrieves SSM value.	CURRSSM	RTRV-SYNC	Read only	ITH-n
Enables input.	ENABLE	ED-SYNC	Y/N	ITH-n
Specifies input format.	FORMAT	ED-SYNC	Enum	ITH-n
Delays qualification of input to allow some measurement to complete.	MEASDLY	ED-SYNC	0 - 1800 minutes	ITH-n
Enables the SSU to suppress events from disabled input.	MONITOR	ED-SYNC	Y/N	ITH-n
Sets 5/10 MHz on PRC.	PRC5MHZ	ED-SYNC	Y/N	ITH-n
Sets input priority.	PRIORITY	ED-SYNC	Int	ITH-n
Sets required SSM quality.	QCUTOFF	ED-SYNC	Int	ITH-n
Sets assumed input quality.	QLEVEL	ED-SYNC	Int	ITH-n
Sets E1 input signaling mode.	SIGMODE	ED-SYNC	Enum	ITH-n
Sets SSM Bit.	SSMBIT**	ED-SYNC	Enum	ITH-n
Enables reading SSM.	SSMENB	ED-SYNC	Y/N	ITH-n
Effects the way SSM value is interpreted.	SSMPDH	ED-SYNC	Y/N	ITH-n
Enables SSM priority grouping.	SSMPRI	ED-SYNC	Int	ITH-n
Sets input tracking time constant.	TCONST	ED-SYNC	Int	ITH-n
Sets time constant for secondary oscillator.	TCONSTSEC	ED-SYNC	Int	ITH-n

\* Where:

Y/N = Yes or No

Enum = Enumeration (e.g., FORCED, MANUAL)

Int = Integer (e.g., 1, 2, 3, 4)

OUTx = Output card letter (applies to both cards in a protected pair)

OUTx-y = Output card letter and port number

IMC = IMC card

ITH = Applies to both cards

ITH-n = Input port number

Sn = Rack number

\*\* SSMBIT is also used with ED-EQPT for an output card.

**Table 6-3. ITH Card Configuration Task/Keyword Summary**

<b>ITH Card Configuration Tasks</b>	<b>Keyword</b>	<b>Command</b>	<b>Value*</b>	<b>&lt;aid&gt;*</b>
Decides the criteria for doing phase build out.	BLDLMT	ED-EQPT	50-2000	ITH
Sets input discontinuity criteria.	DSCTIME	ED-EQPT	Int	ITH
Sets holdover quality in SSM mode.	HFQLEVL	ED-EQPT	0-15	ITH
Sets holdover quality in SSM mode for secondary oscillator.	HFQLEVLSEC	ED-EQPT	0-15	ITH
Selects channel for manual mode.	MANCHAN	ED-EQPT	Int	ITH
Sets maximum number of input channels for CTIE measurements.	MXCCN	ED-EQPT	Int	ITH
Sets pull-in range.	PIRANGE	ED-EQPT	Int	ITH
Sets pull-in range for secondary oscillator.	PIRANGESEC	ED-EQPT	Int	ITH
Enables/disables Revertive mode.	REVERT	ED-EQPT	Y/N	ITH
Selects channels to use for SPRD measurement.	SPRDCHN	ED-EQPT	List of chans	ITH
Determines algorithm for selection channel to track.	SYNCMDE	ED-EQPT	Enum	ITH
Sets input wait time.	WTRSS	ED-EQPT	Int	ITH

**Table 6-4. Traffic Re-Synchronization Output Card Task/Keyword Summary**

<b>Traffic Resync Output Card Configuration</b>	<b>Keyword</b>	<b>Command</b>	<b>Value*</b>	<b>&lt;aid&gt;*</b>
Sets a detection threshold for the slip rate.	HSLIMIT	ED-EQPT	Int	ITH
Specifies whether an SSM should be simply passed through or modified according to conditions in the SSU.	TRSCCSM	ED-EQPT	Enum	OUTx, Sn-OUTx

**Table 6-5. Output Port Configuration Task/Keyword Summary**

<b>Output Port Configuration</b>	<b>Keyword</b>	<b>Command</b>	<b>Value*</b>	<b>&lt;aid&gt;*</b>
Inhibits output port.	SQUELCH	ED-SYNC	Y/N	OUT x-y, Sn-OUTx-y

Where:

Y/N = Yes or No

Enum = Enumeration (e.g., FORCED, MANUAL)

Int = Integer (e.g., 1, 2, 3, 4)

OUTx = Output card letter (applies to both cards in a protected pair)

OUTx-y = Output card letter and port number

IMC = IMC card

ITH = Applies to both cards

ITH-n = Input port number

Sn = Rack number

**Table 6-6. Output Card Configuration Task/Keyword Summary**

Output Card Configuration	Keyword	Command	Value*	<aid>*
Outputs AIS	AIS	ED-EQPT	Y/N	OUTx, Sn-OUTx
Sets holdover mode	HLDACT	ED-EQPT	Enum	OUTx, Sn-OUTx
Sets SSM Bit	SSMBIT**	ED-EQPT	Enum	OUTx, Sn-OUTx
Sets TS0 bits	SABITS	ED-EQPT	Int	OUTx, Sn-OUTx
Sets data pattern in traffic time slots	TRAFFIC	ED-EQPT	Int	OUTx, Sn-OUTx

**Table 6-7. Modem Task/Keyword Summary**

Modem Configuration	Keyword	Command	Value*	<aid>*
Sets the approx. time in seconds allowed for a user to successfully log in.	MDMLOGIN	ED-EQPT	Int	None
Sets the approx. time in seconds allowed following a logout before the SSU attempts to break the connection (hang up).	MDMLOGOUT	ED-EQPT	Int	None
Sets the approximate time in seconds between periodic reinitialization of the modem, when no remote connection is established.	MDMRESET	ED-EQPT	Int	None

\*Where:

Y/N = Yes or No

Enum = Enumeration (e.g., FORCED, MANUAL)

Int = Integer (e.g., 1, 2, 3, 4)

OUTx = Output card letter (applies to both cards in a protected pair)

OUTx-y = Output card letter and port number

IMC = IMC card

ITH = Applies to both cards

ITH-n = Input port number

Sn = Rack number

\*\* SSMBIT is also used with ED-SYNC for an input card.

---

## 6.4 Keyword Icons

6.4.1 TL1 keywords can be identified by the target of their action. In this manual, the following icons are used to help you readily identify keyword targets.



Output Card(s)



Input Track and Hold Cards (ITH)



Output Channel



Input Channel



Remote/Local Communication Port



Modem



Traffic Resync Output Card

---

## 6.5 Description of 55400A TL1 Keywords

6.5.1 The following sections describe each TL1 keyword that can be used with the provisioning commands.

### Hint On Keywords

Each keyword has to be used with the following set of commands:

ED-EQPT-TSG    or    ED-SYNC-TSG

RTRV-EQPT-TSG    RTRV-SYNC-TSG

For example, the keyword "AIS" (Output AIS) is used in the following command:

```
ED-EQPT-TSG::OUTB:SC1:::AIS=Y;
```

Think of a keyword as a parameter/value.

### Example Commands are Underlined in this Chapter

In the example commands, *user* input is underlined.

---

## 6.6 AIS (Output AIS)



The AIS keyword forces an E1 formatted output board (55481) to generate AIS instead of the usual formatted signal.

### Syntax

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

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

### Values

<aid> = OUTx, where x is the letter of the output card in a single rack system (ED-EQPT or RTRV-EQPT).

Sn-OUTx, where n is the number of the subrack (in a multiple rack system), and x is the letter of the output card (ED-EQPT or RTRV-EQPT).

<value> = Y (TRUE)—The output produces AIS.

N (FALSE)—The output produces framed data (default).

---

### **NOTE**

In the case of protected output cards, OUTx applies to both cards of a pair.

### Examples

The following example shows how to set the B Output Cards to produce AIS.

```
ED-EQPT::OUTB:SC1::AIS=Y;
```

### Other Keywords Used to Set the State of Output Cards

HLDACT (Holdover Action)

TRSCSSM (Traffic Re-Synchronization Card Synchronization Status Message)



## 6.7 AOMERGE (Automatic Output Merge)



The AOMERGE keyword specifies whether the automatic output messages and commands will be carried separately on two different ports or combined on one port. The network parameters for the two ports are: PORTCMD5 and PORTAO. Operation using the 55451A or 55452A Open Synchronization Management Framework software requires that separate ports be used.

### When IP Address of Manager is Same as Local Manager (IPLM1) or (IPLM2)

If the IP address of the manager matches IPLM1 or IPLM2, then the output will be merged, regardless of the AOMERGE value. In this case, it is assumed that the local manager software (55450) is being used, which does not support having commands and events carried on separate ports.

### Syntax

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

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

### Values

#### Set AOMERGE Keyword's Value to N or Y, Depending on the Management Software You Are Using to Manage the SSU

AOMERGE must be set to N whenever OSMF-UX is being used to manage the SSU. However, AOMERGE should be set to Y if the local manager software (55450) is being used to manage the SSU. This is due to the fact that the OSMF-UX software can establish an AOPort (Automatic Output Port) connection with the SSU, but the local manager software cannot.

<aid> = IMC

<value> = Y (TRUE)—messages and commands will be carried combined on one port.

N (FALSE)—messages and commands will be carried separately on two different ports (default).

### Examples

The following example shows how to retrieve value of AOMERGE.

```
RTRV-EQPT::IMC:SC1::PARAMETER=AOMERGE;
```

The following example shows how to change the AOMERGE from its default (N) value.

```
ED-EQPT::IMC:SC1::AOMERGE=Y;
```

**AOMERGE Parameter May Reset to Default Setting After a Firmware Download to the NIMC**

Following a firmware download to the Network IMC, the AOMERGE parameter may be reset to its default setting (AOMERGE=N). If one port had been used to carry both automatic events and commands, the AOMERGE setting should be checked and changed to AOMERGE=Y, if necessary.

**Related Keywords**

INACTTIVE (Inactivity Time-Out)

SCRAMBLE (Scramble Communication)

RPTALL (Report All)

---

## 6.8 AUTOPM (Auto-Upload PM)



The AUTOPM keyword inhibits or allows automatic upload of performance data for a particular input channel. The data to be uploaded 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 the AUTOPM keyword is to allow disabling of all automatic measurement uploads from a channel without the need to turn off the PM property on each indicated measurement. See “Displaying Measurement Properties” on page -15 of Chapter for more information on automatic uploading of performance data.

### Syntax

```
ED-SYNC: [<tid>] :<aid>:<ctag>::AUTOPM=<value>;
RTRV-SYNC: [<tid>] :<aid>:<ctag>::PARAMETER=AUTOPM;
```

### Values

<aid> = ITH-n, where n is the number of the input channel.

<value> =Y (TRUE)—Performance data will be uploaded for the channel.

N (FALSE)—Performance data will NOT be uploaded for the channel (default).

### Example

The following example shows how to set input channel 3 to upload performance data.

```
ED-SYNC::ITH-3:SC1::AUTOPM=Y;
```

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

- The AUTOPM keyword has been set to Y for the desired input channel (shown above).
- The PM property has been set to Y for the desired <montype> and input channel (shown below).

For example, the following command will turn on automatic uploading of LMRTIE-15M data for input channel 3.

```
ED-SYNC::ITH-3:SC1::AUTOPM=Y,LMRTIE-15M=PM-Y;
```

The AUTOPM keyword allows you to enable/disable all uploads from a particular channel while the PM property allows you to specify exactly which measurement results are desired.

**Data Uploading**

For TDEV, FFOFF, and SPRD measurements, data is uploaded as soon as new data is generated.

---

**NOTE**

It is easily possible to request uploading of more data than the communications channels can handle. Depending on the baud rate, the limiting factor may be either the Local or Remote ports, or the communications between the ITH and IMC cards. If this occurs, some upload reports may be lost. This problem is particularly likely to occur if the user uploads data at one second intervals.

To assist in avoiding this problem, provision has been made to upload 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 user does explicitly enable reporting of the 1-second data, then it will be uploaded every second (except for MRTIE which is only calculated at 15-minute intervals).

---

**Related Measurements**

TDEV (Time Deviation)

MRTIE (Maximum Relative Time Interval Error)

LMRTIE (Latest Maximum Relative Time Interval Error)

FFOFF (Fractional Frequency Offset)

SPRD (Frequency Spread Between Channels)

**Other Keywords Used to Set the State of an Input Port**

ENABLE (Input Enable)

FORMAT (Input Format)

PRC5MHZ (PRC 5MHz Signal)

SIGMODE (Signal Mode)

---

## 6.9 BLDLMT (Phase Build Out Limit)



The BLDLMT keyword decides the criteria for doing phase build out. The value is in nanosecond.

### Only Available in Firmware Versions R3851B and Later

The BLDLMT keyword is available only in firmware versions R3851B and later.

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>::BLDLMT=<value>;  
RTRV-EQPT: [<tid>]:<aid>:<ctag>::PARAMETER=BLDLMT;
```

### Values

<aid> = ITH

<value> =Range 50 to 20000 (default = 12000, which is 12  $\mu$ s).

### Example

The following example shows the retrieval of the BLDLMT value, the setting of BLDLMT to 6000 (6  $\mu$ s), and the retrieval to verify new BLDLMT value.

```
RTRV-EQPT::CTAG1::PARAMETER=BLDLMT;
```

```
IP CTAG1  
<  
SSU 98-08-25 12:01:33  
M CTAG1 COMPLD  
"ITH::BLDLMT = 12000"
```

```
ED-SYNC::ITH:CTAG2::BLDLMT=6000;
```

```
IP CTAG2  
<  
SSU 98-08-25 12:01:54  
M CTAG2 COMPLD
```

```
RTRV-EQPT::ITH:CTAG3::PARAMETER=BLDLMT;
```

```
IP CTAG3  
<  
SSU 98-08-25 12:02:19  
M CTAG3 COMPLD  
"ITH::BLDLMT = 6000"  
;
```

**Related Keyword**

DSCTIME (Discontinuity Time)

---

## 6.10 CRC4 (Set CRC4 Checking)



The CRC4 keyword controls whether an E1 input channel should expect valid CRC4 information and disqualifies the input when CRC4 channel errors are found. You can also enable this function by setting a switch on the ITH card. Refer to the *55400A SSU System Manual*.

---

### NOTE

The input channel must have CRC4 enabled in order to read SSM bits from the input.

### Syntax

```
ED-SYNC: [<tid>]:<aid>:<ctag>::CRC4=<value>;
```

```
RTRV-SYNC: [<tid>]:<aid>:<ctag>::PARAMETER=CRC4;
```

### Values

<aid> = ITH-n, where n is the number of the input channel.

<value> = Y (True), N (False) Default = N

### Example

The following example shows how to set input channel 3 to expect CRC4 data and to disqualify the input if CRC4 errors are found.

```
ED-SYNC::ITH-3:SC1::CRC4=Y;
```

### Other Keywords Used to Qualify/Disqualify an Input Channel

CURRSSM (Current SSM Value)

ENABLE (Input Enable)

FORMAT (Input Format)

QLEVEL (Quality Level)

SIGMODE (Signal Mode)

SSMENB (Enable reading SSM)

---

## 6.11 CTIEENB (Continuous TIE Enable)



The CTIEENB keyword enables Continuous TIE measurement. The Continuous Time Interval Error (CTIE) measurement, reported in units of nanoseconds, is performed on a specified input and captured every second. (See “CTIE” on page -19 in Chapter for more information on CTIE). CTIEENB=Y will enable the measurement. The default is CTIEENB=N.

### Only Available in Firmware Versions R3851B and Later

The CTIEENB keyword and CTIE measurements are available only in firmware versions R3851B and later, and **only possible when using the Option 004 Expanded Memory NIMC Card.**

---

### NOTE

Up to eight input channels can simultaneously have CTIEENB=Y. The maximum number is set with the MXCCN keyword of channels.

### Syntax

```
ED-SYNC: [<tid>]:<aid>:<ctag>::CTIEENB=<value>;  
RTRV-SYNC: [<tid>]:<aid>:<ctag>::PARAMETER=CTIEENB;
```

### Values

<aid> = ITH-n, where n is the number of the input channel.

<value> =Y (Yes) — the channel is measured for CTIE.

N (No) — the channel is not measured for CTIE (default).

### Example

The following example shows how to retrieve CITEENB.

```
RTRV-SYNC::ITH-0:SC1::PARAMETER=CTIEENB;  
  
IP SC1  
<  
SSU 98-12-25 15:52:36  
M SC1 COMPLD  
"ITH-0::CTIEENB = N"  
;
```



The following example shows how to change CITEENB.

```
ED-SYNC::ITH-0:SC2:::CTIEENB=Y;  
  
IP SC2  
<  
SSU 98-12-25 15:53:00  
M SC2 COMPLD
```

The following example shows how to retrieve to verify CITEENB changed.

```
RTRV-SYNC::ITH-0:SC2:::PARAMETER=CTIEENB;  
  
IP SC3  
<  
SSU 98-12-25 15:53:21  
M SC3 COMPLD  
"ITH-0:CTIEENB = Y"  
;
```

---

## 6.12 CURRSSM (Current SSM Value)



The CURRSSM keyword retrieves the current SSM (Synchronization Status Message) value from the specified E1 input channel. If SSM Reading has been enabled (SSMENB=Y), the SSM value in the specified bit position (SSMBIT) will be retrieved. If SSM Reading has been disabled (SSMENB=N), then the assumed SSM (QLEVEL) will be retrieved instead.

---

### **NOTE**

The current SSM value is only read from the input channel if the channel has been set to FORMAT=E1, SSMENB=Y, and CRC4=Y.

### **Syntax**

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

### **Values**

<aid> = ITH-n, where n is the number of the input channel.

---

### **NOTE**

If an input is set with FORMAT=E1, CRC4=Y, and SSMENB=N, then CURRSSM will retrieve the default SSM value for that input. However, if the input is set with all of the above values except that SSMENB=Y, then CURRSSM will retrieve the currently received SSM value present on the input signal.

### **SSM Quality Levels (QLEVEL):**

<b>Quality Level</b>	<b>Description</b>
0	Quality unknown (existing synchronization network)
1	Reserved
2	Rec. G.811—PRC level
3	Reserved
4	G.812 transit—Transit node (default)
5	Reserved
6	Reserved
7	Reserved
8	G812 local—Local node
9	Reserved
10	Reserved
11	Synchronous Equipment Timing Source (SETS)
12	Reserved
13	Reserved
14	Reserved
15	Do not use for synchronization

### **Example**

The following example shows how to retrieve the current SSM value for input channel 1.

```
RTRV-SYNC : : ITH-1 : SC1 : : PARAMETER=CURRSSM ;
```

### **Related Keywords**

CRC4 (Set CRC4 Checking)  
FORMAT (Input Format)  
QLEVEL (Quality Level)  
SSMENB (Enable Reading SSM)  
SSMBIT (Set SSM Bits)  
SSMPDH (SSM on PDH System)  
SYNCMDE (Sync Mode)

---

## 6.13 DSCTIME (Discontinuity Time)



Use DSCTIME to determine the number of consecutive seconds with severe errors the system will wait before disqualifying the channel.

Most synchronization networks will carry signals over facilities which are subject to dropouts and other failures. For short duration problems, the errors are corrected and the problem is noted, but the input may remain qualified. By default, this parameter is set to 2, which allows for two consecutive errored seconds to pass, but three would fail. In addition, each separate consecutive block of errored seconds is counted and timed. At any point, when the three most recent errored blocks have occurred within the past five minutes, the input will be disqualified.

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>::DSCTIME=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>::PARAMETER=DSCTIME;
```

### Values

<aid> = ITH

<value> = Integer from 1 to 15 seconds (default = 2 seconds)

### Example

The following example shows how to set the input channel to allow two consecutive errored seconds before disqualifying the input on the third errored second.

```
ED-EQPT: : ITH: SC1: : DSCTIME=2;
```

### Other Keywords Used For Configuration

MANCHAN (Manual Channel)

PIRANGE (Pull-in Range)

REVERT (Revertive Mode)

SYNCMDE (Sync Mode)

WTRSS (Wait Time to Restore Synchronization Source)

---

## 6.14 ENABLE (Input Enable)



The ENABLE keyword controls whether an input will be considered as a reference source. You can also enable each input channel by setting a switch on the ITH card. Refer to the *55400A SSU System Manual*.

### Syntax

```
ED-SYNC: [<tid>]:<aid>:<ctag>:::ENABLE=<value>;
RTRV-SYNC: [<tid>]:<aid>:<ctag>:::PARAMETER=ENABLE;
```

### Values

<aid> = ITH-n, where n is the number of the input channel.

<value> =Y (TRUE)—The channel may be used (default).

N (FALSE)—The channel may not be used.

### Example

The following example shows how to disallow input channel 3 from being considered as a reference source in Automatic mode.

```
ED-SYNC:::ITH-3:SC1:::ENABLE=N;
```

### Other Keywords Used to Set the State of an Input Port

CRC4 (Set CRC4 Checking)

FORMAT (Input Format)

MONITOR (Input Event Monitoring)

PRC5MHZ (PRC 5MHz Signal)

PRIORITY (Input Priority)

QCUTOFF (Quality Cutoff)

QLEVEL (Quality Level)

SIGMODE (Signal Mode)

SSMENB (Enable reading SSM)

SSMPRI (Enable SSM Priority Grouping)

TCONST (Time Constant)

---

## 6.15 FORMAT (Input Format)



The **FORMAT** keyword tells the system which format (2048 kbps, or 2048 kHz) to expect from a particular input channel. It can also be set from switches on power-up and overridden by this command. It is ignored for the 5/10 MHz input. You can set each input channel to a particular format by setting a switch on the ITH card. Refer to the *55400A SSU System Manual*.

---

### **NOTE**

If you want to display the current SSM value (**CURRSSM** keyword) of an input channel, you must specify **FORMAT=E1**, **SSMENB=Y**, and **CRC4=Y** for that channel.

---

### **Syntax**

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

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

### **Values**

<aid> = ITH-n, where n is the number of the input channel.

<value> =E1—The input uses the E1 format (2048 kbps).

SQW—The input is a 2048 kHz square wave (unformatted) format (default).

### **Example**

The following example shows how to set input channel 3 to use E1 format.

```
ED-SYNC::ITH-3:SC1:::FORMAT=E1;
```

### **Other Keywords Used to Set the State of an Input Port**

CRC4 (Set CRC4 Checking)

ENABLE (Input Enable)

PRIORITY (Input Priority)

SIGMODE (Signal Mode)

---

## 6.16 HFQLEVL (Holdover and Freerun Quality Level)



The HFQLEVL keyword defines the quality assumed for the local oscillator in SSM (Synchronization Status Message) mode. This value is used for placing SSM bits onto the output stream when in Holdover mode, if the holdover action (HLDACT) keyword is set to create an E1 signal. See “Input Channel Qualification” on page -3 of Chapter for more information on input channel qualification and holdover mode.

### Syntax

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

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

### Values

<aid> = ITH

<value> = Range 0 to 15 (default = 11). See the QLEVEL keyword in this chapter for a list of all possible Quality Levels.

### Example

The following example shows how to set the ITH cards to SSU transit level.

```
ED-EQPT::ITH:SC1::HFQLEVL=4;
```

### Other Keywords Used to Set System States

HLDACT (Holdover Action)

REVERT (Revertive Mode)

SPRDCHN (Spread Channel)

SYNCMDE (Sync Mode)

## 6.17 HFQLEVLSEC (Holdover and Freerun Quality Level for Secondary Oscillator)



The HFQLEVLSEC keyword defines the quality assumed for the secondary oscillator in virtual SSM (Synchronization Status Message) mode.

HFQLEVLSEC applies only to the ITH card with the inferior oscillator when mixed ITH oscillator types are used in the 55400A system.

This keyword only operates on the inferior oscillator of a mixed oscillator pair. It can be used to define the quality assumed for the secondary oscillator in virtual SSM mode. The quality level value is only transmitted if the inferior oscillator goes active while it is in Holdover mode.

The default quality level value for the 55411A/B Quartz oscillator is 11.

### Syntax

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

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

### Values

<aid> = ITH

<value> =Range 0 to 15 (default = 11). 11 = Synchronous Equipment Timing Source (SETS). See the QLEVEL keyword in this chapter for a list of all possible Quality Levels.

### Example

The following example shows how to set the ITH cards to SSU transit level.

```
ED-EQPT::ITH:SC1:::HFQLEVLSEC=4;
```

### Other Keywords Used to Set System States

HLDACT (Holdover Action)

REVERT (Revertive Mode)

SPRDCHN (Spread Channel)

SYNCMDE (Sync Mode)



---

## 6.18 HLDACT (Holdover Action)



The HLDACT keyword controls what happens to the Output cards when the system is in Holdover mode.

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>::HLDACT=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>::PARAMETER=HLDACT;
```

### Values

<aid> = OUTx, where x is the letter of the output card in a single rack system (ED-EQPT or RTRV-EQPT).

Sn-OUTx, where n is the number of the subrack (in a multiple rack system), and x is the letter of the output card (ED-EQPT or RTRV-EQPT).

<value> =CONTINUE — The output cards will continue to operate (default).

AIS — The output cards will be programmed to output an AIS signal. AIS only applies to formatted E1 output cards.

SQUELCH — The output cards will be squelched.

### Example

The following example shows how to set output card B in a single rack system to be squelched in Holdover mode.

```
ED-EQPT::OUTB:SC1::HLDACT=SQUELCH;
```

### Other Keywords Used to Set the State of an Output Port

AIS (Output AIS)

SABITS (SA Bits)

SSMBIT (SSM Bit)

## 6.19 HSLIMIT (High Slip Limit)



The HSLIMIT keyword is used to define the High Slip rate. When the frequency of a specific retimed input on a TRSC (Traffic Re-Synchronization Output Card) is different from that of the ITH, a slip will eventually occur. How often the slip occurs (slip rate) depends on the frequency difference. HSLIMIT specifies a frequency difference in parts per  $10^9$ . In the firmware, it is calculated to a corresponding slip rate. When TRSC detects a slip rate higher than this calculated slip rate (called the High Slip rate), the MSLIP (Multiple Slips) LED on TRSC illuminates. Event “TRCHSLP” occurs as well.

### Explanation of a Slip Within the TRSC (Traffic Re-Synchronization Output Card)

The function of the re-timing channels of the TRSC is to remove the jitter and wander on the traffic-bearing signal connected to the card's four re-timed input channels. The data is clocked into the buffer where its depth is varied to compensate for any jitter and wander between the input clock and the reference clock used for re-timing the signal. The nominal depth, or delay, is one frame, the maximum is two frames, and minimum is 0 frames. Whenever the buffer depth reaches either two frames or zero frames, a slip has occurred and the SLIP LED will light indicating there was an overflow or underflow in the data buffer. If multiple slips occur often enough to meet or exceed the threshold set with the HSLIMIT keyword, the MSLIP LED will illuminate.

### Syntax

```
ED-EQPT::<aid>:<ctag>::HSLIMIT=<value>;
```

```
RTRV-EQPT::<aid>:<ctag>::PARAMETER=HSLIMIT;
```

### Values

<aid> = ITH

<value> = 10 to 20000 parts per  $10^9$  (default = 4600).

### Example

The following example sets the HSLIMIT to a value of 4600 parts per  $10^9$ .

```
ED-EQPT::Sn-ITH:1::HSLIMIT=4600;
```

where

n = number of the subrack in a multiple subrack system that contains the TRSC. the master subrack number is always set to “0”. Expansion subracks can be numbered 1 through 4. This parameter (Sn-) can be left out for a single subrack system.

**Calculations to Convert Frequency Offset to Slip Rate.** What follows are two examples to show the relationship between the setting of the HSLIMIT and the equivalent slip rate.

**HSLIMIT (High Slip Limit)**

At an HSLIMIT threshold setting of 10 parts per  $10^9$ , an MSLIP event will occur when the rate at which multiple slips are occurring is equivalent to a frequency offset of 0.02 Hz. This is equivalent to a slip occurring every 12,500 seconds, or one slip every 3.47 hours. The calculations follow:

$$\text{Frequency offset} = 10 \times 10^9 \times 2.048 \text{ MHz} = 10 \text{ E-9} \times 2.048 \text{ E+6} = 0.0205 \text{ Hz}$$

$$\text{Slip rate} = 256 \text{ bits per frame} / 0.0205 \text{ Hz} = 12,500 \text{ seconds}$$

At the default HSLIMIT threshold setting of 4600, an MSLIP event will occur when the multiple slip rate is equivalent to a frequency offset of 9.4 Hz. This is equivalent to a slip occurring every 27 seconds. The calculations follow:

$$\text{Frequency offset} = 4600 \times 10^9 \times 2.048 \text{ MHz} = 4600 \text{ E-9} \times 2.048 \text{ E+6} = 9.42 \text{ Hz}$$

$$\text{Slip rate} = 256 \text{ bits per frame} / 9.42 \text{ Hz} = 27.17 \text{ seconds}$$

**Parts Per  $10^9$  Values and Slip Rates.** Use the following table to select an HSLIMIT value.

Parts Per $10^9$	Seconds Between Slips	Slips/Minute	Slips/Hour	Slips/Day
4600	27.2	2.2	132.5	3179.5
4000	31.3	1.9	115.2	2764.8
2000	62.5	1.0	57.6	1382.4
1000	125	0.5	28.8	691.2
500	250	0.24	14.4	345.6
100	1250	0.048	2.9	69.1
50	2500	0.24	1.44	34.6
10	12500	0.0048	0.288	6.9

**Related Keyword**

TRSCC (Traffic Re-Synchronization Card Synchronization Status Message)

---

## 6.20 INACTTIME (Inactivity Time-Out)



The **INACTTIME** keyword specifies the length of time a connection to the 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 55400A PORTAO will be closed. The connection will be re-established when another automatic message occurs.

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>:::INACTTIME=<value>;  
RTRV-EQPT: [<tid>]:<aid>:<ctag>:::PARAMETER=INACTTIME;
```

### Values

<aid> = IMC

<value> = Range 0 to 10000 in units of 100 ms, default = 10.

### Examples

The following example shows how to retrieve value of **INACTTIME**.

```
RTRV-EQPT::IMC:SC1:::PARAMETER=INACTTIME;
```

The following example shows how to change the **INACTTIME** to specify a 20-second time-out.

```
ED-EQPT::IMC:SC1:::INACTTIME=200;
```

### Related Keywords

AOMERGE (Automatic Output Merge)

SCRAMBLE (Scramble Communication)

---

## 6.21 LCLAO (Local Automatic Output)



The LCLAO keyword sets the local port to report Automatic Messages always, never, or only when logged into the local port.

### Syntax

```
ED-EQPT: [<tid>] :<aid>:<ctag>::LCLAO=<value>;  
RTRV-EQPT: [<tid>] :<aid>:<ctag>::PARAMETER=LCLAO;
```

### Values

<aid> = IMC

<value> =ALWAYS—Always report Automatic Messages (default)

LOGIN—Only report Automatic Messages when logged in

NEVER—Never report Automatic Messages

### Example

The following example shows how to set up Automatic Message reporting only when logged in to the local port.

```
ED-EQPT::IMC:SC1::LCLAO=LOGIN;
```

### Other Keywords Used to Set the State of a Communication Port

LCLBAUD (Local Baud)

LCLECHO (Local Echo)

LCLFLOW (Local Flow)

RMTAO (Remote Automatic Output)

RMTBAUD (Remote Baud)

RMTECHO (Remote Echo)

RMTFLOW (Remote Flow)

---

## 6.22 LCLBAUD (Local Baud Rate)



The LCLBAUD keyword sets the baud rate on the local port.

---

### NOTE

You cannot set the baud rate of the port you are using.

Although it is possible to set the baud rate and flow control using TL1 commands, it is recommended that they be set via the hardware switches on the IMC card. Refer to the *55400A SSU System Manual*. Pressing the Reset COM Ports button on the IMC card will set the baud rate and flow control to the settings specified by the switches. Any changes made using TL1 commands are lost.

---

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>:::LCLBAUD=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>:::PARAMETER=LCLBAUD;
```

### Values

<aid> = IMC

<value> = 1200, 2400, 9600, 19200 (default = 9600)

### Example

The following example shows how to set the baud rate to 2400 for the local port.

```
ED-EQPT::IMC:SC1:::LCLBAUD=2400;
```

### Other Keywords Used to Set the State of a Communication Port

LCLAO (Local Automatic Output)

LCLECHO (Local Echo)

LCLFLOW (Local Flow)

RMTAO (Remote Automatic Output)

RMTBAUD (Remote Baud)

RMTECHO (Remote Echo)

RMTFLOW (Remote Flow)

---

## 6.23 LCLECHO (Local Echo)



The LCLECHO keyword tells the system to echo characters to the local terminal.

### Syntax

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

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

### Values

<aid> = IMC

<value> = Y (True) N (False) default = Y

### Example

The following example shows how to tell the system not to echo commands to the local terminal.

```
ED-EQPT::IMC:SC1::LCLECHO=N;
```

### Other Keywords Used to Set the State of a Communication Port

LCLAO (Local Automatic Output)

LCLBAUD (Local Baud)

LCLFLOW (Local Flow)

RMTAO (Remote Automatic Output)

RMTBAUD (Remote Baud)

RMTECHO (Remote Echo)

RMTFLOW (Remote Flow)

---

## 6.24 LCLFLOW (Local Flow)



The LCLFLOW keyword sets the flow control on the local port.

---

### NOTE

You cannot set the flow control of the port you are using.

Although it is possible to set the baud rate and flow control using TL1 commands, it is recommended that they be set via the hardware switches on the IMC card. Refer to the *55400A SSU System Manual*. Pressing the Reset COM Ports button on the IMC card will set the baud rate and flow control to the settings specified by the switches. Any changes made using TL1 commands are lost.

---

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>:::LCLFLOW=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>:::PARAMETER=LCLFLOW;
```

### Values

<aid> = IMC

<value> = NONE, HARDWARE (default = NONE)

### Example

The following example shows how to set the flow control to hardware for the local port.

```
ED-EQPT::IMC:SC1:::LCLFLOW=HARDWARE;
```

### Other Keywords Used to Set the State of a Communication Port

LCLAO (Local Automatic Output)

LCLBAUD (Local Baud)

LCLECHO (Local Echo)

RMTAO (Remote Automatic Output)

RMTBAUD (Remote Baud)

RMTECHO (Remote Echo)

RMTFLOW (Remote Flow)



---

## 6.25 MANCHAN (Manual Channel)



The MANCHAN keyword allows you to specify which channel is to be used in the manual or forced synchronization mode.

### Syntax

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

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

### Values

<aid> = ITH

<value> = Range 0–8 (default = 0 which indicates the 5/10 MHz PRC input).

### Example

The following example shows how to set input channel 3 to be used for manual or forced synchronization mode.

```
ED-EQPT::ITH:SC1::MANCHAN=3;
```

### Other Keywords Used For Configuration

REVERT (Revertive Mode)

SYNCMDE (Sync Mode)

WTRSS (Wait Time to Restore Synchronization Source)

---

## 6.26 MDMLOGIN (Modem Login)



The MDMLOGIN keyword sets the approximate time in seconds allowed for a user to successfully log in following the establishment of communications via a modem.

See Chapter , “Modem Control,” for a complete description of the MDMLOGIN keyword word.

---

## 6.27 MDMLOGON (Modem Logon)



The MDMLOGOUT keyword sets the approximate time in seconds following a logout before the 55400A attempts to break the connection (hang up) unless a new login occurs.

See Chapter , “Modem Control,” for a complete description of the MDMLOGON keyword.

---

## 6.28 MDMRESET (Modem Reset)



The MDMRESET keyword sets the approximate time in seconds between periodic reinitializations of the modem, when no remote connection is established.

See Chapter , “Modem Control,” for a complete description of the MDMRESET keyword.

---

## 6.29 MEASDLY (Measurement Delay)



The MEASDLY 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 ITH card.
- Input signal frequency is outside the measurement range.
- There are discontinuities on the input signal exceeding the DSCTIME value.
- The TL1 command used to restart performance measurements (INIT-REG-TSG) is executed with the DISQ parameter. For example:  
INIT-REG::ITH-2:SC1::DISQ;

### Only Available in Firmware Versions R3833C and Later

The MEASDLY keyword is available only in firmware versions R3833C and later.

### Syntax

```
ED-SYNC: [<tid>]:<aid>:<ctag>::MEASDLY=<value>;
RTRV-SYNC: [<tid>]:<aid>:<ctag>::PARAMETER=MEASDLY;
```

### Values

<aid> = ITH-n, where n is the number of the input channel.

<value> = Range 0 – 1800 (default = 0)

### Example

The following example assumes that it is desired that 20 minutes be allotted for a performance measurement to run to completion on Input 1 before the input signal can be judged qualified.

```
ED-SYNC::ITH-1:SC1::MEASDLY=20;
```

### Related Keywords

DSCTIME (Discontinuity Time)

WTRSS (Wait Time to Restore Synchronization Source)

---

## 6.30 MONITOR (Input Event Monitoring)



The MONITOR keyword allows events from disabled inputs to be suppressed by the SSU.

Set MONITOR to “N” for disabled channels that do not have an input signal connected. If the value for ENABLE is “Y”, the setting for MONITOR is ignored.

To use the SSU to monitor an input signal that is not being used as a system reference, set ENABLE for the input you want to monitor to “N”, set MONITOR to “Y”, and connect the signal.

### **Only Available in Firmware Versions R3833C and Later**

The MONITOR keyword is available only in firmware versions R3833C and later.

### **Syntax**

```
ED-SYNC: [<tid>]: ITH-n:<ctag>:::MONITOR=<value>;  
RTRV-SYNC: [<tid>]: ITH-n:<ctag>:::PARAMETER=MONITOR;
```

### **Values**

<aid> = ITH-n, where n is the number of the input channel.

<value> = Y (True), default

N (False), disabled inputs events are suppressed.

### **Example**

The following example configures the SSU to suppress events related to input channel 3.

```
ED-SYNC::: ITH-3: SC1::: ENABLE=N, MONITOR=N;
```

### **Related Keyword**

ENABLE (Input Enable)

## 6.31 MXCCN (Maximum CTIE Channel Number)



The MXCCN keyword selects the channels to measure for Continuous TIE (CTIE).

### Only Available in Firmware Versions R3851B and Later

The MXCCN keyword is available only in firmware versions R3851B and later.

### If Any Input is Being Measured (CTIEENB=Y), MXCCN CANNOT be Changed

If there is any input being measured (CTIEEB=Y), MXCCN CANNOT be changed. An IDNV error will occur if you try to change the value of MXCCN. IMC and early version of NIMC (without Option 004) do NOT support the MXCCN keyword.

### Syntax

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

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

### Values

<aid> = ITH

<value> = range is 1 to 9 (default = 8).

### Example

The following example shows how to retrieve MXCCN.

```
RTRV-EQPT::ITH:SC1::PARAMETER=MXCCN;
IP SC1
<
SSU 99-03-09 14:13:04
M SC1 COMPLD
"ITH::MXCCN = 8"
;
```

**MXCCN (Maximum CTIE Channel Number)**

The following example shows how to change MXCCN to 3.

```
ED-EQPT::ITH:SC2::MXCCN=3;  
IP SC1  
<  
SSU 99-03-09 14:16:19  
M SC2 COMPLD  
;
```

**Related Keyword**

CTIEENB (Continuous TIE Enable)



---

## 6.32 PIRANGE (Pull-In Range)



The PIRANGE keyword controls how far the input can be off from the absolute LO frequency before it is disqualified. Since this is over the lifetime of the oscillator, this is not a substitute for frequency deviation.

This keyword specifies the *pull-in* range as well as the *hold-in* and *pull-out* range for input signals. These three frequency ranges are the same for the 55400A.

### Syntax

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

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

### Values

<aid> = ITH

<value> = Range 10–10000 ppb (parts per billion = parts in  $10^9$ ). Default = 4.6 ppm or 4600 ppb for all oscillator types except Rubidium. Rubidium has a default value of 16 ppb (.016 ppm).

ITH Card P/N	Default PIRANGE <value>
55411	4.6 ppm = 4600 ppb
55412	4.6 ppm = 4600 ppb
55413	4.6 ppm = 4600 ppb
55414	.016 ppm = 16 ppb
55415	4.6 ppm = 4600 ppb

### Example

The following example shows how to set the ITH cards to a pull-in range of 2.0 ppm.

```
ED-EQPT::ITH:SC1::PIRANGE=2000;
```

### Other Keywords Used For Configuration

DSCTIME (Discontinue Time)

REVERT (Revertive Mode)

SPRDCHN (Spread Channel)

SYNCMDE (Sync Mode)

WTRSS (Wait Time to Restore Synchronization Source)

## 6.33 PIRANGESEC (Pull-In Range for Secondary Oscillator)



The PIRANGESEC keyword sets the pull-in range for the secondary oscillator.

PIRANGESEC applies only to the ITH card with the inferior oscillator when mixed ITH oscillator types are used in the 55400A system.

This keyword only operates on the inferior oscillator of a mixed oscillator pair. The keyword can be used to set how far off in fractional frequency the incoming signal can be from the secondary oscillator and still have this ITH card successfully track it.

The default value for an 55411A/B Quartz oscillator is 4600 ppb (4.6 ppm).

### Syntax

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

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

### Values

<aid> = ITH

<value> =Range 0–10000 ppb (parts per billion = parts in  $10^9$ ) Default = 4.6 ppm or 4600 ppb for all oscillator types except Rubidium. Rubidium has a default value of 16 ppb (.016 ppm).

### Example

The following example shows how to set the ITH secondary oscillator to a pull-in range of 2.0 ppm.

```
ED-EQPT::ITH:SC1:::PIRANGESEC=2000;
```

### Related Commands

PIRANGE (Pull-in Range)

DSCTIME (Discontinuity Time)

REVERT (Revertive Mode)

SPRDCHN (Spread Channel)

SYNCMDE (Sync Mode)

WTRSS (Wait Time to Restore Synchronization Source)

---

## 6.34 PRC5MHZ (PRC 5MHz Signal)



The PRC5MHZ keyword allows you to tell the system to expect a 5 or 10 MHz signal on the PRC input channel. The initial setting for this parameter is specified by a switch on the ITH cards. Refer to the *55400A SSU System Manual* for more information. Override the switch setting using the PRC5MHZ keyword.

### Syntax

```
ED-SYNC: [<tid>]: ITH-0:<ctag>::: PRC5MHZ=<value>;
```

```
RTRV-SYNC: [<tid>]: ITH-0:<ctag>::: PARAMETER=PRC5MHZ;
```

### Values

<value> =Y (TRUE)—Expect a 5 MHz signal.

N (FALSE)—Expect a 10 MHz signal (default—based on the switch settings).

---

### NOTE

This keyword should only be used with an <aid> of ITH-0.

### Example

The following example shows how to tell the system to expect a 5 MHz signal on input channel 0 (PRC).

```
ED-SYNC:: ITH-0: SC1::: PRC5MHZ=Y;
```

### Other Keywords Used to Set the State of an Input Port

ENABLE (Input Enable)

PRIORITY (Input Priority)

TCONST (Time Constant)

---

## 6.35 PRIORITY (Input Priority)



The PRIORITY 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 (see SYNCMDE keyword for more details on the selection algorithm). For all channels with the same priority value, the lowest numbered channel will be considered to have priority.

### Syntax

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

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

### Values

<aid> = ITH-n, where n is the number of the input channel.

<value> = Range 0–9 (Default is the channel number plus one.)

---

### NOTE

Each input channel is initially set to a priority equal to its channel number plus one. For example:

- Channel 0 has a priority of 1 (highest priority)
- Channel 1 has a priority of 2 (next highest priority)
- Channel 2 has a priority of 3 (next highest priority)
- Channel 3 has a priority of 4 (next highest priority)
- Channel 4 has a priority of 5 (lowest priority)

---

### Example

The following example shows how to set input channel 3 to a priority of 1 (the highest priority).

```
ED-SYNC::ITH-3:SC1:::PRIORITY=1;
```

### Other Keywords Used to Set the State of an Input Port

ENABLE (Input Enable)

PRC5MHZ (PRC 5MHz Signal)

QCUTOFF (Quality Cutoff)

QLEVEL (Quality Level)

SSMBIT (SSM Bit)

SSMENB (Enable reading SSM)

SSMPRI (Enable SSM Priority Grouping)

---

## 6.36 QCUTOFF (Quality Cutoff)



The QCUTOFF keyword specifies the minimum SSM (Synchronization Status Message) quality level in order for an input to be used. SSM sync mode must be enabled (SYNCMDE = SSM) for the QCUTOFF to operate. For firmware versions after R3744, the input will also be disqualified if the current SSM value equals or exceeds QCUTOFF.

### Syntax

```
ED-SYNC: [<tid>]:<aid>:<ctag>:::QCUTOFF=<value>;
RTRV-SYNC: [<tid>]:<aid>:<ctag>:::PARAMETER=QCUTOFF;
```

### Values

<aid> = ITH-n, where n is the number of the input channel.

<value> = Range 0–15 (default = 15)

### Example

The following example shows how to set input channel 3 to the quality cutoff level of 4 (see the Quality Levels listed under the QLEVEL keyword in this chapter) so that if this input were to read an SSM of 8 (local node), it would not be used in SSM selection of an input reference

```
ED-SYNC:::ITH-3:SC1:::QCUTOFF=4;
```

### Other Keywords Used to Set the State of an Input Port

CRC4 (Set CRC4 Checking)

ENABLE (Input Enable)

FORMAT (Input Format)

QLEVEL (Quality Level)

SIGMODE (Signal Mode)

SSMENB (Enable reading SSM)

SSMBIT (SSM Bits)

SSMPRI (SSM Priority Grouping)

SSMPDH (SSM on PDH System)

SYNCMDE (Sync Mode)

---

## 6.37 QLEVEL (Quality Level)



The QLEVEL keyword specifies the assumed SSM (Synchronization Status Message) quality level for the specified input signal. This assumed SSM level is used when SSM Reading has been disabled (SSMENB = N) for an E1 input or when a non-E1 input has been selected (FORMAT = SQW). The assumed SSM level is always used for the PRC input.

### Syntax

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

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

### Values

<aid> = ITH-n, where n is the number of the input channel.

<value> =Quality Levels:

Quality Level	Description
0	Quality unknown (existing synchronization network)
1	Reserved
2	Rec. G.811—PRC level
3	Reserved
4	G.812 transit—Transit node (default)
5	Reserved
6	Reserved
7	Reserved
8	G812 local—Local node
9	Reserved
10	Reserved
11	Synchronous Equipment Timing Source (SETS)
12	Reserved
13	Reserved
14	Reserved
15	Do not use for synchronization

**QLEVEL (Quality Level)****Example**

The following example shows how to set input channel 3 to an assumed quality level of 2.

```
ED-SYNC::ITH-3:SC1:::QLEVEL=2;
```

**Other Keywords Used to Set the State of an Input Port**

CRC4 (Set CRC4 Checking)

FORMAT (Input Format)

PRIORITY (Input Priority)

QCUTOFF (Quality Cutoff)

SIGMODE (Signal Mode)

SSMENB (Enable reading SSM)

SSMPDH (SSM on PDH System)

SSMPRI (Enable SSM Priority Grouping)

SYNCMDE (Sync Mode)

---

## 6.38 REVERT (Revertive Mode)



The REVERT keyword controls how an input reference is chosen in Automatic and Manual mode. See “Overview of Synchronization Modes and Input Qualification” on page -3 of Chapter for more information on synchronization modes. There are two choices available:

- REVERT = YES (Revertive mode) The highest priority qualified input always will be chosen as the active input (default).
- REVERT = NO (Non-Revertive mode) The current input will remain active until it is disqualified.

### Syntax

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

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

### Values

<aid> = ITH

<value> =Y (TRUE)—The card will always use highest priority channel that meets the availability requirements as determined by the selection algorithms (see also SYNCMDE). Y is the default value.

N (FALSE)—Once the card has switched channels, the only reason to switch again would be lack of availability of the current channel.

### Example

The following example shows how to set all ITH cards to use the highest priority channel that meets the availability requirements.

```
ED-SYNC::ITH:SC1::REVERT=Y;
```

### Other Keywords Used For Configuration

DSCTIME (Discontinue Time)

HFQLEVL (Quality in SSM Mode)

MANCHAN (Manual Channel)

SYNCMDE (Sync Mode)

WTRSS (Wait Time to Restore Synchronization Source)



---

## 6.39 RMTAO (Remote Automatic Output)



The RMTAO keyword sets the remote port to report Automatic Messages always, never, or only when logged into the remote port.

### Syntax

```
ED-EQPT: [<tid>] :<aid>:<ctag>::RMTAO=<value>;  
RTRV-EQPT: [<tid>] :<aid>:<ctag>::PARAMETER=RMTAO;
```

### Values

<aid> = IMC

<value> =ALWAYS—Always report Automatic Messages (default)

LOGIN—Only report Automatic Messages when logged in

NEVER—Never report Automatic Messages

### Example

The following example shows how to set up reporting Automatic Messages only when logged in to the remote port.

```
ED-EQPT::IMC:SC1::RMTAO=LOGIN;
```

### Other Keywords Used to Set the State of a Communication Port

LCLAO (Local Automatic Output)

LCLBAUD (Local Baud)

LCLECHO (Remote Echo)

LCLFLOW (Remote Flow)

RMTBAUD (Remote Baud)

RMTECHO (Remote Echo)

RMTFLOW (Remote Flow)

---

## 6.40 RMTBAUD (Remote Baud Rate)



The RMTBAUD keyword sets the baud rate on the remote port.

### **You Cannot Set the Baud Rate of the Port You are Using**

Although it is possible to set the baud rate and flow control using TL1 commands, it is recommended that they be set via the hardware switches on the IMC card. Refer to the *55400A SSU System Manual*. Pressing the Reset COM Ports button on the IMC card will set the baud rate and flow control to the settings specified by the switches. Any changes made using TL1 commands are lost.

### Syntax

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

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

### Values

<aid> = IMC

<value> = 1200, 2400, 9600, 19200 (default = 9600)

### Example

The following example shows how to set the baud rate to 2400 for the remote port.

```
ED-EQPT::IMC:SC1::RMTBAUD=2400;
```

### **Other Keywords Used to Set the State of a Communication Port**

LCLBAUD (Local Baud)

LCLECHO (Local Echo)

LCLFLOW (Local Flow)

RMTECHO (Remote Echo)

RMTFLOW (Remote Flow)

---

## 6.41 RMTECHO (Remote Echo)



The RMTECHO keyword tells the system to echo characters to the remote terminal.

### Syntax

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

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

### Values

<aid> = IMC

<value> = Y/N—Yes or No. (default = Yes)

### Example

The following example shows how to tell the system not to echo commands to the remote port terminal.

```
ED-EQPT::IMC:SC1::RMTECHO=N;
```

### Other Keywords Used to Set the State of a Communication Port

LCLAO (Local Automatic Output)

LCLBAUD (Local Baud)

LCLECHO (Local Echo)

LCLFLOW (Local Flow)

RMTAO (Remote Automatic Output)

RMTBAUD (Remote Baud)

RMTFLOW (Remote Flow)

---

## 6.42 RMTFLOW (Remote Flow)



The RMTFLOW keyword sets the flow control on the remote port.

---

### **NOTE**

You cannot set the flow control of the port you are using.

Although it is possible to set the baud rate and flow control using TL1 commands, it is recommended that they be set via the hardware switches on the IMC card. Refer to the *55400A SSU System Manual*. Pressing the Reset COM Ports button on the IMC card will set the baud rate and flow control to the settings specified by the switches. Any changes made using TL1 commands are lost.

---

### **Syntax**

```
ED-EQPT: [<tid>]:<aid>:<ctag>:::RMTFLOW=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>:::PARAMETER=RMTFLOW;
```

### **Values**

<aid> = IMC

<value> = NONE, HARDWARE (default = NONE)

### **Example**

The following example shows how to set the flow control to hardware for the remote port.

```
ED-EQPT::IMC:SC1:::RMTFLOW=HARDWARE;
```

### **Other Keywords Used to Set the State of a Communication Port**

LCLAO (Local Automatic Output)

LCLBAUD (Local Baud)

LCLECHO (Local Echo)

LCLFLOW (Local Flow)

RMTAO (Remote Automatic Output)

RMTBAUD (Remote Baud)

RMTECHO (Remote Echo)

---

## 6.43 RPTALL (Report All)



When the RPTALL keyword is set to Y, events will not be filtered based on whether an ITH 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 RTRV-COND or RTRV-ALM will occur regardless of whether the ITH card is active. With this keyword set to Y, the loss of an input signal, for example, will be reported by both ITH cards. Both cards will report which input is being tracked.

The default value of the RPTALL keyword is N to prevent redundant reports of input related events.

### Syntax

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

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

### Values

<aid> = IMC

<value> =Y (TRUE)—The ITH cards will report all active events.

N (FALSE)—Filter events from inactive ITH card (default).

---

### NOTE

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

---

### Example

To set RPTALL to Y:

```
ED-EQPT:::ABC001:::RPTALL=Y;
```

To set RPTALL to N:

```
ED-EQPT:::ABC001:::RPTALL=N;
```

To retrieve the RPTALL setting:

```
RTRV-EQPT:::ABC001:::PARAMETER=RPTALL;
```

See more examples of RPTALL in the sidebar block on the next page.

**In Firmware Versions R3833 and Later:**

The RPTALL keyword may also be included in the RTRV-COND and RTRV-ALM commands to disable the filtering of redundant events during the execution of that command.

Example:

```
RTRV-COND : : : <CTAG> : : RPTALL ;
```

```
RTRV-ALM : : : <CTAG> : : RPTALL ;
```

**In Firmware Versions R3833 and later:**

Input related events will be reported (regardless of the setting of RPTALL) if they indicate an alarm level higher than that being reported by the active ITH card.

**Related Keywords**

LCLAO (Local Automatic Output)

RMTAO (Remote Automatic Output)

AOMERGE (Automatic Output Merge)

---

## 6.44 SABITS (SA Bits)



The SABITS keyword allows you to set certain bits in the non-frame aligned word on 2048 kbps outputs.

The 2048 kbps output card switch settings must be configured for a CRC4 output signal.

The bits are set as follows:

Hex Value	Dec Value	Sets
0X80	128	International bit
0X20	32	Transmit remote alarm

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>:::SABITS=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>::: PARAMETER=SABITS;
```

### Values

<aid> = OUTx, where x is the number of the output card.

Sn-OUTx, where n is the number of the subrack (in a multiple rack system), and x is the letter of the output card (ED-EQPT or RTRV-EQPT).

<value> = 0–255 but only bits 0X80 (128) and 0X20 (32) are used. The default is 159 (0X9F).

### Example

The following example shows how to set the TS0 bits on Output Card A to 0XDF.

```
ED-EQPT::OUTA:SC1:::SABITS=223;
```

Note that 223 is the decimal equivalent of 0XDF. This sets the International Bit ON and the Remote Alarm Bit OFF.

### Related Keywords

CURRSSM (Current SSM Value)

QLEVEL (Quality Level)

SSMENB (Enable reading SSM)

## 6.45 SCRAMBLE (Scramble Communication)



The SCRAMBLE keyword allows a low-level encryption for communications to and from the 55400A. It requires use of the 55451A or 55452A open synchronization management framework software and a network connection to the remote port of the 55400A.

### SCRAMBLE Value Set to Y Over the LAN Port

If the SCRAMBLE value is set to Y over the LAN port, whatever network program being used to communicate with the 55400A must also be capable of supporting the SCRAMBLE algorithm. Otherwise, a visit to the site of the SSU will be required to disable the SCRAMBLE feature via the Local Port.

**NOTE** Changing the value of SCRAMBLE will close the network connection.

**NOTE** The Local port is not affected by the SCRAMBLE keyword setting.

**NOTE** NIMC Option 002 (X.25) and Option 003 (TP4) require that SCRAMBLE parameters to be copied from Auxiliary to Working memory. The SCRAMBLE parameter is controlled directly only with the NIMC standard (Option 001) LAN card.

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>::SCRAMBLE=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>::PARAMETER=SCRAMBLE;
```

### Values

<aid> = IMC

<value> = Y (TRUE) — enables encryption for communications (scramble state).

N (FALSE) — disables scramble state.

### Examples

The following example shows how to retrieve value of SCRAMBLE.

```
RTRV-EQPT::IMC:SC1::PARAMETER=SCRAMBLE;
```

The following example shows how to change the communications from the 55400A's non-encryption (default) state to a scrambled state.

```
ED-EQPT::IMC:SC1::SCRAMBLE=Y;
```



**Related Keywords**

AOMERGE (Automatic Output Merge)

INACTTIVE (Inactivity Time-Out)

---

## 6.46 SIGMODE (Signal Mode)



The SIGMODE keyword allows you to control whether an E1 input channel should expect valid CAS/CCS information and whether CAS/CCS errors will disqualify an input.

### Syntax

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

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

---

### NOTE

CCS allows any information in TS16, while CAS requires a certain structure to the bits in that time slot.

### Values

<aid> = ITH-n, where n is the number of the input channel port.

<value> =CAS — Channel Associated Signaling, also known as PCM30

CCS — Common Channel Signaling (default), also known as PCM31

#### In Firmware Versions before R3833:

Prior to firmware version R3833, if you retrieve the signal mode of the PRC input signal, UNKNOWN will display because this mode is not available for the PRC input signal. For firmware version R3833 and later versions, if you retrieve the signal mode of the PRC input signal, CCS will display.

### Example

The following example shows how to set input channel 3 to expect CAS information.

```
ED-SYNC::ITH-3:SC1::SIGMODE=CAS;
```

### Other Keywords Used to Set the State of an Input Port

CRC4 (Set CRC4 Checking)

ENABLE (Input Enable)

FORMAT (Input Format)

QCUTOFF (Quality Cutoff)

QLEVEL (Quality Level)

SSMENB (Enable reading SSM)

SSMPRI (Enable SSM Priority Grouping)

---

## 6.47 SPRDCHN (Spread Channels)



The SPRDCHN 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.

---

### NOTE

SPRD is recalculated if a measurement is restarted (e.g., using the INIT-REG command) on a channel that is included in the SPRD calculation.

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>:::SPRDCHN =<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>:::PARAMETER=SPRDCHN;
```

### Values

<aid> = ITH

<value> = List of channels to be included. See the following example.

### Example

The following example shows how to tell the system to use the channels 0 (PRC), 2, and 4 for SPREAD measurements.

```
ED-EQPT::ITH:SC1:::SPRDCHN=0&2&4;
```

The following example shows how to restore the default of using all channels for SPREAD measurements.

```
ED-EQPT::ITH:SC1:::SPRDCHN=0&&4;
```

### Other Keywords Used For Configuration

DSCTIME (Discontinue Time)

MANCHAN (Manual Channel)

PIRANGE (Pull-In Range)

REVERT (Revertive Mode)

SYNCMDE (Sync Mode)

WTRSS (Wait Time to Restore Synchronization Source)

---

## 6.48 SQUELCH (Squelch Output)



The SQUELCH keyword specifies which output channels are to be squelched.

---

### **NOTE**

If all of the outputs on a card are squelched, the card will go into standby mode.

### **Syntax**

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

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

### **Values**

<aid> = OUT<sub>x</sub>-y, where x is the letter of the output card in a single rack system and y is the channel number.

Sn-OUT<sub>x</sub>-y, where n is the number of the subrack (in a multiple rack system), x is the letter of the output of cards, and y is the channel number.

<value> =Y (TRUE) — The output signal will be squelched.

N (FALSE) — The output signal will not be squelched (default).

### **Example**

This command shows how to disable port 5 of Output Card A.

```
ED-SYNC::OUTA-5:SC1:::SQUELCH=Y;
```

The following example shows how to disable outputs 5 and 10-16 of output card A.

```
ED-SYNC::OUTA-5&10&&16:SC1:::SQUELCH=Y;
```

The following example shows how to restore the default by enabling all outputs on output card A.

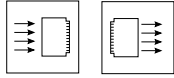
```
ED-SYNC::OUTA-1&&16:SC1:::SQUELCH=N;
```

### **Related Keywords**

AIS (Output AIS)

HLDACT (Holdover Action)

## 6.49 SSMBIT (SSM Bits)



The SSMBIT keyword specifies the SA bit used for carrying SSM (Synchronization Status Message) information in the Time Slot 0 (TS0) bits for a Non Frame Aligned Signal (NFAS) frame of an E1 signal. The bits are numbered 1 (MSB) to 8, with one of the last five bits (SA4, SA5, SA6, SA7, or SA8) carrying the SSM information.

This keyword can be used to specify which SSM bit is read on an E1 input signal, or it can be used to specify which SSM bit is written on an E1 output signal. For an input SSM bit to be read correctly, SSM must be enabled (SSMENB = Y) and the input format must be appropriate (FORMAT = E1 and CRC4 = Y).

### Syntax For Input Port

```
ED-SYNC: [<tid>]:<aid>:<ctag>::SSMBIT=<value>;
RTRV-SYNC: [<tid>]:<aid>:<ctag>::PARAMETER=SSMBIT;
```

### Syntax For Output Card

```
ED-EQPT: [<tid>]:<aid>:<ctag>::SSMBIT=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>::PARAMETER=SSMBIT;
```

### Values

<aid> = ITH-n, where n is the number of the input port (ED-SYNC or RTRV-SYNC).

OUTx, where x is the letter of the output card in a single rack system (ED-EQPT or RTRV-EQPT).

Sn-OUTx, where n is the number of the subrack (in a multiple rack system), and x is the letter of the output card (ED-EQPT or RTRV-EQPT).

<value> = SA4 — (default), SA5, SA6, SA7, SA8

### Example

The following example shows how to tell the system to use the SA5 bit for the synchronization status of input channel 3.

```
ED-SYNC::ITH-3:SC1::SSMBIT=SA5;
```

The following example shows how to tell the system to use the SA6 bit for the synchronization status of output card B.

```
ED-EQPT::OUTB:SC1::SSMBIT=SA6;
```

**SSMBIT (SSM Bits)**

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**Other Keywords Used to Set the State of an Input Port**

CRC4 (Set CRC4 Checking)

ENABLE (Input Enable)

FORMAT (Input Format)

PRIORITY (Input Priority)

QCUTOFF (Quality Cutoff)

QLEVEL (Quality Level)

SSMPDH (SSM on PDH System)

SIGMODE (Signal Mode)

SYNCMDE (Sync Mode)

**Other Keywords Used to Set the State of an Output Card**

HLDACT (Holdover Action)

SABITS (SA Bits)

---

## 6.50 SSMENB (Read SSM Bits)



The SSMENB keyword enables the reading of the SSM (Synchronization Status Message) bit for the specified input. If this keyword is disabled (SSMENB = N), the assumed SSM value (QLEVEL) will be used instead. For an input SSM bit to be read correctly, the SSMBIT must be appropriately specified and the input format must be appropriate (FORMAT = E1 and CRC4 = Y).

This keyword is ignored for the PRC (Primary Reference Clock) and 2048 kHz inputs (FORMAT = SQW).

---

### NOTE

If you want to display the current SSM value (CURRSSM keyword) of an input channel, you must specify FORMAT=E1, SSMENB=Y, and CRC4=Y for that channel.

---

### Syntax

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

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

### Values

<aid> = ITH-n, where n is the number of the input port.

<value> =N (FALSE) — Do NOT read the SSM from the input. The value in QLEVEL will be used instead (default).

Y (TRUE) — If appropriate (channel 1–8, set as E1 input), read the SSM bits and use them for SSM priority processing.

### Example

The following example shows how to set input channel 3 to read the SSM bits.

```
ED-SYNC::ITH-3:SC1::SSMENB=Y;
```

**SSMENB (Read SSM Bits)**

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**Other Keywords Used to Set the State of an Input Port**

CRC4 (Set CRC4 Checking)

CURRSSM (Current SSM Value)

ENABLE (Input Enable)

FORMAT (Input Format)

QCUTOFF (Quality Cutoff)

QLEVEL (Quality Level)

SIGMODE (Signal Mode)

SSMENB (Enable reading SSM)

SSMBIT (SSM Bit)

SSMPDH (SSM on PDH System)

SSMPRI (Enable SSM Priority Grouping)



---

## 6.51 SSMPDH (SSM on PDH System)



The SSMPDH keyword effects the way SSM (Synchronization Status Message) value is interpreted. When this keyword is enabled (SSMPDH = Y), a non-zero SSM value is interpreted as meaning the signal is not available for use.

If the incoming E1 signal can only present either 0000 or 1111 as the SSM pattern, then this mode (SSMPDH = Y) is useful. The 1111 is interpreted as “do not use” and the 0000 gets translated to the value set with QLEVEL.

### Only Available in Firmware Versions R3833C and Later

The SSMPDH keyword is available only in firmware versions R3833C and later.

### Syntax

```
ED-SYNC: [<tid>]:<aid>:<ctag>:::SSMPDH=<value>;  
RTRV-SYNC: [<tid>]:<aid>:<ctag>:::PARAMETER=SSMPDH;
```

### Values

<aid> = ITH-n, where n is the number of the input port.

<value> =N (FALSE) — Do NOT disqualify the input if SSM input is non-zero (default).

Y (TRUE) — If appropriate (channel 1–8, set as E1 input, SSMENB = Y), read the SSM bits and if the SSM value is non-zero, disqualify the input, provided SYNCMDE = SSM.

### Example

The following example configures the SSU to modify how the SSM value is interpreted on input channel 1.

```
ED-SYNC::ITH-1:SC1:::SSMPDH=Y;
```

---

### NOTE

To read the SSM value of an E1 input, the CRC4 = Y must normally be set. However, the SSMPDH keyword, when enabled, allows non-zero SSM values to disqualify the input *without* CRC4 set to Y. When a non-zero SSM is read, the SSU will set the CURRSSM value to 15.

### Related Keywords

CRC4 (Set CRC4 Checking)

CURRSSM (Current SSM Value)

HFQLEVL (Holdover and Freerun Quality Level)

QCUTOFF (Quality Cutoff)

QLEVEL (Quality Level)  
SSMBIT (SSM Bit)  
SSMENB (Enable reading SSM)  
SYNCMDE (Sync Mode)

---

## 6.52 SSMPRI (SSM Priority Grouping)



When in SSM (Synchronization Status Message) mode, the SSMPRI keyword provides the 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 gives 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, if:

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

then the system would choose input 1.

Now if input 1 became disqualified, the system would have to choose between 2 and 3. Since they are the same and neither is the current input, the system chooses the one with the lowest PRIORITY value.

If input 2 also becomes disqualified, then the system would use input 3. If input 2 were then to become qualified, the system would remain on input 3 since they have the same SSMPRI. If input 1 were to become qualified, then the system would use input 1 since it has a lower SSMPRI.

### Syntax

```
ED-SYNC: [<tid>] :<aid>:<ctag>::SSMPRI=<value>;
RTRV-SYNC: [<tid>] :<aid>:<ctag>::PARAMETER=SSMPRI;
```

### Values

<aid> = ITH-n, where n is the number of the input port.

<value> = 0 through 8 (default =3)

### Example

The following example shows how to set input channel 3 to an SSM priority of 1.

```
ED-SYNC::ITH-3:SC1::SSMPRI=1;
```

**Other Keywords Used to Set the State of an Input Port**

CRC4 (Set CRC4 Checking)

ENABLE (Input Enable)

FORMAT (Input Format)

PRIORITY (Input Priority)

QCUTOFF (Quality Cutoff)

QLEVEL (Quality Level)

SIGMODE (Signal Mode)

SSMBIT (SSM Bit)

SSMENB (Enable Reading SSM)

SYNCMDE (Signal Mode)

---

## 6.53 SYNCMDE (Sync Mode)



The SYNCMDE keyword controls how the input channel is chosen as a synchronization source. See “Overview of Synchronization Modes and Input Qualification” on page -3 of Chapter for more information.

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>::SYNCMDE=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>::PARAMETER=SYNCMDE;
```

### Values

<aid> = ITH

<value> = AUTO—The card chooses the input channel based on the given priorities among the available channels. Channel availability is determined by measurements on the channel and by the channel enable (default).

MANUAL—The card uses the channel given by the manual selection channel, unless the given input is disqualified, then it goes into Automatic mode.

SSM—The input channel is chosen based on the virtual SSM algorithm, which combines the measurements and qualifying conditions with the quality levels for each channel. Basically, the highest priority amongst the qualified input channels is chosen.

FORCED—The card uses the channel given by the manual selection channel, unless the given input is disqualified, then it goes into Holdover mode.

### Example

The following example shows how to tell the system to use the manually selected channel as specified by the MANUAL keyword.

```
ED-EQPT::ITH:SC1::SYNCMDE=MANUAL;
```

### Related Keyword

REVERT (Revertive Mode)

### Other Keywords Used For Configuration

MANCHAN (Manual Channel)

SSMENB (Read SSM Bits)

## 6.54 TCONST (Time Constant)



The TCONST keyword sets the loop tracking time constant for each input. Once the system is in “slow” tracking, there are several possible time constants for the tracking: 192,768, 3072, 12288, 49152. The default depends on the type of ITH card. This only applies once the system is fully warmed up. If a value other than one of the above is given, the nearest one from the above will be substituted.

### Syntax

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

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

### Values

<aid> = ITH-n, where n is the number of the input port.

<value> =192,768, 3072, 12288, 49152

The default depends on the type of card:

55414A/B Enhanced Stratum 2—Rubidium = 3072

55411A/B Stratum 2 = 768

55415A/B Enhanced Transit Node = 768

55412A/B Transit Node = 192

55413A/B Local Node = 192

### Example

The example shows how to set input 3 to track with a 768 time constant.

```
ED-SYNC::ITH-3:SC1:::TCONST=768;
```

### Related Keyword

TCONSTSEC (Time Constant for Secondary Oscillator)

### Other Keywords Used to Set the State of an Input Port

AUTOPM (Auto-Upload PM)

DSCTIME (Discontinue Time)

ENABLE (Input Enable)

PRC5MHZ (PRC 5MHz Signal)

WTRSS (Wait Time to Restore Synchronization Source)

## 6.55 TCONSTSEC (Time Constant for Secondary Oscillator)



The TCONSTSEC keyword sets the time constant for the secondary oscillator.

TCONSTSEC applies only to the ITH card with the inferior oscillator when mixed ITH oscillator types are used in the 55400A system.

This keyword only operates on the inferior oscillator of a mixed oscillator pair. It 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 ITH 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.

### Default Value

The default time constant values for the ITH cards used as secondary oscillators are the same as when used as matched pairs. A 55411A Stratum 2 oscillator uses a default value of 768 seconds. A 55412A Transit Node oscillator uses a default value of 192 seconds.

### Syntax

```
ED-SYNC: [<tid>]:<aid>:<ctag>:::TCONSTSEC=<value>;
RTRV-SYNC: [<tid>]:<aid>:<ctag>:::PARAMETER=TCONSTSEC;
```

### Values

<aid> = ITH-n, where n is the number of the input port.

<value> =192, 768, 3072, 12288, 49152

The default depends on the type of card:

55414A/B Enhanced Stratum 2—Rubidium = 3072

55411A/B Stratum 2 = 768

55415A/B Enhanced Transit Node = 768

55412A/B Transit Node = 192

55413A/B Local Node = 192

**TCONSTSEC (Time Constant for Secondary Oscillator)**

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**Example**

The example shows how to set 768-second time constant for input channel 3.

```
ED-SYNC::ITH-3:SC1:::TCONSTSEC=768;
```

**Related Keyword**

TCONST (Time Constant)



---

## 6.56 TIDQUIET (TID Quiet)



The TIDQUIET keyword allows you to set up 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>.

---

### NOTE

In normal operation, the system will produce a TL1 DENY response to any command if a non-null <tid> does not match the system's current <sid>. However, some operating systems may prefer that the system give no response to these commands. The TIDQUIET keyword provides this capability.

---

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>:::TIDQUIET=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>:::PARAMETER=TIDQUIET;
```

### Values

<aid> = IMC

<value> =N (FALSE)—Display a DENY response when the <tid> specified is not the same as the current <sid> (default).

Y (TRUE)—Do not display a DENY response when the <tid> specified is not the same as the current <sid>.

### Example

The following example shows how to set up the system to not issue a DENY response when the <tid> specified in a command does not match the currently specified <sid>.

```
ED-EQPT:::SC1:::TIDQUIET=Y;
```

### Related Keywords

LCLAO (Local Automatic Output)

RMTAO (Remote Automatic Output)

AOMERGE (Automatic Output Merge)

## 6.57 TRAFFIC (Traffic Data Pattern)



The TRAFFIC keyword allows you to specify a data pattern that will be carried in the traffic time slots of the 55481B 2048 kbps Output Card. The default value is all ONES (255). Since the typical use for these output signals is as clock signals for downstream equipment, 255 is the preferred value because this causes the greatest number of clock pulses to occur.

### Syntax

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

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

### Values

<aid> = OUTx or Sn-OUTx, where x is the letter of the output card and n is the subrack number.

<value> = Enter the traffic pattern value as an integer. Integer values that produce one zero = 127, 191, 223, 239, 247, 251, 253, and 254.

#### Behavior BEFORE Firmware Revision 3744H

The 55481B card can carry a traffic value that contains no more than 1 zero. The 55481A card can only carry an all ONES pattern. If this card is paired with an 55481B, both cards will be set for 255. If a pattern with more than one zero is set for the slot where the 55481B is located, the card will be programmed to 0xFF (255).

#### Behavior WITH Firmware Revision 3744H and Later

The 55481B card can carry a traffic value that contains no more than 1 zero. The 55481A card can only carry an all ONES pattern. If the 55481A is paired with the 55481B that is using a traffic pattern other than 255, the 55481A card will be taken off-line and an alarm will be issued. The 55481B card will generate the specified legal traffic pattern. If a pattern with more than one zero is set for the slot where the 55481B is located, the card will be programmed to 0xFF (255).

### Example

The following example shows how to set up D output card in subrack #2 to carry a traffic pattern of 11111110 (0xFE). If the system only includes a single subrack, leave out the subrack identifier (S2-) or specify "S0-".

```
ED-EQPT: :S2-OUTD:01: :TRAFFIC=254;
```

### Related Keywords

SABITS (SA Bits)

## 6.58 TRSCSSM (Traffic Re-Synchronization Card Synchronization Status Message)



The TRSCSSM keyword decides whether to replace the SAx bits (SSM bits) in the output of the retimed channel. Refer to G.704 for E1 format. When TRSCSSM = INSERT and the TRSC (Traffic Re-Synchronization Output Card) channel is set to CRC4 by DIP switches, SSM bits on the output will be replaced (or inserted). The value of SSM bits inserted is decided by the ITH card. See the “Value” section below to learn how the value is achieved. The position of SSM bits is decided by the SSMBIT keyword.

### If the TRSC Channel is set to Non-CRC4

If the TRSC channel is set to non-CRC4, the output bits won't be affected by this keyword.

### Only Available in Firmware Versions R3744E and Later

The TRSCSSM keyword is only available in firmware versions R3744E and later.

The TRSCSSM keyword affects all four retimed channels of the TRSC.

### Syntax

```
ED-EQPT::<aid>:<ctag>:::TRSCSSM=<value>;
RTRV-EQPT::<aid>:<ctag>:::PARAMETER=TRSCSSM;
```

### Values

<aid> = OUTx or Sn-OUTx, where x is the letter of the output card and n is the subrack number.

<value> =INSERT (insert an SSM value dependent on the input reference being tracked).

NOINSERT (pass through any SSM value received on the input).  
Default value = NOINSERT

**TRSCSSM = NOINSERT.** This is called the “transparent mode” because the TRSC output SSM bits will be identical to the SSM bits at that TRSC input channel. If there is no SSM coding on the input, then the output will be without SSM coding.

**TRSCSSM = INSERT Scenarios.** There are three possible situations for the TRSCSSM = INSERT mode:

1. The SSU is tracking a 2048 kbps (E1) input. In this case, the SSM value inserted by the TRSC is read from the active reference input. Note that the E1 input

**TRSCSSM (Traffic Re-Synchronization Card Synchronization Status** Issue 2: Jul 00**Message)**

signal must be in CRC-4 format, and this reference input must be configured as follows to correctly read the incoming SSM coding:

- The **FORMAT** keyword is set to “E1” — Input Format indicates to the system which format (2048 kbps or 2048 kHz) to expect.
- The **CRC4** keyword is set to “Y” — Set CRC4 Checking controls whether CRC-4 information should be expected.
- The **SSMENB** keyword is set to “Y” — Read SSM Bits when enabled, the SSM bits will be read and used.

If these first three settings (above) are not correct, the SSM value will be determine as in situation 2, below.

- The **SSMBIT** keyword setting for the input channel matches the SSM bit location on the input signal (SSM Bits indicates to the system which bit to read for the synchronization status) — If there is no match, the input signal SSM will not be read correctly and the TRSC will output an incorrect SSM value (most likely a value of 15 which indicates the signal should not be used for synchronization).
2. The SSU is tracking the PRC input or a 2048 kHz input. Here the SSM output by the TRSC is determined by the **QLEVEL** keyword (SSM Quality Level) value set for the input channel. The **QLEVEL** value can be assigned an SSM value in cases where the input signal cannot carry an SSM value of its own.
  3. The SSU is in Holdover mode. In this case, the TRSC will output the SSM value set with the **HFQLEVL** (Holdover SSM Quality Level) keyword. In addition, the **HLDACT** (Holdover Action) keyword must be set to **CONTINUE** for the TRSC card to ensure its output signals continue to operate during holdover.

**Additional Information**

Note 1: In situation 1, if the setting of the TRSC output **SSMBIT** does not match the SSM bit position on the signal applied to the TRSC card input, there will be two SSM values on the output signal and one of the SSM values will be wrong.

Note 2: When the **INSERT** mode is used, each of the four inputs to the retimed TRSC channels for that card must have their SSM value in the same bit location. This is because the **SSMBIT** keyword for output cards applies to all four retimed channels on the card. If any of the bit locations are different (they must all be the same), the problem described in Note 1 will occur.

Note 3: If there was any bit error on the input signal to the TRSC card, it will not be detectable after it passes through the TRSC (with **TRSCSSM = INSERT**) since a new CRC-4 value will be generated.

In each case, the **SSMBIT** keyword specifies which bit of the non-frame aligned word will be used to carry the synchronization status for the four retimed channels of each pair of TRSC cards.

**TRSCSSM (Traffic Re-Synchronization Card Synchronization Status Message)** Issue 2: Jul 00**Example**

The following example sets the TRSC to insert the SSM value.

```
ED-EQPT::Sn-OUTx:1:::TRSCSSM=INSERT;
```

where

n = number of the subrack in a multiple subrack system that contains the TRSC. the master subrack number is always set to "0". Expansion subracks can be numbered 1 through 4. This parameter (Sn-) can be left out for a single subrack system.

x = letter of the module plug-in area where the TRSC is located.

**Related Keyword**

HSLIMIT (High Slip Limit)

---

## 6.59 USESUBRCK (Use Subrack Identifier)



In single-rack 55400A systems, the USESUBRCK keyword allows you to specify that the system responses and automatic messages include the subrack number. In multiple-subrack systems, the subrack number is included by default. The subrack identifier is displayed as part of the access identifier (<aid>).

### Syntax

```
ED-EQPT-TSG:::<ctag>:::USESUBRCK=<value>;  
RTRV-EQPT-TSG:::<ctag>:::PARAMETER=USESUBRCK;
```

### Values

<aid> = IMC  
<value> = Y/N—Yes or No (default =N)

### Example

The following example shows how to set the system to include the subrack number (S0) in the Access ID of responses and automatic messages of a single subrack system.

```
ED-EQPT-TSG:::01:::USESUBRCK=Y;
```

#### **This Keyword Only Affects the Format of Messages Sent from the SSU**

This keyword only affects the format of messages *sent from* the SSU. It has no effect on the format required for commands *sent to* the SSU.

### Related Keywords

None

## 6.60 WTRSS (Wait Time to Restore Synchronization Source)



The WTRSS keyword controls how long an input channel must wait to re-establish all its operating parameters before it will be considered for use as a synchronization source.

### Syntax

```
ED-EQPT: [<tid>]:<aid>:<ctag>::WTRSS=<value>;
RTRV-EQPT: [<tid>]:<aid>:<ctag>::PARAMETER=WTRSS;
```

### Values

<aid> = ITH

<value> = Range — 0 to 1000 seconds (default is 30 seconds)

### Example

The following example shows how to tell the system to wait 50 seconds to reestablish all its operating parameters before considering an input channel for use as a synchronization source.

```
ED-EQPT::ITH:SC1::WTRSS=50;
```

### Other Keywords Used For Configuration

DSCTIME (Discontinue Time)

HFQLEVL (Quality in SSM Mode)

MANCHAN (Manual Channel)

MEASDLY (Measurement Delay)

PIRANGE (Pull-in Range)

REVERT (Revertive Mode)

SPRDCHN (Spread Channel)

SYNCMDE (Sync Mode)

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## 7.1 Chapter Contents

7.1.1 This chapter describes events, alarms, retrieving events and alarms, changing and displaying event properties, and logging (reporting) events.

7.1.2 This chapter is organized as follows:

- Overview page 7-3
- Events and Alarms page 7-3
- Logging Events page 7-4
  - Event Log page 7-4
  - Automatic Output (AO) Log page 7-5
- Types of Events page 7-6
  - State Events page 7-6
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  - Transient Events page 7-7
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- Event Summary page 7-8
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- Example Commands for Event (Conditions) and Alarms page 7-19
  - Retrieving Events/Alarms page 7-19
  - Changing/Displaying Event Properties page 7-20
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---

## 7.2 Overview

7.2.1 Events tell you what is happening on the network and in the 55400A. You determine what you want to know (which conditions should generate a report) and how important it is (the severity). All of the events have default settings, however, you can customize your 55400A to meet your specific network needs. This chapter describes events and alarms.

7.2.2 See “Event Descriptions” starting on page -21 for complete descriptions of each event. Each event description includes a discussion of its typical cause and solution.

---

## 7.3 Events and Alarms

7.3.1 This section defines types of events and alarms.

- *Events* are conditions that occur or are detected in the 55400A.
- *Alarms* are a subset of these events which have been configured, either by default or by the user, to generate an alarm indication and to produce a RPT ALM TSG message.

Every event has two *properties* which are configured to default values at the factory.

- ALM property—specifies the severity of the event
- LOG property—specifies whether to record the event in the Event Log

In most cases the user can modify these settings. See “Changing/Displaying Event Properties” on page -20, and the ED-EQPT command in Chapter .

The current state of system events is constantly being maintained, updated, and reported automatically (if configured to report). However, you can use the RTRV-ALM-TSG command at any time to retrieve a report of alarms that are currently active. A similar command, RTRV-COND-TSG, can be used to retrieve a report of all standing conditions, including alarmed events, non-alarmed events, and non-reported events.

---

## 7.4 Logging Events

7.4.1 The 55400A maintains two separate logs:

- Event Log (ITH cards)—The Event Logs are useful for examining a sequence of events, perhaps for network or equipment diagnostic purposes. Battery backed up.
- Automatic Output (AO) Log (IMC card)—The Automatic Output Log is useful for retrieving messages that may have been missed or overlooked by the Operating System. This log will be erased if the IMC loses power or if the code is restarted (e.g., with a code download or a change in some network communication parameters)

7.4.2 The Events Logs should not be confused with the Automatic Output Log stored on the IMC card which provides a temporary record of recent Automatic Messages.

7.4.3 Note that logging of events in the logs is controlled by different properties:

- LOG property controls which events are recorded in the Event Log.
- ALM property controls whether an event generates an Automatic Message and is therefore recorded in the Automatic Output Log. Other Automatic Messages, such as automatic performance monitoring uploads and session related messages will be included in the Automatic Output Log.

7.4.4 Logging of an event is completely independent of the setting of its ALM property.

### 7.4.4.1 Event Log

The Event Log is a chronological record of both alarmed and non-alarmed events and is maintained independently on each ITH card. You may configure which events are entered in the log. Each log holds a maximum of 1000 events; as more events are received, the earliest logged events are discarded. These logs are stored in battery-backed-up RAM, and are retrieved (in reverse chronological order) using the RTRV-LOG command. For example, use the following command to retrieve the ten most recently logged events:

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

The Event Logs on both ITH cards may be cleared using the INT-LOG command as shown in the following example:

```
INIT-LOG:::ITH:SC1::EVT;
```

The primary use of this log to determine the sequence of events leading up to a network or system problem. The log provides an “ITH card view” of events detected by each ITH card and can be retrieved separately from each card. Although Output Card Events are maintained by the IMC card, the ITH cards will enter a non-alarmed event into the Event Log when they detect an Output Card event (such as an OPCDIN Output Card Inserted).

The Event Log is retrieved in reverse chronological order (i.e., last in, first out). 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). Events are retrieved in groups of ten events at a time.

#### ***7.4.4.2 Automatic Output (AO) Log***

The Automatic Output (AO) Log is a record of all Automatic Messages that have been generated. The primary purpose of this log is to allow an operating system 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 event reports, automatic updating of Performance Monitoring data (if enabled) and information on user’s logging on and off of the communications ports. This is a circular log that is saved on the IMC card and currently holds the most recent 100 messages or 10000 characters of information (whichever is less). The AO Log is retrieved in chronological order. No battery backup is provided for this log.

You can retrieve all of the Automatic Messages in the AO Log by using the following example command:

```
RTRV-AO:::SC1:::ATAGSEQ=FIRST&&LAST;
```

You can also specify which type of Automatic Messages you want to retrieve. For example, use the following command to retrieve all alarmed messages in the AO Log:

```
RRTRV-AO:::SC1:::MSGTYPE=ALM;
```

---

## 7.5 Types of Events

7.5.1 There are two types of events:

- State events — an ongoing condition.
- Transient events — something has just happened; not an ongoing condition.

### Example of State and Transient Events

The SNHOLD event (state event) represents an ongoing condition, namely, that the ITH card is operating in Holdover Mode, whereas the LOGCLR event represents a transient occurrence, namely, that the Event Log has just been cleared.

#### 7.5.1.1 State Events

State Events have an *active (set)* and *cleared* state. Depending on the configuration of the ALM (*severity*) property of the event, alarms can be generated or cleared, and TL1 reports can be issued whenever these events change their state.

#### 7.5.1.2 ALM Property of State Events

The following values are available for the ALM property:

NONE	No alarms or reports are generated by either the setting or clearing of this event. ( <i>Note: the RTRV-COND-TSG command can be used to retrieve all active state events, including those with the ALM property set to NONE.</i> )
NONALM	Both the setting and clearing of this event will generate a RPT EVT TSG message, indicating the change in state. No alarms are generated.
MINOR	The setting of this event will generate a Minor Alarm indication and generate a RPT ALM TSG message. The clearing of this event will clear the associated alarm indication and will generate another RPT ALM TSG message indicating the clearing of the alarm.
MAJOR	The setting of this event will generate a Major Alarm indication and generate a RPT ALM TSG message. The clearing of this event will clear the associated alarm indication and will generate 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 has also set a FAIL condition) then the alarm level is promoted 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 promoted to Critical, with a new TL1 report issued.

Events related to input signals are normally only reported by the *active* ITH card, to avoid duplicate reports from the two ITH cards (see RPTALL keyword).

Events related to operating conditions on an ITH card, which are unrelated to the input signals, are reported by a card regardless of whether the card is active.

**Minor Alarm from an ITH Card Promoted to Major Alarm in Firmware Versions R3742A and Later**

If a Minor alarm from an ITH card remains active for 24 hours, it will automatically be promoted to a Major alarm.

### ***7.5.1.3 Transient Events***

Transient events are events that do not have an ongoing state. Therefore, they cannot generate alarms.

### ***7.5.1.4 ALM Property of Transient Event***

The ALM property of these events is restricted to the following:

- |        |                                                                                                   |
|--------|---------------------------------------------------------------------------------------------------|
| NONE   | No alarms or reports are generated by this event.                                                 |
| NONALM | This event will generate a RPT EVT TSG message over the TL1 interface, indicating its occurrence. |

Some of these events will be reported by only the active ITH card, while others are reported regardless of whether the card is active.

---

## 7.6 Event Summary

7.6.1 Table 7-1 lists all of the events in alphabetical order along with their description and type.

**Table 7-1. Event Summary**

<b>Event</b>	<b>Description</b>	<b>Event Type</b>
BTTMODE	BTT mode active	State Event
CFGCHD	Configuration changed	IMC State Event
CFGRST	Configuration reset	Transient Event
IMCCRST	IMC configuration reset	IMC State Event
IMCNCDN	No IMC Rack communication downward	IMC State Event
IMCNCUP	No IMC Rack communication upward	IMC State Event
IMCNVFL	IMC NVRAM failed	IMC State Event
IMCPRFL	IMC EEPROM failed	IMC State Event
IMCRST	IMC beginning reset	IMC State Event
INDISQ	Input disqualified	Input State Event
INEXPH	Input excessive phase hits	Input State Event
INMEAS	Disqualified by measurements.	Input State Event
INMSDLY	Waiting for measurements	Input State Event
INPAIS	Input AIS	Input State Event
INPLOS	Input loss of signal	Input State Event
INPOOF	Input loss of framing	Input State Event
INPRCDQ	Input PRC status disqualified	Input State Event
INPSSM	Input SSM changed	Transient Event
INPULL	Pull-in range exceeded	Input State Event
ITHACTV	ITH active	ITH State Event
ITHCDIN	Other ITH card inserted	Transient Event
ITHCDRM	Other ITH card removed	Transient Event
ITHDISA	ITH disagree on channel quality	ITH State Event
ITHFAIL	ITH failed	ITH State Event
ITHGONE	ITH card missing	IMC State Event
ITHHLTH	ITH marginal failure	ITH State Event
ITHNCDN	No ITH Rack communication downward	ITH State Event



**Table 7-1. Event Summary (Continued)**

<b>Event</b>	<b>Description</b>	<b>Event Type</b>
ITHNCOM	ITH communications failure	ITH State Event
ITHNCUP	No ITH Rack communication upward	ITH State Event
ITHNVFL	NVRAM Failed	ITH State Event
ITHOFFL	ITH Offline	ITH State Event
ITHPRFL	ITH EEPROM failed	ITH State Event
ITHWARM	ITH Warmup	ITH State Event
LOGCLRD	EVT log cleared	Transient Event
LSTCFGFC	Latest configuration change	Subrack or IMC/NIMC State Event
MEASRNG	Measurement range exceeded	Input State Event
MEASRP	Measurement reported beyond threshold	Input State Event
MEASRST	Measurements restarted	ITH State Event
MODMONL	Modem online at remote port	IMC State Event
MODMRDY	Modem ready at remote port	IMC State Event
NETCLOS	Network connection closing	NIMC Event
NORESP	Complete response not received	IMC Event
OPCDFL	Output card failed	Output Card State Event
OPCDIN	Output card inserted	Output Card State Event
OPCDMS	Output card mismatch	Output Card State Event
OPCDNA	Output card not accessible	Output Card State Event
OPCDNP	Output card not present	Output Card State Event
OPCDPMM	Output card protect mismatch	Output Card State Event
RACKDUP	Duplicate Rack number	IMC State Event
RACKOOR	Rack number out of range	IMC State Event
RCKALM [1-8]	Rack alarms	NIMC State Event
SECACTV	Inferior ITH is active	ITH State Event
SGLSWMM	Single/Double ITH switch mismatch	ITH State Event
SNDRIFT	Drift Exceeds Limits	ITH State Event
SNFAIL	Sync failure	State Event
SNFREE	Freerun mode	Input State Event
SNHAVL	Holdover available	Transient Event
SNHOLD	Holdover mode	Input State Event

**Table 7-1. Event Summary (Continued)**

<b>Event</b>	<b>Description</b>	<b>Event Type</b>
SNOPER	Sync in normal operating mode	Transient Event
SNPWRA	Power supply A failed	IMC State Event
SNPWRB	Power supply B failed	IMC State Event
SNSAVL	SmartClock available	Transient Event
SNSCSUS	SmartClock suspended	ITH State Event
SNSSM	SSM algorithm executed	Transient Event
SNTRCK	Tracking this input	Input State Event
SRINVMM	Inventory mismatch	IMC State Event
SWDL	Software Download Mode	IMC State Event
SWDLMMC	SWDL Mismatch, IMC shows clear	IMC State Event
SWDLMMS	SWDL Mismatch, IMC shows set	IMC State Event
TRAOOR	TRAFFIC value invalid for card	ITH State Event
TRCBLOS	TRSC buffer input loss of signal	Output Card State Event
TRCHSLP	TRSC input high slip	Output Card State Event
TRCLOS	TRSC input loss of signal	Output Card State Event
TRCOOF	TRSC input out of frame	Output Card State Event
TRCSLIP	TRSC input slip	Output Card State Event
UNKALM	Unidentified alarm detected	State Event
UNKSTAT	Expansion status unknown	IMC/NIMC State Event
XFER	Istate not identical	ITH State Event

7.6.2 The following tables list the events by type along with the event's default settings.

## 7.7 State Events Related To Input Signals

7.7.1 This section describes state events related to input signals. These events are listed in Table 7-2.

**Table 7-2. State Events Related To Input Signals**

Code	Description	Default ALM (Severity)	Default LOG	Notes*
INDISQ	Input disqualified	MINOR	YES	
INEXPH	Input excessive phase hits	NONE	NO	
INMEAS	Disqualified by meas.	NONE	NO	
INPAIS	Input AIS	NONE	NO	
INPLOS	Input loss of signal	NONE	NO	
INPOOF	Input loss of framing	NONE	NO	
INPRCDQ	Input PRC status disqualified	NONE	NO	
INPULL	Pull-in range exceeded	NONE	NO	
MEASRNG	Measurement range exceeded	NONALM	YES	
MEASRP	Measurement beyond threshold	NONALM	YES	
MEASRST	Measurements restarted	NONE	YES	
SNDRIFT	Drift Exceeds Limits	NONALM	YES	
SNHOLD	Holdover mode	MAJOR	YES	
SNTRCK	Tracking this input	NONALM	YES	Note 1

\* Note 1: These events represent normal operating conditions. Therefore, the ALM property can only be configured to either NONE or NONALM. If the user were permitted to assign an alarmed severity to these properties, an alarm would always be generated under normal operating conditions.

### **NOTE**

The events listed in Table 7-2 (above) cannot be configured to a severity of FAIL.

#### **7.7.1.1 INMEAS EVENT**

The INMEAS event is generated when a measurement disqualifies an input channel and is reported as the event <monval>-DQ. For example, if the 15 minute LMRTIE measurement disqualifies an input, the event type will be reported as LMRTIE-15M-DQ.

```
SSU 95-09-06 12:14:37
** 0013 REPT ALM TSG
"ITH-1:MJ,LMRTIE-15-DQ:SA,,,,:\ "Input disqualified\ ""
;
```

The crossing of a measurement threshold will disqualify an input channel only if the CRI (criteria) property is set to Y for that measurement on that input channel. For example:

```
ED-SYNC::ITH-3:SC1::LMRTIE-15M=CRI-Y;
```

This example configures the LMRTIE-15M measurement on input channel 3 to disqualify the channel and generate the LMRTIE-15M-DQ event if the threshold is crossed.

The INMEAS keyword is used to set the properties for all measurement-caused input disqualifications. For example:

```
ED-EQPT:::SC1::INMEAS=ALM-MAJOR&LOG-Y;
```

This example configures the system to issue a Major alarm whenever a measurement disqualifies an input, and to enter the event in the Event log.

---

**NOTE**

The INMEAS keyword itself will never appear in an event report, as it is replaced by the specific measurement that disqualified an input channel.

### 7.7.1.2 MEASRP EVENT

The MEASRP event is generated when a measurement crosses its threshold and is reported as the event <monval>-T. For example, if the 15 minute LMRTIE measurement crosses its threshold, the event type will be reported as LMRTIE-15M-T as shown below.

```
SSU 95-09-06 12:14:37
** 0013 REPT ALM TSG
"ITH-1:MJ,LMRTIE-15-T:SA,,,,:\Meas. beyond threshold\"";
```

The crossing of a measurement threshold on a particular input channel will generate an event report only if you have set up the RPT (report) property for that measurement. For example:

```
ED-SYNC::ITH-3:SC1::LMRTIE-15M=RPT-Y;
```

This example configures the LMRTIE-15M measurement on input channel 3 to generate an event if the LMRTIE-15M threshold is crossed.

---

**NOTE**

This example only tells the system to generate an event when this threshold is exceeded. If you want to report the event, you need to use the MEASRP keyword as shown in the next example.

The MEASRP keyword is used to set the properties for reporting all measurement threshold crossings as events.

```
ED-EQPT:::SC1:::MEASRP=ALM-MINOR&LOG-Y;
```

**NOTE**

The MEASRP keyword itself will never appear in an event report, as it is replaced by the specific measurement threshold that was crossed.

---

## 7.8 ITH State Events Not Related To Input Signals

7.8.1 This section describes state events not related to input signals. These events are listed in Table 7-3.

**Table 7-3. ITH State Events Not Related To Input Signals**

Code	Description	Default ALM (Severity)	Default LOG	Notes*
ITHACTV	ITH Active	NONALM	YES	Note 1
ITHDISA	ITH disagree on chan. quality	NONALM	YES	
ITHFAIL	ITH failed	FAIL	YES	
ITHHLTH	ITH Marginal Failure	MINOR	YES	
ITHNCOM	ITH Communications failure	NONALM	YES	
ITHNVFL	NVRAM Failed	MAJOR	YES	
ITHOFFL	ITH Offline	MAJOR	YES	
ITHWARM	ITH Warmup	FAIL	YES	
SNFREE	Freerun mode	MAJOR	YES	
SNHAVL	Holdover available	NONALM	YES	
SNOPER	Sync in normal operating mode	NONALM	YES	
SNSAVL	SmartClock available	NONALM	YES	

\* Note 1: This event represents a normal operating conditions. Therefore the ALM property can only be configured to either NONE or NONALM. If the user were permitted to assign an alarmed severity to these properties, then an alarm would always be generated under normal operating conditions.

---

## 7.9 Transient Events Reported Only by Active ITH Card

7.9.1 This section describes transient events reported only by the active ITH card. These events are listed in Table 7-4.

**Table 7-4. Transient Events Reported Only by Active ITH Card**

Code	Description	Default ALM (Severity)	Default LOG	Notes
CFGRST	Configuration reset	NONALM	YES	
INPSSM	Input SSM changed	NONALM	NO	
SNSSM	SSM algorithm executed	NONALM	YES	

---

## 7.10 Transient Events Reported Regardless of Whether the ITH Card is Active

This section describes transient events reported regardless of whether the ITH card is active. These events are listed in Table 7-5.

**Table 7-5. Transient Events Reported Regardless of Whether the ITH Card is Active**

Code	Description	Default ALM (Severity)	Default LOG	Notes*
ITHCDIN	Other ITH Card Inserted	NONALM	YES	Note 2
ITHCDRM	Other ITH Card Removed	NONE	YES	Note 2
LOGCLRDR	Event log cleared	NONE	YES	Note 3

\* Note 2: The removal or insertion of an ITH card causes the IMC to generate or clear a ITHGONE alarm, with a severity level of FAIL. In addition, the detection of this removal or insertion by the other ITH card, generates the ITHCDRM and ITHCDIN transient events for purposes of logging in the Event Log on that ITH card.

Note 3: ALM severity and LOG settings cannot be changed from the default setting.

---

## 7.11 Output Card Related Events

7.11.1 Unlike ITH cards, missing Output Cards do not necessarily represent an abnormal condition. A missing Output Card will only generate an alarm under the following conditions:

- If the other card of the pair is present and its switch indicates it is part of a protected pair.
- If the card was once present and has since been removed.

7.11.2 In the latter case, entering the OPR-ACO-ALL will clear the OPCDNP alarm. However, if the missing card is part of a protected pair, the alarm will not clear.

7.11.3 Even though a missing Output Card alarm (OPCDNP) has been cleared using the OPR-ACO-ALL command, the card is still included in the inventory of expected Output Cards. The RTRV-COND-TSG command will continue to retrieve this event, but as a non-alarmed condition. The card can be removed from the inventory with the RMV-EQPT command, provided it is not part of a protected pair. Reinserting the card automatically adds it back into the inventory.

7.11.4 The Output Card related events are listed in Table 7-6.

**Table 7-6. Output Card Related Events**

Code	Description	Default ALM (Severity)	Default LOG	Notes *
OPCDFL	Output Card Failed	FAIL	YES	Note 3
OPCDIN	Output Card Inserted	NONALM	YES	Note 5
OPCDMS	Output Card Mismatch	FAIL	YES	Note 3
OPCDNA	Output Card Not Accessible	FAIL	YES	Note 3
OPCDNP	Output Card Not Present	FAIL	NO	Note 4
OPCDPMM	Output Card Protect Mismatch	NONALM	YES	Note 3

\* Note 3: The ALM (severity) property of these events is not user configurable. These events are detected and logged on the ITH card, but a record of the events is maintained on the IMC card.

\* Note 4: This event is detected by the IMC card and is never logged in the Event Log. However, removal of an Output Card should cause the OPCDNA event to also occur, which can be logged. The indicated severity level of FAIL is correct when an Output Card is removed from the unit. However, as explained in the discussion of Output Cards, this alarm can sometimes later be downgraded to NONALM.

\* Note 5: The ALM property of this event is not user configurable. This event is detected and logged on the ITH card as a transient event and is not retrieved by RTRV-COND-TSG.

## 7.12 Rack or IMC Card Related Events

7.12.1 The following events are detected directly on the IMC card. The occurrence of these events is reported to both ITH cards so the events can be logged. The severity level of these alarms is not user configurable. Table 7-7 lists the IMC card's events.

**Table 7-7. IMC Events**

Code	Description	Default ALM (Severity)	Default LOG	Notes *
CFGCHD	Configuration Reset	NONE	NO	Note 7
IMCCRST	IMC Configuration Reset	NONALM	YES	Note 6
ITHGONE	ITH Card Missing	FAIL	No	Note 7
SNPWRA	Power supply A failed	MAJOR	YES	Note 6
SNPWRB	Power supply B failed	MAJOR	YES	Note 6
SWDL	Software Download Mode	NONE	NO	Note 7

\* Note 6: The ALM (severity) property of these events is not user configurable. Although this alarm is generated on the IMC card, these events are reported to each ITH card and can be entered in the Event Log on that card.

\* Note 7: The properties of these events are not user configurable.

### 7.12.1.1 *CFGCHD (Configuration Changed) Event/Condition*

The CFGCHD Condition is unique to a particular communications port (local or remote). It is set whenever there is any change in the SSU setup other than those changes initiated by the particular port interrogating the condition. In particular, it is set if the other port issues a command changing the setup or if the unit's setup is reset as the result of insertion of an ITH card with its switch set to force a return to defaults. In addition, it is set whenever the IMC card is inserted into the subrack or power is initially applied. The fact that this flag is set does not assure that a change has occurred; it only signals the possibility that a change may have occurred.

#### **CFGCHD Does Not Relate to Automatic Changes in the SSU Operation**

CFGCHD does not relate to automatic changes in the SSU operation, such as might occur if signal is lost on an input port. The following commands can cause a change in the setup:

ED-EQPT	SET-ATTR-TSG
ED-SYNC	SET-TH-TSG



To clear the CFGCHD condition, use the following command (this only clears the CFGCHD with respect to the port receiving this command):

```
RTRV-COND:::ABC002::CFGCHD;  
SSU 98-12-11 11:55:34  
M ABC002 COMPLD  
"TSG:NR,CFGCHD,12-11,11-54-59,3,,\"Configuration changed\""  
;
```

where:

12-11,11-54-59 — is the date and time of last change from other port.

3 — this number will change whenever there is a configuration change from the other port. (Note: may increment by more than one.)

This command will report and then clear the condition.

### 7.12.1.2 LSTCFG (Latest Configuration Change) Condition

The LSTCFG Condition is updated (it is never cleared) whenever there is any change in the SSU setup. In particular, it is set if either port issues a command changing the setup or if the unit's setup is reset as the result of insertion of an ITH card with its switch set to force a return to defaults. In addition, it is set whenever the IMC card is inserted into the subrack or power is initially applied. The fact that this flag is set does not assure that a change has occurred; it only signals the possibility that a change may have occurred.

#### **LSTCFG Does Not Relate to Automatic Changes in the SSU Operation**

LSTCFG does not relate to automatic changes in the SSU operation, such as might occur if signal is lost on an input port. The following commands can cause a change in the setup:

ED-EQPT	SET-ATTR-TSG
ED-SYNC	SET-TH-TSG

The LSTCFG condition can not be cleared. However, the following command can be used to retrieve this condition without also retrieving all other conditions:

```
RTRV-COND:::ABC001::LSTCFG;  
KEITH FER 98-12-11 11:54:25  
M ABC001 COMPLD  
"TSG:NR,LSTCFG,12-11,11-53-00,3,,\"Latest Configuration changed\""  
;
```

where:

12-11,11-53-00 — is the date and time of last change.

3 — this number will change whenever there is a configuration change. (Note: may increment by more than one.)

This command will report just the LSTCFG condition.

### 7.12.1.3 SNFAIL and UNKALM Event/Condition

Table 7-8 lists the subrack's SNFAIL and UNKALM events.

**Table 7-8. Subrack Event**

Code	Description	Default ALM (Severity)	Default LOG	Notes *
SNFAIL	Sync failure	Fail	No	Note 8
UNKALM	Unknown alarm	Varies	No	Note 8

\* Note 8: The properties of the SNFAIL and UNKALM events are not user configurable.

The UNKALM event (condition) is unusual in that it can be reported at different times with different severities (MAJOR, MINOR). If an ITH or Output Card signals an alarm condition (via its alarm lights), but the exact cause of the alarm is not reported to the IMC card, the IMC card will generate either a SNFAIL alarm (for FAIL condition) or an UNKALM (for minor or major severity). This assures that the alarm severity reported over the TL1 interface port agrees with that reported by the front panel lights.

Examples of situations that will generate a SNFAIL or UNKALM condition are:

- An ITH card fails in such a manner that it is unable to report the exact cause of its failure, but it is able to signal an alarm over the backplane of the subrack.
- An IMC card is inserted into the subrack while another card is already generating an alarm. A SNFAIL or UNKALM alarm will be reported showing the severity level of the existing alarm.
- An ITH card with a “fail” condition has been reporting a MAJOR alarm, which is later upgraded to a CRITICAL alarm if the other ITH card also fails. The SNFAIL condition is used to indicate this upgraded alarm status.

When a SNFAIL condition is reported, you may want to issue one of the following commands to attempt to determine the cause of the SNFAIL alarm:

- RTRV-ALM
- RTRV-COND

In firmware versions R3833 and higher, the occurrence of either a SNFAIL or an UNKALM will cause the IMC to automatically query the reporting card for more information. If this query successfully determines the cause of the SNFAIL or UNKALM, then that alarm will be cleared, and the correct alarm will be reported.

Prior to R3833, UNKALM did not exist, and SNFAIL was used to report these conditions.

---

## 7.13 Example Commands for Event (Conditions) and Alarms

7.13.1 This section provides example commands for retrieving, displaying, and changing event/alarms.

### 7.13.1.1 Retrieving Events/Alarms

Use the RTRV-COND-TSG command (shown in the following example) to retrieve a list of all currently active state events. Since transient events do not have an ongoing state, they cannot be retrieved.

```
RTRV-COND:::SC1;

SSU 96-01-02 16:30:45
M SC1 RTRV
"ITH1:NA,ITHACTV,NSA,,,\\"ITH Active\\"
"ITH1-1:MN,INDISQ,NSA,,,\\"Input disqualified\\"
"ITH1-0:NA,SNTRCK,NSA,,,\\"Tracking this input\\"
>
SSU 96-01-02 16:30:45
M SC1 COMPLD
"ITH2:MN,SNFAIL,SA,,,\\"Sync failure\\"
;
```

The ALM property of the event has no bearing on whether the event is retrieved, but 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 RTRV-ALM-TSG command (shown in the following example) to retrieve a list of all currently active alarms. The RTRV-ALM-TSG command is similar to the RTRV-COND-TSG command except that it only reports events which are causing alarms (e.g., CR, MJ, MN).

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

SSU 96-01-02 16:30:45
M SC1 RTRV
"ITH-1:MN,INDISQ,NSA,,:\Input disqualified\""
>
SSU 96-01-02 16:30:45
M SC1 COMPLD
"ITH2:MN,SNFAIL,SA,,:\Sync failure\\"" ;
```

**NOTE**

If available, the Event Message will include a problem code. This code can be used to help diagnose system problems.

**7.13.1.2 Changing/Displaying Event Properties**

Use the ED-EQPT command to change the properties of an event as shown in the following example:

```
ED-EQPT::ITH:SC1:::INDISQ=LOG-Y&ALM-MAJOR;
```

This example tells the system to create a major alarm and an entry in the Event Log when it detects that an input channel has been disqualified.

You can also find out what properties are set for a particular keyword by using the "Retrieving System Information and Status" starting on page -14 RTRV-EQPT command as shown in the following example:

```
RTRV-EQPT::ITH:SC1:::PARAMETER=INDISQ;

<IP sc1
<
SSU 98-12-11 13:39:13
M sc1 COMPLD
"ITH::INDISQ = LOG-Y & ALM-NONALM"
;
```

This example shows how to find out what conditions have been set up for the INDISQ event (e.g., the system detects that an input channel has been disqualified). In this case, the system will generate a major alarm and an entry in the Event Log.

See "Retrieving System Information and Status" starting on page -14 in Chapter .

## 7.14 Event Descriptions

**Table 7-9. Summary of Events With Typical Causes and Solutions**

Event	Event Title	Description	Typical Causes	Typical Solutions
BTTMODE	BTT mode active	Block Text Transfer mode is active.	<ul style="list-style-type: none"> <li>Firmware download started but not completed.</li> </ul>	<ul style="list-style-type: none"> <li>Wait for download process to complete.</li> <li>Send the CANC-BTT command to the card.</li> </ul>
CFGCHD	Configuration changed	The configuration has been changed via the other IMC communications port since this flag was last cleared.	<ul style="list-style-type: none"> <li>Unless cleared by the user, this event is normally present in the RTRV-COND response.</li> <li>See LSTCFG event.</li> </ul>	<ul style="list-style-type: none"> <li>Send the RTRV-COND:::CFGCHD; command to clear this event.</li> </ul>
CFGRST	Configuration reset	The ITH card parameter settings have been reset to the default values.	<ul style="list-style-type: none"> <li>ITH switch S5-7 has been set to OFF.</li> </ul>	<ul style="list-style-type: none"> <li>Set ITH switch S5-7 back to ON.</li> </ul>
IMCCRST	IMC Configuration reset	The IMC card parameters settings have been reset to the default values.	<ul style="list-style-type: none"> <li>IMC switch S4-2 has been set OFF to force reloading of the default parameters.</li> <li>Contents of NVRAM have been corrupted.</li> </ul>	<ul style="list-style-type: none"> <li>Set IMC switch S4-2 back to ON position.</li> <li>Remove and re-insert the IMC card.</li> </ul>
IMCNCND	No IMC Rack Comm. Downward	The IMC card can not communicate with the previous subrack in the ring.	<ul style="list-style-type: none"> <li>Expansion Com port connector J6 is not properly connected to the previous subrack.</li> </ul>	<ul style="list-style-type: none"> <li>Check Expansion Com cable connections.</li> <li>Re-route the cables to minimize cross-talk.</li> </ul>
IMCNCUP	No IMC Rack Comm. Upward	The IMC card can not communicate with the next subrack in the ring.	<ul style="list-style-type: none"> <li>Expansion Com port connector J5 is not properly connected to the next subrack.</li> </ul>	<ul style="list-style-type: none"> <li>Check Expansion Com cable connections.</li> <li>Re-route the cables to minimize cross-talk.</li> </ul>
IMCNVFL	IMC NVRAM Failed	The Non-Volatile Random Access Memory has failed on the IMC card.	<ul style="list-style-type: none"> <li>IMC card not removed and inserted a second time during firmware upgrade procedure.</li> <li>NVRAM contents have been corrupted.</li> <li>NVRAM component has failed.</li> </ul>	<ul style="list-style-type: none"> <li>Remove and re-insert the IMC card.</li> <li>Send the ACT-SWDL and CANC-SWDL commands.</li> </ul>
IMCPRFL	IMC PROM Failed	The EEPROMs have failed on the IMC card.	<ul style="list-style-type: none"> <li>EEPROM device has failed.</li> <li>EEPROM contents have been corrupted.</li> </ul>	<ul style="list-style-type: none"> <li>Replace EEPROMs.</li> <li>Replace IMC card.</li> </ul>

Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)

Event	Event Title	Description	Typical Causes	Typical Solutions
IMCRST	IMC card beginning RESET	The IMC card is restarting.	<ul style="list-style-type: none"> <li>• Normal event occurs when the NIMC network parameters are modified.</li> </ul>	<ul style="list-style-type: none"> <li>• Normal event occurs when the NIMC network parameters are modified.</li> </ul>
INDISQ	Input disqualified	A reference input has been disqualified by the ITH card.	<ul style="list-style-type: none"> <li>• Input signal not present.</li> <li>• Input signal is bad.</li> <li>• Wrong Input signal FORMAT.</li> <li>• Input signal AIS.</li> <li>• Input signal phase hit.</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate input signal quality.</li> <li>• Connect signals to all inputs.</li> <li>• Change this alarm severity to NONALM.</li> <li>• Set correct input signal FORMAT.</li> </ul>
INEXPH	Input excessive phase hits	Multiple phase discontinuities have occurred for an input	<ul style="list-style-type: none"> <li>• Input signal quality is degrading</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate input signal quality</li> <li>• Wait for input to requalify</li> </ul>
INMEAS	Disqualified by meas.	An input has been disqualified due to a measurement criteria exceeding a limit	<ul style="list-style-type: none"> <li>• Input signal is bad</li> <li>• A TDEV, MRTIE, LMRTIE, or FFOFF measurement has been configured to be used as input qualification criteria, but the threshold value has not been set correctly</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate input signal quality</li> <li>• Set CRI-N to disable this measurement</li> </ul>
INMSDLY	Waiting for Measurements	Measurements on an input have restarted	<ul style="list-style-type: none"> <li>• MEASDLY is used to delay qualification of an input until the desired measurement has completed</li> </ul>	<ul style="list-style-type: none"> <li>• Wait for number of minutes specified by MEASDLY to elapse</li> <li>• Set MEASDLY to zero</li> </ul>
INPAIS	Input AIS	An E1 reference input is receiving an Alarm Indication Signal (AIS)	<ul style="list-style-type: none"> <li>• Upstream equipment failure</li> <li>• Wrong FORMAT selected for input</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate upstream equipment</li> <li>• Set correct input signal FORMAT</li> </ul>
INPLOS	Input Loss of signal	The amplitude of an input signal has dropped below the minimum required level	<ul style="list-style-type: none"> <li>• Signal not connected</li> <li>• Event is normally present if one or more inputs are not used</li> </ul>	<ul style="list-style-type: none"> <li>• Connect input signal</li> <li>• Change this alarm severity to NONALM</li> <li>• Disable the unused input(s) and set MONITOR to N (firmware R3829 or later)</li> </ul>

Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)

Event	Event Title	Description	Typical Causes	Typical Solutions
INPOOF	Input Loss of framing	An out-of-frame error has occurred on an E1 input	<ul style="list-style-type: none"> <li>• Bad input signal</li> <li>• Input signal not formatted correctly</li> <li>• CRC4 not configured properly</li> <li>• Input FORMAT not configured correctly</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate input signal quality and format</li> <li>• Temporarily configure the input for CRC = N and FORMAT = CCS in order to qualify any E1 input format</li> </ul>
INPRCDQ	Input PRC status disqualified	The PRC status input indicates that the PRC input should not be used as a reference	<ul style="list-style-type: none"> <li>• Upstream PRC (Cesium or GPS) is experiencing trouble</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate upstream PRC status</li> </ul>
INPSSM	Input SSM changed	Synchronization Status Message on an E1 input has changed value	<ul style="list-style-type: none"> <li>• The SSM quality level indicated by upstream equipment has changed</li> </ul>	<ul style="list-style-type: none"> <li>• Set SSMENB = N to disable reading of the input SSM value</li> </ul>
INPULL	Pull-in range exceeded	The input frequency has drifted in excess of the accepted range	<ul style="list-style-type: none"> <li>• Input signal quality has degraded</li> <li>• Pull-in range set too small for type of input</li> </ul>	<ul style="list-style-type: none"> <li>• Set PIRANGE to default value for oscillator (Qz: 4600 ppb, Rb: 16 ppb)</li> </ul>
ITHACTV	ITH Active	The indicated ITH card is the synchronization source for all of the output cards	<ul style="list-style-type: none"> <li>• Normal event</li> <li>• One and only one ITH card can be active</li> </ul>	<ul style="list-style-type: none"> <li>• Normal event</li> </ul>
ITHCDIN	Other ITH Card Inserted	The ITH card indicates that a second ITH card has been inserted	<ul style="list-style-type: none"> <li>• An ITH card has been inserted by the user</li> <li>• An ITH card has re-started after experiencing a firmware error</li> </ul>	<ul style="list-style-type: none"> <li>• Normal event when ITH card is inserted</li> </ul>
ITHCDRM	Other ITH Card Removed	The remaining ITH card indicates that the other ITH card has been removed	<ul style="list-style-type: none"> <li>• An ITH card has been removed by the user</li> <li>• An ITH card has re-started after experiencing a firmware error</li> <li>• A hardware failure has occurred on the ITH card</li> </ul>	<ul style="list-style-type: none"> <li>• Re-insert the ITH card</li> <li>• Replace the ITH card</li> </ul>
ITHDISA	ITH disagree on chan. quality	The ITH cards are reporting different quality levels for the same reference input	<ul style="list-style-type: none"> <li>• Input signal has too much jitter or wander</li> <li>• Wrong input signal FORMAT</li> <li>• ITH card hardware problem</li> </ul>	<ul style="list-style-type: none"> <li>• Verify input signal quality</li> <li>• Restart measurements using INIT-REG</li> <li>• Set correct input signal FORMAT</li> <li>• Replace ITH card</li> </ul>

**Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)**

Event	Event Title	Description	Typical Causes	Typical Solutions
ITHFAL	ITH failed	An ITH card has failed	<ul style="list-style-type: none"> <li>• ITH switch S5-7 or S5-8 set to OFF</li> <li>• The ITH card hardware has failed</li> </ul>	<ul style="list-style-type: none"> <li>• Set ITH switches S5-7 and S5-8 to ON</li> <li>• Remove and re-insert the ITH card</li> <li>• ITH LEDs may indicate specific failure type</li> <li>• Replace ITH card</li> </ul>
ITHGONE	ITH Card Missing	The IMC card cannot detect the presence of the indicated ITH card	<ul style="list-style-type: none"> <li>• An ITH or Exp. Sync card has been removed by the user</li> </ul>	<ul style="list-style-type: none"> <li>• Re-insert the ITH or Exp. Sync card</li> <li>• Replace the ITH or Exp. Sync card</li> </ul>
ITHHLTH	ITH Marginal Failure	The internal ITH card power supply voltage or oven warmup current exceeds limits	<ul style="list-style-type: none"> <li>• Incorrect oscillator type switch settings</li> <li>• ITH internal power supply voltage exceeds limits</li> <li>• ITH card with double oven oscillator has been powered on for less than 60 minutes</li> </ul>	<ul style="list-style-type: none"> <li>• Check that ITH S6 switch settings match oscillator type</li> <li>• Wait one hour for ITH card to warm up</li> <li>• Replace ITH card</li> </ul>
ITHNCDN	No ITH Rack Comm. Downward	There is a communications problem between the ITH or Exp. Sync card and the previous card in the ring	<ul style="list-style-type: none"> <li>• Cable not connected properly</li> <li>• Expansion Sync card not installed</li> </ul>	<ul style="list-style-type: none"> <li>• Verify proper cable connection to Comm port J6</li> <li>• Verify Expansion Sync card is installed</li> </ul>
ITHNCOM	ITH Communications failure	There is a communications problem between the two ITH or Exp. Sync cards	<ul style="list-style-type: none"> <li>• ITH card has failed</li> <li>• Backplane has failed</li> </ul>	<ul style="list-style-type: none"> <li>• Remove and reinsert the ITH or Exp. Sync card</li> <li>• Replace the ITH or Exp. Sync card</li> </ul>
ITHNCUP	No ITH Rack Comm. Upward	There is a communications problem between the ITH or Exp. Sync card and the next card in the ring	<ul style="list-style-type: none"> <li>• Cable not connected properly</li> <li>• Expansion Sync card not installed</li> </ul>	<ul style="list-style-type: none"> <li>• Verify proper cable connection to Comm port J5</li> <li>• Verify Expansion Sync card is installed</li> </ul>
ITHNVFL	NVRAM Failed	The Non-Volatile Random Access Memory has failed on the ITH card	<ul style="list-style-type: none"> <li>• ITH card not removed and inserted a second time during firmware upgrade procedure</li> <li>• NVRAM contents have been corrupted</li> <li>• NVRAM component has failed</li> </ul>	<ul style="list-style-type: none"> <li>• Remove and re-insert the ITH card</li> <li>• Send the ACT-SWDL and CANC-SWDL commands</li> </ul>



Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)

Event	Event Title	Description	Typical Causes	Typical Solutions
ITHOFFL	ITH Offline	There is a serious problem with the indicated ITH or Exp. Sync card	<ul style="list-style-type: none"> <li>• ITH card can not synchronize with the other ITH card</li> <li>• Main rack ITH card is in warm-up mode</li> <li>• ITH output signal is out of specification</li> <li>• ITH card can not communicate with other ITH card</li> </ul>	<ul style="list-style-type: none"> <li>• Wait 20 minutes for ITH warm-up to complete</li> <li>• Attempt to reset the ITH card by commanding into and out of software download mode</li> <li>• Replace indicated ITH card</li> <li>• Loss of service may result if the Force Active button is pressed on an Offline ITH card</li> </ul>
ITHPRFL	ITH PROM Failed	The EEPROMs have failed on the ITH card	<ul style="list-style-type: none"> <li>• EEPROM device has failed</li> <li>• EEPROM contents have been corrupted</li> </ul>	<ul style="list-style-type: none"> <li>• Replace EEPROMs</li> </ul>
ITHWARM	ITH Warmup	The oscillator oven in the ITH card is warming up	<ul style="list-style-type: none"> <li>• Normal event when an ITH card is inserted</li> <li>• The ITH card will not accept any TL1 commands in this mode</li> </ul>	<ul style="list-style-type: none"> <li>• Normal event when an ITH card is inserted</li> <li>• May last up to 20 minutes</li> </ul>
LOGCLRDR	EVT log cleared	The event log stored in the ITH memory has been cleared	<ul style="list-style-type: none"> <li>• Normal event after the clear event log command</li> </ul>	<ul style="list-style-type: none"> <li>• Normal event</li> </ul>
LSTCFG	Latest Configuration Change	Timestamp of last TL1 command that could have changed the SSU configuration	<ul style="list-style-type: none"> <li>• Event is normally present in the RTRV-COND response</li> </ul>	<ul style="list-style-type: none"> <li>• Event is normally present in the RTRV-COND response</li> </ul>
MEASRNG	Measurement range exceeded	The input frequency has drifted beyond the measurement range of the ITH card	<ul style="list-style-type: none"> <li>• Input signal frequency has drifted more than 8 ppm from nominal</li> <li>• Input signal is weak or noisy</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate upstream signal quality</li> <li>• Increase input signal strength, if possible</li> </ul>
MEASRP	Measurement Reported beyond thresh.	A performance measurement has crossed the indicated threshold	<ul style="list-style-type: none"> <li>• Input signal has exceeded the user-defined performance measurement threshold</li> </ul>	<ul style="list-style-type: none"> <li>• Increase the measurement threshold setting</li> <li>• Investigate upstream equipment quality</li> </ul>

**Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)**

Event	Event Title	Description	Typical Causes	Typical Solutions
MEASRST	Measurements restarted	The performance measurements for the specified channel have restarted	<ul style="list-style-type: none"> <li>INIT-REG command was sent</li> <li>Input signal discontinuity was detected</li> </ul>	<ul style="list-style-type: none"> <li>Normal event when INIT-REG command is sent</li> <li>Investigate input signal quality</li> </ul>
MODMONL	Modem online at remote port	The modem connected to the remote port has established communication with another modem	<ul style="list-style-type: none"> <li>Normal event when modem connection is being used</li> </ul>	<ul style="list-style-type: none"> <li>Normal event when modem connection is being used</li> </ul>
MODMRDY	Modem ready at remote port	The modem connected to the remote port is ready to receive an incoming call	<ul style="list-style-type: none"> <li>Normal event when modem is connected to the remote port</li> </ul>	<ul style="list-style-type: none"> <li>Normal event when modem is connected to the remote port</li> </ul>
NETCLOS	Network connection closing	The Network IMC card is closing the network connection	<ul style="list-style-type: none"> <li>NIMC working memory parameters have been changed and the NIMC card must reboot</li> </ul>	<ul style="list-style-type: none"> <li>Wait for connection to close then re-establish the network connection</li> </ul>
NORESP	Complete response not received	The IMC card can not communicate with the indicated card	<ul style="list-style-type: none"> <li>Firmware failure on IMC or Exp. IMC card</li> <li>Firmware failure on indicated card</li> <li>IMC card is in firmware download mode</li> <li>Hardware failure on indicated card</li> <li>Hardware failure on backplane</li> </ul>	<ul style="list-style-type: none"> <li>Re-send the RTRV-COND command</li> <li>Cancel firmware download mode</li> <li>Remove and re-insert the IMC card</li> <li>Remove and re-insert the indicated card</li> <li>Replace the indicated card</li> </ul>
OPCDFL	Output Card Failed	The output card has failed, which may affect redundancy or cause a loss of output signals	<ul style="list-style-type: none"> <li>Output card hardware failure</li> <li>ITH card hardware failure</li> </ul>	<ul style="list-style-type: none"> <li>If only one output card has this failure, remove and reinsert that output card</li> <li>Replace the output card</li> <li>If multiple output cards have this failure, remove and reinsert the ITH card</li> <li>Replace the ITH card</li> </ul>
OPCDIN	Output Card Inserted	The output card has been inserted into the subrack	<ul style="list-style-type: none"> <li>Output card inserted</li> <li>ITH card inserted</li> <li>ITH card switched from Standby to Active</li> </ul>	<ul style="list-style-type: none"> <li>Normal event when output card inserted</li> </ul>

Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)

Event	Event Title	Description	Typical Causes	Typical Solutions
OPCDMS	Output Card Type Mismatch	The output cards in a protected pair are not of the same type	<ul style="list-style-type: none"> <li>• An incorrect output card type has been inserted</li> <li>• The output card switch settings are different</li> <li>• TRAFFIC value is invalid for the output card</li> </ul>	<ul style="list-style-type: none"> <li>• Remove the incorrect output card</li> <li>• Verify that the switches are set identically on both output cards in the protected pair</li> <li>• Set TRAFFIC=255 for the output card</li> </ul>
OPCDNA	Output Card Not Accessible	The ITH cards can not communicate with the indicated output card	<ul style="list-style-type: none"> <li>• Output card did not initialize properly</li> <li>• Hardware failure on output card</li> <li>• Hardware failure on backplane</li> </ul>	<ul style="list-style-type: none"> <li>• Remove and re-insert the output card</li> <li>• Replace the output card</li> </ul>
OPCDNP	Output Card Not Present	IMC card cannot detect the presence of an expected or required output card	<ul style="list-style-type: none"> <li>• Output card has been removed</li> <li>• Protection switch on other output card of pair is set incorrectly</li> <li>• IMC card hardware problem</li> </ul>	<ul style="list-style-type: none"> <li>• Install missing output card</li> <li>• Set protection switch to indicate unprotected output card</li> <li>• Use RMV-EQPT to remove output card from inventory</li> <li>• Replace the IMC card</li> </ul>
OPCDPMM	Output Card Protect Mismatch	The protection switches are not set correctly for a pair of output cards	<ul style="list-style-type: none"> <li>• Protection switch is not set correctly</li> </ul>	<ul style="list-style-type: none"> <li>• Check protection switch on each output card</li> </ul>
RACKDUP	Duplicate Rack Number	Two subracks have the backplane switches (located behind the IMC cards) set to the same value	<ul style="list-style-type: none"> <li>• Backplane switches are not set correctly</li> <li>• Two subracks have the same switch setting</li> </ul>	<ul style="list-style-type: none"> <li>• Verify master subrack ID switch is set to '0'</li> <li>• Verify each expansion subrack ID switch is set to 1, 2, 3, or 4</li> </ul>
RACKOOR	Rack Number Out of Range	The rack identification switch has been set to an invalid number	<ul style="list-style-type: none"> <li>• The master subrack rack identification switch is not set to zero</li> <li>• An expansion subrack switch is set to a number greater than 4</li> </ul>	<ul style="list-style-type: none"> <li>• Verify the correct setting on the backplane switch located behind the IMC card on each subrack</li> </ul>
RCKALM	External Rack Alarms 1 - 8	The NIMC Rack Alarm connector is being used by other equipment to indicate an external alarm	<ul style="list-style-type: none"> <li>• The external equipment is generating the indicated rack alarm</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate external equipment generating the alarm</li> </ul>

**Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)**

Event	Event Title	Description	Typical Causes	Typical Solutions
SECACTV	Inferior ITH is Active	The ITH card with the oscillator designated as inferior is active	<ul style="list-style-type: none"> <li>The Force Active pushbutton has been pressed</li> <li>The superior ITH card has failed</li> </ul>	<ul style="list-style-type: none"> <li>Use the pushbutton or SW-DX-EQPT command to force the superior ITH active</li> <li>Verify the ITH S4-7 switch is set correctly</li> <li>Replace the superior ITH card</li> </ul>
SGLSWMM	Sgl-DbI ITH Switch Mismatch	The IMC or NIMC single ITH switch setting doesn't match the number of ITH cards present	<ul style="list-style-type: none"> <li>The IMC switch is set for one ITH card, but two ITH cards are present</li> </ul>	<ul style="list-style-type: none"> <li>Set the IMC S6-1 switch to ON</li> <li>Set the NIMC S8-1 switch to ON</li> <li>Remove the second ITH card</li> </ul>
SNDRIFT	Drift Exceeds Limits	The frequency of an input signal, as compared to the ITH oscillator, has drifted beyond the acceptable limits	<ul style="list-style-type: none"> <li>Input signal frequency is drifting</li> <li>Input signal frequency has shifted</li> <li>ITH oscillator frequency is drifting</li> <li>ITH oscillator switch setting is incorrect</li> </ul>	<ul style="list-style-type: none"> <li>Investigate upstream signal quality</li> <li>Verify that highest quality input is active</li> <li>Wait three days for event to clear</li> <li>Remove and insert ITH card</li> <li>Verify that oscillator type matches oscillator switch setting (S6-1,2,3)</li> <li>Replace ITH card</li> </ul>
SNFAIL	Sync Failure	An alarm signal is present on the backplane that has not been identified by the card generating the alarm signal	<ul style="list-style-type: none"> <li>Minor alarm has been promoted to Major after 24 hours (R3744A or earlier firmware)</li> <li>IMC card was inserted while another card was already generating an alarm</li> <li>The indicated ITH or Output card has failed</li> <li>The output card type is new and is not recognized by the ITH firmware</li> <li>ITH card is in software download mode</li> </ul>	<ul style="list-style-type: none"> <li>Clear minor alarms before 24 hours has elapsed (R3744A or earlier firmware)</li> <li>Remove and reinsert the failed card</li> <li>Upgrade the SSU firmware to the newest version</li> <li>Replace the failed card</li> <li>Use ITH switch S5-7 to restore default settings</li> <li>Cancel ITH software download mode</li> </ul>

Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)

Event	Event Title	Description	Typical Causes	Typical Solutions
SNFREE	Freerun Mode	The ITH card is generating a reference output, but there are no qualified inputs and holdover mode is not available	<ul style="list-style-type: none"> <li>The ITH card has just been inserted or powered on</li> <li>All inputs are disqualified</li> </ul>	<ul style="list-style-type: none"> <li>Normal event when an ITH card is inserted</li> <li>Wait for an input to qualify</li> <li>Correctly configure the input signal format</li> </ul>
SNHAVL	Holdover available	The ITH card has collected enough tracking data to enter holdover mode if all inputs become disqualified	<ul style="list-style-type: none"> <li>Normal event after an ITH card has been inserted or power cycled</li> </ul>	<ul style="list-style-type: none"> <li>Normal event after an ITH card has been inserted or power cycled</li> </ul>
SNHOLD	Holdover mode	The ITH card is in holdover mode	<ul style="list-style-type: none"> <li>All enabled inputs are disqualified</li> <li>ITH sync mode has been commanded to track a particular input which is disqualified</li> </ul>	<ul style="list-style-type: none"> <li>Investigate input signal quality</li> <li>Restart measurements using INIT-REG</li> <li>Switch the SYNCMDE to AUTO</li> </ul>
SNOPER	Sync in normal operating mode	The indicated time constant is being used by the ITH card to track the active input	<ul style="list-style-type: none"> <li>Normal event after the ITH card has been powered on</li> <li>For 55411 and 55415 ITH cards, this event occurs 8 hours after being power on</li> </ul>	<ul style="list-style-type: none"> <li>Normal event after the ITH card has been powered on</li> </ul>
SNPWRA	Power Supply A failed	The rack power input A has failed	<ul style="list-style-type: none"> <li>Rack power 'A' connector has been disconnected</li> <li>Rack power 'A' connector is out of the -36 to -57 V range</li> </ul>	<ul style="list-style-type: none"> <li>Verify rack power 'A' connector is firmly connected</li> <li>Verify rack power 'A' supply voltage</li> </ul>
SNPWRB	Power Supply B failed	The rack power input B has failed	<ul style="list-style-type: none"> <li>Rack power 'B' connector has been disconnected</li> <li>Rack power 'B' connector is out of the -36 to -57 V range</li> </ul>	<ul style="list-style-type: none"> <li>Verify rack power 'B' connector is firmly connected</li> <li>Verify rack power 'B' supply voltage</li> </ul>
SNSAVL	SmartClock available	The Stratum-2 level ITH cards are prepared to use SmartClock in holdover mode	<ul style="list-style-type: none"> <li>Normal event for Stratum-2 level ITH cards after 32 hours of continuous operation</li> </ul>	<ul style="list-style-type: none"> <li>Normal event for Stratum-2 level ITH cards after 32 hours of continuous operation</li> </ul>
SNSCSUS	SmartClock suspended	The oscillator frequency has drifted outside of limits during holdover	<ul style="list-style-type: none"> <li>Due to excessive oscillator drift or excessive time in holdover mode, the oscillator has drifted beyond limits</li> </ul>	<ul style="list-style-type: none"> <li>End holdover mode by configuring the SSU to qualify an input signal</li> </ul>

**Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)**

Event	Event Title	Description	Typical Causes	Typical Solutions
SNSSM	SSM algorithm executed	The ITH card has executed the SSM algorithm to determine which input should be tracked	<ul style="list-style-type: none"> <li>• Normal event if SSMENB has been set to true for an E1 input signal</li> <li>• Must be in SSM SYNCMDE for SSM algorithm to operate</li> </ul>	<ul style="list-style-type: none"> <li>• Normal event if SSMENB has been set to true for an E1 input signal</li> </ul>
SNTRCK	Tracking this input	The ITH card has begun tracking the indicated input	<ul style="list-style-type: none"> <li>• Normal event after an input has been qualified</li> </ul>	<ul style="list-style-type: none"> <li>• Normal event after an input has been qualified</li> </ul>
SRINVMM	Inventory mismatch	The inventory lists maintained by each ITH card and the IMC card do not agree	<ul style="list-style-type: none"> <li>• An expansion rack has been added</li> <li>• A rack to rack communications problem has occurred</li> <li>• A card to card communications problem has occurred</li> </ul>	<ul style="list-style-type: none"> <li>• Wait a few minutes for subrack to be added to inventory</li> <li>• Verify that the Expansion Comm Port cables are connected correctly</li> </ul>
SWDL	Software Download Mode	The indicated card has entered software download mode	<ul style="list-style-type: none"> <li>• Normal event during firmware upgrades</li> <li>• EEPROMs have been corrupted</li> </ul>	<ul style="list-style-type: none"> <li>• Cancel firmware download mode</li> <li>• Replace EEPROMs</li> </ul>
SWDLMMC	SWDL Mismatch, IMC shows clr	The indicated card is in download mode, but the IMC is not aware of this	<ul style="list-style-type: none"> <li>• The IMC card has been removed and inserted while another card was in software download mode</li> </ul>	<ul style="list-style-type: none"> <li>• Activate and then cancel the firmware download mode for the indicated card</li> </ul>
SWDLMMS	SWDL Mismatch, IMC shows set	The IMC card believes that the indicated card is in download mode, but the card reports it is not	<ul style="list-style-type: none"> <li>• A card in download mode has been removed and replaced</li> </ul>	<ul style="list-style-type: none"> <li>• Activate and then cancel the firmware download mode for the indicated card</li> </ul>
TRAOOR	Traffic value invalid for card	The TRAFFIC value specified for the output card is not valid for the output card type	<ul style="list-style-type: none"> <li>• 55481A card inserted with TRAFFIC not set to 255</li> </ul>	<ul style="list-style-type: none"> <li>• Set TRAFFIC to 255</li> <li>• Replace 55481A with 55481B</li> </ul>
TRCBLOS	TRSC Buffer Input Loss of Signal	There is no signal present on an enabled Traffic Resynchronization card buffer input	<ul style="list-style-type: none"> <li>• Signal disconnected</li> <li>• Input channels not configured</li> </ul>	<ul style="list-style-type: none"> <li>• Connect inputs</li> <li>• Disable unused buffer channels</li> </ul>
TRCHSLP	TRSC Input High Slip	Input signal slips are occurring at a rate greater than the HSLIMIT threshold	<ul style="list-style-type: none"> <li>• Input signal frequency is drifting</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate upstream equipment</li> </ul>
TRCLOS	TRSC Input Loss of Signal	There is no signal present on an enabled Traffic Resynchronization card re-timed input	<ul style="list-style-type: none"> <li>• Signal disconnected</li> <li>• An unused input is giving false TRCLOS events due to noise</li> </ul>	<ul style="list-style-type: none"> <li>• Connect inputs</li> <li>• Disable or terminate unused channels</li> </ul>

Table 7-9. Summary of Events With Typical Causes and Solutions (Continued)

Event	Event Title	Description	Typical Causes	Typical Solutions
TRCOOF	TRSC Input Out Of Frame	A frame loss at a Traffic Resynchronization Card input has occurred	<ul style="list-style-type: none"> <li>• An unused input is giving false TRCOOF events due to noise</li> <li>• Signal type does not match signal type switch settings</li> <li>• Signal has framing errors</li> </ul>	<ul style="list-style-type: none"> <li>• Disable or terminate unused TRSC inputs</li> <li>• Verify correct TRSC card switch settings</li> <li>• Investigate upstream equipment</li> </ul>
TRCSLIP	TRSC Input Slip	An signal slip has occurred on a Traffic Resynchronization Card input	<ul style="list-style-type: none"> <li>• Input signal frequency is drifting</li> </ul>	<ul style="list-style-type: none"> <li>• Investigate upstream equipment</li> </ul>
UNKALM	Unidentified Alarm Detected	An alarm signal is present on the backplane that has not been identified by the card generating the alarm signal	<ul style="list-style-type: none"> <li>• The IMC card was inserted while an alarm was already present</li> <li>• A card has failed but has not reported the failure to the IMC card</li> </ul>	<ul style="list-style-type: none"> <li>• Wait a minute for the alarm to clear</li> <li>• Remove and insert failed card</li> <li>• Replace failed card</li> </ul>
UNKSTAT	Expansion IMC Status Unknown	An Exp. IMC card has failed to report its status	<ul style="list-style-type: none"> <li>• An Exp. IMC card has failed</li> <li>• A rack-to-rack communications problem exists</li> </ul>	<ul style="list-style-type: none"> <li>• Check the expansion rack communication port cables</li> <li>• Remove and insert Exp. IMC card</li> <li>• Replace failed Exp. IMC card</li> </ul>
XFER	Istate not identical	The parameter settings in the two ITH cards are not identical	<ul style="list-style-type: none"> <li>• ITH card was recently inserted</li> <li>• ITH card firmware upgraded</li> <li>• ITH card S5-7 switch set to OFF</li> </ul>	<ul style="list-style-type: none"> <li>• Wait 10 minutes for Istate to transfer</li> <li>• Set ITH switch S5-7 back to ON</li> </ul>

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## 8.1 Chapter Contents

8.1.1 This chapter discusses all of the network performance measurements, such as FFOFF, MRTIE/LMRTIE, TIE, CTIE, and TDEV, that the 55400A is constantly performing.

8.1.2 This chapter is organized as follows:

- Overview of Network Performance Measurements page 8-3
- Measurement Summary page 8-4
- FFOFF page 8-6
- MRTIE/LMRTIE page 8-7
- TIE page 8-9
- TDEV page 8-10
- SPRD page 8-11
- BERC page 8-12
- BPVC page 8-12
- Setting Up/Displaying Measurement Properties page 8-13
  - GOOD Property Explained page 8-14
  - Changing Measurement Properties page 8-14
  - Displaying Measurement Properties page 8-15
- Displaying Measurements page 8-16
  - Automatically Displaying Measurement Data page 8-16
  - Manually Displaying Measurement Data page 8-17
  - Manually Restarting Measurements page 8-18
- CTIE page 8-19
  - Capturing Data page 8-19
  - Retrieving Data page 8-19

---

## **8.2 Overview of Network Performance Measurements**

8.2.1 The 55400A is constantly measuring network performance. This chapter describes all of the network performance measurements. It includes the following topics:

- Measurement Summary
- FFOFF (Fractional Frequency Offset)
- MRTIE/LMRTIE (Maximum Relative Time Interval Error/Latest Maximum Relative Time Interval Error)
- TIE (Time Interval Error)
- TDEV (Time Deviation)
- SPRD (Spread)
- BER (Bit Error Rate Count) — firmware versions R3833C and later
- BPVC (Bi-Polar Violation Count) — firmware versions R3833C and later
- Setting Up/Displaying Measurement Properties
- Displaying Measurements
- CTIE (Continuous Time Interval Error) — firmware versions R3851A and later

8.2.2 The system has been set up at the factory to not automatically display measurement information. You can change this by using the ED-SYNC command which is described in the section “Automatically Displaying Measurement Data” on page -16.

## 8.3 Measurement Summary

8.3.1 The 55400A continuously makes over 200 phase deviation measurements per second on each input reference. Network performance parameters based on these measurements are computed and updated periodically, and are available at any time using the RTRV-PM-TSG command. For example:

```
RTRV-PM-TSG::ITH-4:SC1::FFOFF;
```

8.3.2 This example retrieves all of the Fractional Frequency Offset measurements on input channel 4.

### **NOTE**

The phase deviation measurement results cannot be displayed.

8.3.3 Measurement time periods are either averaging time or observation time depending on the type of measurement. The following tables list the 55400A performance monitoring measurements along with the unit that is measured and the measurement time period.

**Table 8-1. TDEV Time Deviation**

Measured Unit	Measurement-Tau (Tau=averaging time)	First Data Available After	Updated Every	Includes Data From Last
<i>Single input channel</i>	TDEV-1S (1 Seconds)	98 sec	96 sec	98 sec
	TDEV-4S (4 Seconds)	392 sec	192 sec	392 sec
	TDEV-16S (16-Seconds)	1568 sec	384 sec	1568 sec
	TDEV-64S (64 Seconds)	6272 sec	768 sec	6272 sec
	TDEV-256S (256 Seconds)	25088 sec	1536 sec	25088 sec
	TDEV-1024S (1024 Seconds)	100352 sec	3072 sec	100352 sec

**Table 8-2. MRTIE Maximum Relative Time Interval Error**

Measured Unit	Measurement-t (t=observation time)	First Data Available After	Updated Every	Includes Data From Last
<i>Single input channel</i>	MRTIE-1S (1Second)	15 min	15 min	24 hours*
	MRTIE-1M (1 Minute)	15 min	15 min	24 hours*
	MRTIE-15M (15 Minutes)	15 min	15 min	24 hours*
	MRTIE-30M (30 Minutes)	30 min	15 min	24 hours*
	MRTIE-1H (1 Hour)	1 hour	15 min	24 hours*
	MRTIE-2H (2 Hours)	2 hours	15 min	24 hours*
	MRTIE-8H (8 Hours)	8 hours	15 min	24 hours*
	MRTIE-24H (24 Hours)	24 hours	15 min	24 hours*

\* if available

**Measurement Summary**

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**Table 8-3. LMRTIE Latest Maximum Relative Time Interval Error**

Measured Unit	Measurement-t (t=observation time)	First Data Available After	Updated Every	Includes Data From Last
<i>Single input channel</i>	LMRTIE-1S (1 Second)	1 sec	1 sec	1 sec
	LMRTIE-1M (1 Minute)	1 min	1 min	1 min
	LMRTIE-15M (15 Minutes)	15 min	15 min	15 min
	LMRTIE-30M (30 Minutes)	30 min	15 min	30 min
	LMRTIE-1H (1 Hour)	1 hour	15 min	1 hour
	LMRTIE-2H (2 Hours)	2 hours	15 min	2 hours
	LMRTIE-8H (8 Hours)	8 hours	15 min	8 hours
	LMRTIE-24H (24 Hours)	24 hours	15 min	24 hours

**Table 8-4. TIE Time Interval Error**

Measured Unit	Measurement-t (t=observation time)	First Data Available After	Updated Every	Includes Data From Last
<i>Single input channel</i>	TIE-1S (1 Second)	1 sec	1 sec	1 sec
	TIE-1M (1 Minute)	1 min	1 min	1 min
	TIE-15M (15 Minutes)	15 min	15 min	15 min
	TIE-30M (30 Minutes)	30 min	15 min	30 min
	TIE-1H (1 Hour)	1 hour	15 min	1 hour
	TIE-2H (2 Hours)	2 hours	15 min	2 hours
	TIE-8H (8 Hours)	8 hours	15 min	8 hours
	TIE-24H (24 Hours)	24 hours	15 min	24 hours

**Table 8-5. FFOFF Fractional Frequency Offset**

Measured Unit	Measurement-t (t=averaging time)	First Data Available After	Updated Every	Includes Data From Last
<i>Single input channel</i>	FFOFF-3S (3 Seconds)	3 sec	1 sec	3 sec
	FFOFF-12S (12 Seconds)	12 sec	4 sec	12 sec
	FFOFF-48S (48 Seconds)	48 sec	16 sec	48 sec
	FFOFF-192S (192 Seconds)	192 sec	64 sec	192 sec
	FFOFF-768S (768 Seconds)	768 sec	256 sec	768 sec
	FFOFF-3072S (3072 Seconds)	3072 sec	1024 sec	3072 sec

**Table 8-6. SPRD Frequency Spread Between Channels**

Measured Unit	Measurement-t (t=averaging time)	First Data Available After*	Updated Every*	Includes Data From Last*
<i>All input channels</i>	SPRD-3S (3 Seconds)	(1)	(1)	(1)
	SPRD-12S (12 Seconds)	(1)	(1)	(1)
	SPRD-48S (48-Seconds)	(1)	(1)	(1)
	SPRD-192 (192 Seconds)	(1)	(1)	(1)
	SPRD-768S (768 Seconds)	(2)	(2)	(2)
	SPRD-3072S (3072 Seconds)	(2)	(2)	(2)

\* (1) Because SPRD depends on FFOFF measurements from multiple channels, 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, 12, 48, and 192 seconds, SPRD will be updated about once per minute.

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

## 8.4 FFOFF

8.4.1 The Fractional Frequency Offset (FFOFF) measurement, reported in units of ppm, is performed on an input channel. It measures the input channel's Fractional Frequency Offset at specific averaging time intervals. (See definition of FFOFF in the *55400A SSU System Manual*.) You can request the system to display FFOFF data by using the RTRV-PM-TSG command. For example:

```
RTRV-PM-TSG:::ITH-4:SC1::FFOFF;
SSU 95-09-05 12:07:38
M SC1 COMPLD
"ITH1-4:FFOFF-3S,2.000000,COMPL"
"ITH1-4:FFOFF-12S,2.000000,COMPL"
"ITH1-4:FFOFF-48S,2.000000,COMPL"
"ITH1-4:FFOFF-192S,2.000000,COMPL"
"ITH1-4:FFOFF-768S,NA,NA"
"ITH1-4:FFOFF-3072S,NA,NA"
;
```

8.4.2 The example shows the FFOFF values that have been calculated for averaging times of 3, 12, 48, 192 seconds. In the example, the values for averaging times of 768 and 3072 seconds are not yet available. They will become available as the unit continues to collect data. The <AID> field indicates that this data was collected by the ITH card 1.

---

**NOTE**

1-minute values are only available in firmware versions R3833 and later.

---

## 8.5 MRTIE/LMRTIE

8.5.1 The Maximum Relative Time Interval Error (MRTIE) measurement, reported in units of ns, is performed on an input channel. It measures the input channel's Maximum Relative Time Interval Error at specific time intervals. (See definition of MRTIE and LMRTIE in the *55400A SSU System Manual*.)

8.5.2 MRTIE values from 1 second to 24 hour observation times are available every 15 minutes. For LMRTIE, the 1 second data is available after 1 second and is updated each 1 second.

---

**NOTE**

1-minute values are only available in firmware versions R3833 and later.

8.5.3 MRTIE is measured by stepping a window of size "Observation Time" through a block of data. Block size is 24 hours (or less if 24 hours of data is not yet available) and is known as the Measurement time. For Observation Time = 1 second, the step size is 1 second. For Observation Time = 1 minute, the step size is 1 minute. For all other times, the step size is 15 minutes. The results are updated every 15 minutes. It is also possible to view the MRTIE for just the last step of the window of data. This measurement is called LMRTIE (for Latest MRTIE).

### Example

- 1:00 p.m.—The "Latest 1-hour-MRTIE" (LMRTIE) value is produced at 1:00 p.m. and represents the maximum phase deviation range in nanoseconds for that input measured from noon to 1:00 p.m.
- 1:00 to 1:15 p.m.—MRTIE is the maximum of the corresponding LMRTIE values over the last 24 hours assuming data has been collected for at least 24 hours. It is available for interrogation from 1:00 to 1:15 p.m. by using the RTRV-PM-TSG command.
- 1:15 p.m.—A new 1-hour LMRTIE value based on phase data between 12:15 to 1:15 p.m. is produced, and accordingly, a new 1-hour MRTIE. The old 1-hour MRTIE is lost unless interrogated and recorded.

Similarly, MRTIE for other observation times are produced simultaneously. The 1-second LMRTIE, useful for transient error detection, is available every second, and the 1-minute LMRTIE is available every minute. Each MRTIE comes from processing over 17 million raw phase data. You can display MRTIE/LMRTIE data by using the RTRV-PM-TSG command. For example:

```
RTRV-PM-TSG::ITH-4:SC1::MRTIE;
SSU 98-09-05 12:07:38
M SC1 COMPLD
"ITH1-4:MRTIE-1S,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-1M,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-15M,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-30M,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-1H,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-2H,NA,NA,, ,75-MIN"
"ITH1-4:MRTIE-8H,NA,NA,, ,75-MIN"
"ITH1-4:MRTIE-24H,NA,NA,, ,75-MIN"
;
```

The example indicates that MRTIE data has been collected over the past 75 minutes (known as 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, 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 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. MRTIE is only updated at 15-minute intervals.

---

**NOTE**

Once the measurement time reaches 24 hours, data older than 24 hours will be lost as new data is collected. The <aid> field indicates that this data was collected by the ITH card 1.

---



---

## 8.6 TIE

8.6.1 Whereas MRTIE and LMRTIE are based on the maximum phase deviation over an interval of time, TIE simply represents the *net* phase deviation over the interval. 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.

8.6.2 For example, a 1-minute TIE measurement is simply 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.

8.6.3 To display TIE measurements use the RTRV-PM-TSG command with the TIE qualifier. For example:

```
RTRV-PM-TSG::ITH-0:SC1::TIE;
<IP SC1
<
SSU 99-02-25 08:02:23
M SC1 COMPLD
"ITH1-4:TIE-1S,2.000000,COMPL"
"ITH1-4:TIE-1M,2.000000,COMPL"
"ITH1-4:TIE-15M,2.000000,COMPL"
"ITH1-4:TIE-30M,NA,NA"
"ITH1-4:TIE-1H,NA,NA"
"ITH1-4:TIE-2H,NA,NA"
"ITH1-4:TIE-8H,NA,NA"
"ITH1-4:TIE-24H,NA,NA"
;
```

---

**NOTE** TIE measurements are supported in firmware revisions R3833 and higher. However, these measurements are actually available (with very minor differences) in all earlier release of the code.

---



---

**NOTE** See also "CTIE" on page -19.

---

---

## 8.7 TDEV

8.7.1 The Time Deviation TDEV measurement, reported in units of ns, is performed on an input channel. It measures the input channel's RMS value of second difference of phase deviation expressed in time units for various averaging times. (See definition of TDEV in the *55400A SSU System Manual*.)

8.7.2 The mathematical formula for TDEV computation is based on Type II of the "Efficient Algorithms for Computing Time Variance (TVAR) and Time Deviation (TDEV) by Marc A. Weiss and Doug Zirkie", adapted for continuous data stream.

8.7.3 TDEV values are computed based on 98 average phase deviation values separated by  $\tau$ , 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. Like MRTIE, overlapping data enables TDEV values to be available for interrogation at a higher rate. You can display TDEV data by using the RTRV-PM-TSG command. For example:

```
RTRV-PM-TSG::ITH-4:SC1::TDEV;
SSU 95-09-05 12:07:38
M SC1 COMPLD
"ITH1-4:TDEV-1S,2.000000,COMPL"
"ITH1-4:TDEV-4S,2.000000,COMPL"
"ITH1-4:TDEV-16S,2.000000,COMPL"
"ITH1-4:TDEV-64S,2.000000,COMPL"
"ITH1-4:TDEV-256S,NA,NA"
"ITH1-4:TDEV-1024S,NA,NA"
;
```

8.7.4 The example shows the TDEV values have been calculated for averaging times of 1, 4, 16, 64 seconds. The values for 256 and 1024 seconds are not yet available. They will become available as the unit continues to collect data. The <aid> field indicates that this data was collected by the ITH card 1.

---

## 8.8 SPRD

8.8.1 The Frequency Spread SPRD measurement, reported in units of ppm, measures the Frequency Spread of the input channels at specific averaging times. SPRD is the maximum difference of FFOFF over all channels unless some channels have been excluded from the measurement by using the ED-EQPT command with the SPRDCHN keyword. If a FFOFF measurement is not yet available on a channel (e.g., if no signal is connected), then that channel will be automatically excluded until a FFOFF measurement is available. (See definition of SPRD in the *55400A SSU System Manual*.)

---

### NOTE

For performance monitoring, it is recommend to use SPRD, rather than FFOFF as this gives a view of relative performance across all channels. If a problem is observed (SPRD too large), then FFOFF values for individual channels may be useful in diagnosing the problem.

SPRD is recalculated if a measurement is restarted (INIT-REG command) on a channel that is included in the SPRD calculation.

---

8.8.2 You can display SPRD data by using the RTRV-PM-TSG command. For example:

```
RTRV-PM-TSG::ITH:SC1::SPRD;
SSU 95-09-05 12:07:38
M SC1 COMPLD
"ITH1:SPRD-3S,2.000000,COMPL"
"ITH1:SPRD-12S,2.000000,COMPL"
"ITH1:SPRD-48S,2.000000,COMPL"
"ITH1:SPRD-192S,2.000000,COMPL"
"ITH1:SPRD-768S,NA,NA"
"ITH1:SPRD-3072S,NA,NA"
;
```

8.8.3 The example shows SPRD values have been calculated for observation times of 3, 12, 48, 192 seconds. The values for observation times of 768 and 3072 seconds are not yet available. They will become available as the unit continues to collect data.

---

### NOTES

The <aid> field does not specify a channel when requesting SPRD data.

For firmware versions prior to R3833, responses including SPRD information showed ITH1-0 or ITH2-0. In R3833 or later, SPRD information shows ITH1 or ITH2.

---

## 8.9 BERC

8.9.1 BERC (Bit Error Rate Count) measurement property allows you to measure the number of bit errors that occur during the specified intervals. BERC is only available if `FORMAT = E1`.

8.9.2 The method of measuring BERC depends on whether `CRC4 = Y` or `N`, and the desired threshold value may be different depending on this keyword.

BERC is only available in firmware versions R3833C and later.

8.9.3 To display BERC measurements used the `RTRV-PM-TSG` command with the BERC qualifier. For example:

```
RTRV-PM-TSG::ITH-3:SC1::BERC;
<IP SC1
<
SSU 99-02-25 08:45:22
M SC1 COMPLD
"ITH1-3:BERC-1S,0.000000,COMPL"
"ITH1-3:BERC-1M,0.000000,COMPL"
"ITH1-3:BERC-15M,0.000000,COMPL"
;
```

## 8.10 BPVC

8.10.1 BPVC (Bi-Polar Violation Count) measurement property allows you to measure the number of bi-polar violations that occur during the specified intervals. BPVC is only available if `FORMAT = E1`.

BPVC is only available in firmware versions R3833C and later.

8.10.2 To display BPVC measurements used the `RTRV-PM-TSG` command with the BPVC qualifier. For example:

```
RTRV-PM-TSG::ITH-3:SC1::BPVC;
<IP SC1
<
SSU 99-02-25 08:48:21
M SC1 COMPLD
"ITH1-3:BPVC-1S,0.000000,COMPL"
```

```
"ITH1-3:BPVC-1M,0.000000,COMPL"
"ITH1-3:BPVC-15M,0.000000,COMPL"
```

```
;
```

---

## 8.11 Setting Up/Displaying Measurement Properties

8.11.1 You can specify measurement properties that determine how measurement results affect system operation. The system is configured at the factory with default settings for all of the following measurement properties:

THR-n = threshold value (specific to the type of measurement)

n = nanoseconds for TDEV (range 0 to 800,000 ns) (Default = 0)

n = nanoseconds for MRTIE (range 0 to 1,900,000,000 ns) (Default = 0)

n = nanoseconds for LMRTIE (range 0 to 1,900,000,000 ns) (Default = 0)

n = ppm (parts per million) for SPRD (range 0 to 7,300,000 ppm)  
(Default = 0)

n = ppm (parts per million) for FFOFF (range 0 to 7,300,000 ppm)  
(Default = 0)

CRI-y/n — Yes/No to use in the input selection criteria (Default = N)

**Note:** *CRI cannot be set to Y for SPRD measurements.*

RPT-y/n — Yes/No to generate an event when a threshold is crossed in either direction (Default = N)

PM-y/n — Yes/No to automatically display each new measurement as it occurs (Default=N) Must also set up AUTOPM to use this. See chapter .

GOOD-n — Number of consecutive good measurements that must occur following a bad measurement. This property is available for all measurements. GOOD has no effect unless the property CRI = Y. (Default = 1). See explanation below for details on the GOOD measurement property.

---

### **NOTE**

In most cases, you would not want to set both CRI and RPT to Y. Although it is allowable to do so, you would get duplicate reports.

### 8.11.1.1 *GOOD Property Explained*

The GOOD (Number of Good Measurements Required) measurement property allows you to specify the 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. This property is available for all measurements. GOOD has no effect unless the property CRI = Y.

GOOD is only available in firmware versions R3833C and later.

The range of GOOD is 1 to 15, with a default of 1.

Changes to the value of GOOD will take effect as soon as the next measurement is completed. However, a channel that is already qualified will not be disqualified as the result of increasing the value of GOOD.

In the following example, the 15-minute MRTIE measurement must complete 3 times with results within the set threshold of 50 ns before the input signal can be qualified.

```
ED-SYNC::ITH-3:::MRTIE-15M=THR-50&CRI-Y&RPT-Y&PM-Y&GOOD-3;
```

You can change these settings by using the ED-EQPT or ED-SYNC command for your particular system needs.

### 8.11.1.2 *Changing Measurement Properties*

If you want to change the default measurement settings for a particular input channel, use the ED-SYNC command. For example:

```
ED-SYNC::ITH-3:SC1:::LMRTIE-15M=THR-500&CRI-Y&RPT-Y&PM-Y&GOOD-4;
```

This example specifies the LMRTIE-15M threshold to be 500 nanoseconds (THR-500) for input channel 3. In addition it tells the system to automatically display (PM-Y) the measurement every 15 minutes (as it occurs). If the threshold is exceeded, display an Automatic Message (RPT-Y) and disqualify this channel as an input reference (CRI-Y). Following a disqualification, require 4 good measurements consecutively before req-qualifying (GOOD-4).

```
ED-EQPT::ITH-3:SC1:::SPRD-12S=THR-500&RPT-Y&PM-Y;
```

This example specifies the SPRD-12S threshold to be 500 nanoseconds (THR-500) for input channel 3. Display the measurement every 15 minutes (as it occurs). If the threshold is exceeded, display an Automatic Message (RPT-Y).

---

#### **NOTE**

SPRD cannot be used to disqualify an input channel. Therefore, CRI will always be N.

---

### ***8.11.1.3 Displaying Measurement Properties***

You can find out what measurement criteria is currently active for a particular input channel by using a TL1 command. For example:

```
RTRV-SYNC::ITH-0:SC1:::PARAMETER=MRTIE-1S;  
  
SSU 96-03-01 14:00:32  
  
M SC1 COMPLD  
  
"ITH-0::MRTIE-1S = THR-0.000&CRI-N&RPT-N&PM-N&GOOD-1:"  
  
;
```

This example response shows that no threshold value has been set up for MRTIE-1S (THR-0). Also if this threshold is exceeded, do not use this measurement for input channel selection (CRI-N), do not display an Automatic Message (RPT-N), and do not automatically display performance monitoring information (PM-N). Re-qualify on first good measurement (GOOD-1).

---

## 8.12 Displaying Measurements

8.12.1 Measurements can be displayed automatically by the system or on your command. The system is shipped from the factory configured to *not* display measurement data automatically. Therefore, if you want performance measurements for a particular input channel to automatically display when they are calculated, you must:

- Set up the measurement criteria for the input channel (see above).
- Set up automatic uploading of active performance measurements (next section).

### 8.12.1.1 Automatically Displaying Measurement Data

You can set up the system to automatically display measurement data when calculated for a particular input channel. For example:

```
ED-SYNC::ITH-0:SC1:::AUTOPM=Y;
SSU 96-03-01 14:52:10
M SC1 COMPLD
;
```

This example tells the system to automatically display measurement data for input channel 0 (PRC) when the data is calculated.

The specific data to be displayed is determined by the PM property of each measurement. The primary purpose of the AUTOPM keyword is to allow disabling of all automatic measurement uploads from a channel, without the need to turn off the PM property on each indicated measurement.

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

- The AUTOPM keyword 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

For example, the following command will turn on automatic uploading of LMRTIE-15M data for input channel 3.

```
ED-SYNC::ITH-3:SC1:::AUTOPM=Y,LMRTIE-15M=PM-Y;
```

The AUTOPM keyword allows you to enable/disable all uploads from a particular channel while the PM property allows you to specify exactly which measurement results are desired.



**Data Uploading**

For TDEV, FFOFF, and SPRD measurements, data is uploaded as soon as new data is generated. Note that in the case of FFOFF-3S new data is generated every 1 second, so this will generate a great deal of data over the TL1 interface.

**Note**

It is easily possible to request uploading of more data than the communications channels can handle. If this occurs, some upload reports may be lost. The problem is more likely to occur if you request automatic uploading of data at one second intervals.

To assist in avoiding this problem, LMRTIE, MRTIE, and TIE 1 second measurements can be reported at 1-minute and 15-minute intervals, rather than every second. For these measurements, enabling automatic reporting on the 1-minute and 15-minute values also will cause the 1 second values to be reported along with the 1-minute and 15-minute values, even though 1 second data is not explicitly enabled for automatic reporting. If you explicitly enable reporting of the 1 second data, then it will be uploaded every second (except for MRTIE, which is only calculated at 15-minute intervals).

**8.12.1.2 Manually Displaying Measurement Data**

You can request the system to display measurement data when needed by using the RTRV-PM-TSG command. For example:

```
RTRV-PM-TSG: : ITH-4 : SC1 : : MRTIE ;
SSU 95-09-05 12:07:38
M SC1 COMPLD
"ITH1-4:MRTIE-1S,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-1M,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-15M,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-30M,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-1H,2.000000,COMPL,, ,75-MIN"
"ITH1-4:MRTIE-2H,NA,NA,, ,75-MIN"
"ITH1-4:MRTIE-8H,NA,NA,, ,75-MIN"
"ITH1-4:MRTIE-24H,NA,NA,, ,75-MIN"
;
```

The example indicates that MRTIE data has been collected over the past 75 minutes (known as 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, 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 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.

---

**NOTE**

---

Once the measurement time reaches 24 hours, data prior to 24 hours will be lost as new data is collected. The <aid> field indicates that this data was collected by the ITH card 1.

***8.12.1.3 Manually Restarting Measurements***

Measurements can be restarted using the INIT-REG (Initialize Register) command. This feature is useful if an input has been disqualified because of a performance measurement, but the input signal problem has since been corrected. Restarting the measurements manually will erase the bad measurement data, which may cause the input to re-qualify much more quickly.

---

## 8.13 CTIE

### Only Available in Firmware Versions R3851B and Later

The CTIEENB keyword and CTIE measurements are available only in firmware versions R3851B and later, and **only possible when using the Option 004 Expanded Memory NIMC Card.**

8.13.1 CTIE (Continuous Time Interval Error) provides the ability to capture up to 24 hours of consecutive filtered TIE measurements (see “TIE” on page -9). After 24 hours, the memory “wraps around” with new TIE measurements, replacing the earliest. The CTIE measurement is based on 10 Hz filtered data, whereas the TIE measurement is based on unfiltered data.

---

#### NOTE

The phase data for CTIE calculations is digitally filtered using a 10 Hz low-pass filter. Data for TIE measurements is not filtered.

#### 8.13.1.1 Capturing Data

You must specify, using the CTIEENB keyword with the ED-SYNC-TSG command, which channels are to save CTIE data. Because 24 hours of 1-second data requires saving 86400 data points, it is only possible to enable up to 8 channels for CTIE.

---

#### NOTE

By setting MXCCN to less than 8, more than 24 hours of data can be captured.

#### 8.13.1.2 Retrieving Data

The save CTIE data (the Continuous TIE history) can be retrieved by using the RTRV-PM-HIST command with CTIE qualifier. See RTRV-PM-HIST in Chapter .

8.13.2 In the following example, the RTRV-PM-HIST command includes a starting date.

```
RTRV-PM-HIST::ITH-0:SC2::CTIE,,,,,30,99-02-18,10-42-30;
```

```
MINI SSU 99-02-18 10:43:56
M SC2 COMPLD
"ITH1-0:CTIE,,,,,30,99-02-18,10-42-30"
"1:0"
"2:0"
"3:0"
"4:0"
"5:0"
"6:0"
```

```

"7:0"
"8:0"
"9:0"
"10:0"
"11:0"
"12:0"
"13:0"
"14:2"
"15:-2"
"16:0"
"17:0"
"18:0"
"19:0"
"20:0"
"21:2"
"22:-2"
"23:0"
"24:0"
"25:0"
"26:0"
"27:0"
"28:0"
"29:0"
"30:0"
;

```

8.13.3 In the following example, the RTRV-PM-HIST command has no starting date.

```
RTRV-PM-HIST::ITH-0:SC3::CTIE,,,,,30,,;
```

```

MINI SSU 99-02-18 10:44:08
M SC3 COMPLD
"ITH1-0:CTIE,,,,,30,99-02-18,10-43-00"
"31:0"
"32:0"

```

"33:0"  
"34:2"  
"35:-2"  
"36:0"  
"37:0"  
"38:2"  
"39:-2"  
"40:0"  
"41:2"  
"42:-2"  
"43:0"  
"44:0"  
"45:0"  
"46:0"  
"47:0"  
"48:2"  
"49:-2"  
"50:0"  
"51:0"  
"52:0"  
"53:0"  
"54:0"  
"55:0"  
"56:0"  
"57:0"  
"58:2"  
"59:-2"  
"60:0"  
;

**CTIE Data is Only Saved From the Active ITH Card**

CTIE is only saved from the active ITH card. The display of the data will indicate which ITH card provided the data. If a switch in active ITH cards occurred, the output data will be provided in multiple blocks (using the RTRV header) to correctly indicate the ITH card.

Because neither the phase samples nor the 1-second measurement intervals are synchronized between the ITH cards, a switch in active ITH cards can cause an offset in the captured data at the time of the switch. Although this will generally be a relatively minor error, you should note the occurrence of a switch in active ITH cards when analyzing CTIE data.



---

## 9.1 Chapter Contents

9.1.1 This chapter provides information on what is needed to support modem control of a remotely located 55400A Synchronization Supply Unit (SSU). It includes some technical information on implementation of modem support in the SSU and the TL1 commands that are part of modem operation.

9.1.2 This chapter is organized as follows:

- Getting Started page 9-3
  - Hardware/Software Requirements page 9-3
  - Computer Requirements page 9-4
  - Customer-Supplied Cables page 9-5
  - Connecting the Modems page 9-5
  - Enabling Modem Control page 9-5
  - Initiating Communication page 9-6
  - Modem Initialization page 9-6
  - Logging On page 9-6
  - Ending Communication page 9-6
- Summary of Commands, Events, and Keywords Associated With Modem Use page 9-7
  - List of Modem Commands, Keywords, and Events page 9-7
  - Events Related to Modem Control page 9-7
  - Timeouts Related to Modem Control page 9-7
- Examples Modem Commands page 9-9
  - Supplying a User-Defined Setup String page 9-9
  - Retrieving the User-Specified Modem Setup String page 9-11
  - Forcing the Modem to be Reinitialized page 9-11
  - Setting Modem Timeouts page 9-12
- Security Considerations When Using a Modem page 9-12



---

## 9.2 Getting Started

9.2.1 This section provides information on:

- hardware/software requirements,
- computer requirements,
- customer-supplied cables,
- connecting to the SSU and PC,
- enabling modem control,
- initiating communications,
- logging on, and
- ending communication.

### 9.2.1.1 Hardware/Software Requirements

9.2.2 Ensure that you have the following items before beginning the installation of the modems.

#### Supported Modems

<b>Modem Control Feature is Only Available on the 55441A Information Management Card (IMC)</b>
------------------------------------------------------------------------------------------------

To support modem control, you will need an 55441A IMC with switch S4-4 set to the OFF position (see instructions below).
--------------------------------------------------------------------------------------------------------------------------

The 55400A recognizes and has been tested with the following two modems.

- MultiTech Systems® MT2834ZDX “MultiModemZDX” — this modem has been fully tested with the SSU, and it is recommended
- USRobotics® Sportster 28,800 DATA/FAX Modem

9.2.3 Other similar modems may work, but operation is not guaranteed. In particular, when using other modems it may be necessary for the user to specify a custom setup string.

9.2.4 You will need *two* modems, one attached to the PC and one attached to the SSU.

---

**NOTE**

If you do not use the MT2834ZDX or Sportster modem, problems may be encountered and modem operation is not guaranteed. When using other modems, it may be necessary to specify a custom setup string using a TL1 command that must be sent via the **Local** port of the SSU (see “Supplying a User-Defined Setup String” on page -9).

---

**NOTE**

The custom setup string is only allowed to be specified via the **Local** port because should a bad string be provided, the modem may not initialize properly and remote communication may not be possible.

The following 55400A items are needed to support modem control:

- 55441A Information Management Card (IMC) with firmware revision 3703E, or later

**To determine firmware revision number, send the TL1 command:**

```
RTRV-NETTYPE-ALL:::SSU1;
```

Then, observe the information retrieved for the IMC.

- A switch must be set on the 55441A IMC to support modem operation (described below under Enable Modem Control)

**Default Communication Parameters for SSU**

The default communication parameters of the 55400A **Remote Comm Port** are as shown below (These values are set by switches on the 55441A card. The switch settings and locations are documented in the *55400A SSU System Manual*.):

- Baud rate = 9600
- Data bits = 8
- Stop bits = 1
- Parity = None
- Flow control = None
- Echo = Yes

**9.2.4.1 Computer Requirements**

The computer used for modem control should include the *installed device driver* for the attached modem.

**9.2.4.2 Customer-Supplied Cables**

You will need to supply the following cables:

- a *serial cable* to connect from PC serial port to modem: 9-pin female to 25-pin male serial cable,
- two *telephone cables* to connect from modems to telephone jack, and
- a *serial cable (straight-through)* to connect from SSU **Remote Comm Port** to modem: 25-pin male to 25-pin male.

**9.2.4.3 Connecting the Modems**

Two modems of the recommended type are needed to support modem control of the 55400A SSU.

1. Connect one modem to the **Remote Comm Port** of the 55400A SSU using a straight-through 25-pin serial communications cable (described above).
2. Connect a second modem to the PC using a 9-pin to 25-pin serial communications cable (described above).

**Table 9-1. Signals Used for Modem Connection**

Signal Name	Abbreviation	Remote Comm Port Connector
Signal Ground	COM	Pin 7
Transmitted Data	TD	Pin 2
Received Data	RD	Pin 3
Request to Send	RTS	Pin 4
Clear to Send	CTS	Pin 5
Data Set Ready	DSR	Pin 6
Carrier Detect	CD	Pin 8

**9.2.4.4 Enabling Modem Control**

There is a switch setting on the 55441A IMC that enables modem control for the Remote Comm Port of the 55400A.

1. Remove the IMC card.
2. Set switch S4-4 to the OFF position. This enables modem control via the Remote Port.
3. Reinsert IMC card.

### ***9.2.4.5 Initiating Communication***

Before communication between the PC and the SSU can take place, the SSU modem must first be initialized. With the IMC switch set to enable Modem Control, as described above, the 55400A will attempt to initialize the attached modem in the following situations:

- When power is first applied to the IMC (assumes that a modem is attached and not already communicating with a remote modem).
- When a modem is newly attached to the Remote Comm Port or whenever power is applied to the modem.
- Whenever a connection to the SSU modem ends.
- Periodically, as specified by the Modem Reset keyword. Whenever there is no remote connection established, this control keyword sets the time between 55400A-generated initializations of the attached modem. The Modem Reset keyword is explained later in this document.

### ***9.2.4.6 Modem Initialization***

If successful, the initialization will leave the modem in the Auto Answer mode, and the SSU will stop sending all automatic output messages to the Remote Comm Port. Otherwise these messages could interfere with the modems attempt to auto answer calls from a remote modem. When an incoming call is received, the modem will answer and establish communication with the remote modem. At this point, normal port operation will be re-enabled, and the SSU will make automatic output messages available over the Remote Comm Port.

### ***9.2.4.7 Logging On***

Use the PC modem application to establish communication with the SSU. Assuming that security has been enabled in the 55400A, once a connection is established it is normally necessary to first enter a user name and password to gain access to the 55400A.

---

**NOTE**

By default, you have 60 seconds to log in after establishing a connection. This value can be changed using the TL1 keyword MDMLOGIN. It is explained later in this document.

---

### ***9.2.4.8 Ending Communication***

When the connection to the remote modem is ended, or lost, the attached modem will hang up the phone line and reinitialize itself. If the user did not log off of the 55400A before ending the connection, an automatic logoff will be performed by the 55400A.

---

## 9.3 Summary of Commands, Events, and Keywords Associated With Modem Use

9.3.1 The following commands, events, and keywords are associated with modem. Examples of these commands are described in “Examples Modem Commands” on page -9.

### 9.3.1.1 *List of Modem Commands, Keywords, and Events*

Commands:

```
SET-MODEM
RTRV-MODEM
```

Keywords:

```
MDMLOGIN
MDMLOGOUT
MDMRESET
```

Events:

```
MODMRDY          Modem ready at remote port
MODMONL          Modem online at remote port
```

### 9.3.1.2 *Events Related to Modem Control*

9.3.2 Two new event types (evttype) are defined for indicating the state of the modem:

```
MODMRDY          Modem ready at remote port
MODMONL          Modem online at remote port
```

9.3.3 These state events have the following properties:

```
ALM = NONE
LOG = N
```

9.3.4 These properties are not user configurable.

### 9.3.4.1 *Timeouts Related to Modem Control*

9.3.5 The following three modem related keywords have been defined for use with the ED-EQPT-TSG command:

**Modem Use**

MDMLOGIN  
MDMLOGOUT  
MDMRESET

**Login Timeout**

The MDMLOGIN keyword sets the approximate time in seconds allowed for a user to successfully log in following the establishment of communications via a modem. If no login is completed within this time the 55400A will attempt to break the connection (hang up). A value of zero for this keyword disables this feature (not recommended—see security discussion, below) so that the unit will not hang up even if no login occurs. The default value is 60 seconds.

**Logout Timeout**

The MDMLOGOUT keyword sets the approximate time in seconds following a logout before the 55400A attempts to break the connection (hang up) unless a new login occurs. A value of zero for this keyword disables this feature, and the unit will not hang up following a logout. The default value is zero (disabled).

**Modem Reset Time**

The MDMRESET keyword sets the approximate time in seconds between periodic reinitializations of the modem, when no remote connection is established. A value of zero disables this feature (no periodic reinitializations). The default value is 600 seconds (10 minutes).

**Unattended Modem Initializations**

Because the 55400A may be installed in unattended locations, several means are provided to reinitialize the modem should a power loss or other transient condition cause the modem to lose its setup:

- The built-in modem command strings cause the setup to be stored in the modem's nonvolatile RAM and set the modem to reload these values when power is applied. It is recommended that any user-supplied string do the same.
- Whenever a connection is broken, as would likely happen during even a momentary power loss or other transient event, the modem will reinitialize once power is restored.
- Whenever the 55400A detects that power to the modem is removed and then restored the modem will be reinitialized (if power is removed for less than about one second the 55400A may not detect the loss of power).
- While the modem is waiting for an incoming call, it will reinitialize periodically as specified by the MDMRESET keyword. Using a small value for this keyword reduces the time required for setup problems to be corrected, but increases the likelihood that the modem will be in the midst of a reinitialization when an incoming call is received.

---

## 9.4 Examples Modem Commands

9.4.1 This section provides example modem commands.

### 9.4.1.1 *Supplying a User-Defined Setup String*

<b>User-Defined Setup Strings</b>
-----------------------------------

This form of the command can only be executed from the <b>Local</b> (TL1) port.
---------------------------------------------------------------------------------

**To specify the string: AT &F8 &F E &d &E13 &Q1 &S &SF1 S0=1 &W:**

Example SET-MODEM-TSG:::ABC001::AT &F8 &F E &d &E13 &Q1 &S &SF1 S0=1 &W;

Syntax See “Syntax Details” below.

**To return to using the built-in setup strings:**

Example SET-MODEM-TSG:::ABC001::DEFAULT;

Syntax See “Syntax Details” below.

**While using the default strings, to return to using the most recently specified user string:**

Example SET-MODEM-TSG:::ABC001::USER;

Syntax SET-MODEM:::ctag::mdmstr;

Details

where:

mdmstr:

DEFAULT

USER

usrstr

usrstr:

An arbitrary string of up to 60 ASCII characters starting with AT.

---

**NOTE**

As with other 55400A TL1 commands, the -TSG suffix may be omitted from the command name; that is, SET-MODEM may be used instead of SET-MODEM-TSG. The meaning is the same.

---

**Note on the Setup Process When Using a User-Specified String****Caution**

If a bad string is provided, the modem may not initialize properly and communication may not be possible.

*If a bad string is provided, the modem may not initialize properly and communication may not be possible.* For this reason, the string may only be specified via the Local Port, and it is strongly recommended that proper operation be tested before relying on remote dial-in communications. (If the string could be changed via the Remote Port it is possible that a user might specify an incorrect string, disconnect, and then not be able to re-connect to correct the string.

Even though a user defined string is specified, the 55400A first sends two simple initialization strings to the modem prior to sending the user defined string. These strings include only very common commands that are quite generally recognized by modems. The strings are:

ATZ

ATE0Q0V1

The ATZ command resets the modem. Because it may erase the modem's command buffer it must be the last command on the line. Thus it is not possible for a user to include the Z command in their command string. The user may, however, be assured that the ATZ command was sent before their command string. Note that the exact effect of ATZ varies between different modems!

The AT E0 Q0 V1 string performs the following operations:

E0 Turns off echoing of commands sent to the modem

Q0 Enables the modem for sending result codes to the 55400A

V1 Specifies that result codes are to be in text (not numeric) format

These commands overcome some possible effects of modem switch settings, and establish conditions necessary for proper operation of the 55400A modem control firmware.



### 9.4.1.2 Retrieving the User-Specified Modem Setup String

**To retrieve the user-specified modem setup string:**

Example RTRV-MODEM-TSG:::ABC001;

Syntax RTRV-MODEM-TSG:::ctag;

Example of the response:

```
SSU 96-03-29 16-37-08
M ABC001 COMPLD
"USER:AT &F8 &F E &d &E13 &Q1 &S &SF1 S0=1 &W"
;
```

Example of the response if the built-in strings are enabled:

```
SSU 96-03-29 16-37-08
M ABC001 COMPLD
"DEFAULT:"
;
```

### 9.4.1.3 Forcing the Modem to be Reinitialized

#### Forced Reinitialization

This form of the command can be executed from either port.

**To force a reinitialization of the modem:**

Example SET-MODEM-TSG:::ABC001;

Syntax SET-MODEM-TSG:::ctag;

---

**NOTE** As with other 55400A TL1 commands, the -TSG suffix may be omitted from the command name, i.e., SET-MODEM may be used instead of SET-MODEM-TSG. The meaning is the same.

---

If the modem is not currently connected to a remote modem (i.e., communications are not established), this command causes the modem to be reinitialized immediately. Otherwise, the reinitialization will be delayed until the connection is broken, i.e., when a hangup occurs (note that a reinitialization will occur upon hangup regardless of whether this command has been executed).

#### 9.4.1.4 Setting Modem Timeouts

**To set the Modem Login time to 2 minutes (120 seconds):**

Example     ED-EQPT-TSG:::ABC001:::MDMLOGIN=120;

**To set the Modem Logout time to 1 minutes (60 seconds):**

Example     ED-EQPT-TSG:::ABC001:::MDMLOGOUT=60;

**To set the Modem Reset time to 30 minutes (1800 seconds):**

Example     ED-EQPT-TSG:::ABC001:::MDMRESET=1800;

**To retrieve the modem timeout parameters:**

Example     RTRV-EQPT-TSG:::ABC001:::PARAMETER=MDMLOGIN&MDMLOGOUT&MDMRESET;

---

## 9.5 Security Considerations When Using a Modem

9.5.1 When using a public dial-in system extra attention should be paid to system security. The following are several suggestions:

- Be certain the Security switch on the IMC card is in the Enabled position and security access levels have been established. (Refer to the *55400A SSU System Manual*.)
- Set the value of the MDMLOGIN keyword to allow sufficient time for an authorized user to complete a login following establishment of a connection, but without allowing too much excess time. This reduces the ability of an unauthorized person to tie up the modem connection without logging in, and helps frustrate attempts at breaking in through random passwords. The default is 60 seconds.
- The use of the MDMLOGOUT keyword depends on the expected operation of the system. Unlike the MDMLOGIN time, MDMLOGOUT time only applies after a user has been successfully logged in. Therefore the validity of the connection should already have been established. With some operating systems the user may wish to logout without breaking the connection (for example, to still receive automatic messages), and for these cases the default MDMLOGOUT value of zero (disabled) is useful. In other cases the system administrator may want to require that the connection be broken following a logout.



---

## 10.1 Chapter Contents

10.1.1 This chapter provides information on standard LAN, X.25 LAN (Option 002), TP4 LAN (Option 003), and the network parameters.

10.1.2 This chapter is organized as follows:

- LAN Network Interfaces page 10-3
  - About the LAN Network Parameters page 10-4
  - Working and Auxiliary Memories Explained page 10-4
  - IP Addresses and Port Numbers Explained page 10-4
- NIMC LAN (Standard) page 10-4
  - Set the Initial LAN Parameters page 10-6
  - Summary of Steps to Change Network Parameters page 10-7
  - Configure the LAN Interface Port page 10-7
  - Network Parameters Set Directly page 10-11
- NIMC X.25 Interface (Option 002) page 10-13
  - X.25 Interface Specifications page 10-13
  - Items Needed for X.25 Network Operation page 10-14
  - Network Manager and 55400A Units in an X.25 Network page 10-15
  - 55400A Remote Comm Port Pin Assignments for X.25 Option page 10-16
  - List of X.25 Network Parameters page 10-16
  - Set the Initial X.25 Network Parameters page 10-19
  - Summary of Steps to Change Network Parameters page 10-20
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- NIMC TP4 Interface (Option 003) page 10-25
  - Set the Initial TP4 Parameters page 10-25
  - Summary of Steps to Change Network Parameter page 10-27
  - Configure the TP4 Interface Port page 10-27
- Configuring the SSU for 55452A OSMF for UX Operation page 10-30

---

## 10.2 LAN Network Interfaces

10.2.1 The Network IMC (NIMC) card makes it possible to install the SSU on a network and manage it from a remote location.

10.2.2 The following network interfaces are available:

- standard LAN,
- X.25 Interface (Option 002), or
- TP4 Interface (Option 003).

10.2.3 Each of the network interfaces are discussed in detailed in this chapter.

10.2.4 The network version of the IMC also adds a rack alarm port described below. The LED indicators on the network card are described in the *55400A SSU System Manual*.

### **Function of the NIMC LAN Port and SSU Remote Comm Port Depends on Which NMIC Option is Used**

When using the standard 55442A (LAN) card or Option 003 (TP4) card, the LAN port is used for the network connection and the Remote Comm Port is not functional. With the Option 002 55442A (X.25), the Remote Comm Port is used for the network connection (RS-232 DTE) and the LAN port on the card is not functional.

#### ***10.2.4.1 About the LAN Network Parameters***

It is important to note that the process of setting or changing most LAN network parameters are different from the way non-network parameters are handled. This difference is intended to reduce the likelihood of accidental or incorrect settings causing interruptions in network communications. For example, if it were possible to inadvertently send the command to change the IP address of a network element, all communication with that device could be lost until on-site access could re-establish the correct settings. A dual-memory scheme, designated Working Memory and Auxiliary Memory is used to help avoid this situation (see “Working and Auxiliary Memories Explained” on page -4 for description of these memories).

In addition, changes to most network parameters force a closing of the network connection, and in some cases, even restarts the operating system in the Network IMC card. (This action erases any data stored in the automatic output log stored on the Network IMC card.)

### **CAUTION — When Changing Network Parameters**

Be extremely careful when making changes to these parameters, particularly if no access is available to the Local Port to undo any incorrect settings.

### 10.2.4.2 Working and Auxiliary Memories Explained

Most network parameters are *stored* in two separate regions of memory: the *Working (WKG) memory*, which controls actual operation of the network, and the *Auxiliary (AUX) memory*, which holds a backup copy of these parameters. The parameters in AUX memory are accessed using the same TL1 keywords as those in WKG memory *except with an X added to the name*. For example, the IP address of the Network Element is retrieved from WKG memory using the keyword IPNE, and from the AUX memory using the keyword IPNEX (see Table 10-1 on page -5).

The RTRV-EQPT-TSG command is used to view the network settings, from either the WKG or AUX memory. The ED-EQPT-TSG command is used to modify settings in the AUX memory—it cannot be used to directly modify the WKG memory. The CPY-MEM and CPY-MEM-SECU commands are used to transfer information between the two memories.

### 10.2.4.3 IP Addresses and Port Numbers Explained

The *IP addresses* (the parameters starting with IP) are of the form:

a.b.c.d

where:

a b, c, and d are each in the range 0 to 255.

**The Last Number of the Subnet Mask “d” Must be 0 or 128**

The last number of the subnet masks “d” Must be 0 or 128. Thus, 255.255.248.192 is NOT valid. But, 255.255.248.0 is valid.

Range of values for *Port numbers* are 5001 to 20000.

---

## 10.3 NIMC LAN (Standard)

10.3.1 This section describes a procedure to follow and the commands to send to prepare the SSU for connection to a standard LAN.

Table 10-1 shows a listing of the network parameters for the *standard 55442A Network IMC* card. The keywords are shown for both the working and auxiliary memories.

**Table 10-1. LAN Network Parameters for Standard 55442A NIMC**

LAN Network TL1 Keywords (type of memory)	Range of Values	Description
IPNE (WKG) IPNEX (AUX)	0.0.0.0 to 255.255.255.255	IP address of the network element.
IPSUBNET (WKG) IPSUBNETX (AUX)	0.0.0.0 to 255.255.255.xxx <sup>1</sup>	Subnetwork mask. Used for extracting the network identifier from the IP address.
IPGATE (WKG) IPGATEX (AUX)	0.0.0.0 to 255.255.255.255	IP address of default gateway.
IPEM1 (WKG) IPEM1X (AUX) IPEM2 (WKG) IPEM2X (AUX)	0.0.0.0 to 255.255.255.255	IP address of the primary and alternate element manager. The alternate address is used for event reporting in the case of communication failure to the primary element manager.
IPLM1 (WKG) IPLM1X (AUX) IPLM2 (WKG) IPLM2X (AUX)	0.0.0.0 to 255.255.255.255	IP address of the primary and alternate local manager. The alternate address is used for event reporting in the event of communication failure to the primary local manager.
PORTCMD (WKG) PORTCMDX (AUX)	5001 to 20000 <sup>2</sup>	Used to specify the port number for the command/response reporting.
PORTAO (WKG) PORTAOX (AUX)	5001 to 20000 <sup>2</sup>	Used to specify the port number for the event reporting.
INACTTIME <sup>3</sup>	0 to 10000 in units of 100 ms (0.1 s)	Sets the inactivity timer. Used to specify the length of time a connection will continue without the occurrence of an automatic output message.
AOMERGE <sup>3</sup>	Y or N	Applies only to a network manager (IPEM) connected to the LAN port. Y = Merge commands and automatic output messages on the command port, N = carry on separate ports.
SCRAMBLE <sup>3</sup>	Y or N	Applies only to a network manager (IPEM) connected to the LAN port. Y = Scramble communications from 55400A, N = do not scramble.

<sup>1</sup> The last byte of the IP subnet mask can only be set to 0 or 128 (i.e., the last 7 bits must be zero).

<sup>2</sup> DO NOT set the Command Port address and the Automatic Output Port address to the same value.

<sup>3</sup> Detailed descriptions are provided for these network parameters in Chapter 5, "TL1 Keywords," of this manual.

### ***10.3.1.1 Set the Initial LAN Parameters***

The 55442A Network IMC supports a 10Base-T LAN connection. Before testing the **LAN** port or installing the SSU on a network, the following network parameters must be set via the SSU **Local** port (the TL1 keywords are shown in parentheses):

- IP address of network element/SSU (IPNEX)
- IP subnetwork mask (IPSUBNETX)
- IP address of default gateway (IPGATEX)
- IP address of element manager (IPEM1X)
- IP address of local manager (IPLM1X)
- Command port number (PORTCMDX)
- Automatic event output port number (PORTAOX)

All network parameters that require address settings or port numbers are stored in two separate regions of Network IMC memory. The other network-related parameters are INACTTIME, AOMERGE, and SCRAMBLE, which do not use the dual-memory design.

The two areas of memory are called: Working Memory (WKG) and Auxiliary Memory (AUX). The WKG memory contains the parameter settings being used by the network, while the AUX memory holds a backup copy of these parameters. The WKG memory parameters cannot be directly set.

Any parameter modifications are first set in the AUX memory and then when you are sure the settings are correct, the CPY-MEM-SECU command is used to transfer the AUX memory to WKG memory.(See “Working and Auxiliary Memories Explained” on page -4 for more information on these memories.)

#### **Use Keyword With “X” Only When Setting or Retrieving Values for AUX Memory**

The network parameter settings in WKG memory can be accessed using the TL1 keywords listed above, without the “X.” Setting or retrieving the parameter values from AUX memory requires that an “X” be appended to the parameter keyword. For example, the IP address of the network element is retrieved from WKG memory using the keyword, “IPNE,” and from AUX memory using the keyword, “IPNEX.”

The RTRV-EQPT-TSG command is used to view the network parameter settings from either the WKG or AUX memory. Use the ED-EQPT-TSG command to modify settings in the AUX memory.

Copying the AUX memory into WKG memory forces the network connection to close, and the Network IMC operating system to be restarted. This action erases any data stored in the automatic output log.

NETTIMER1 Keyword Not Supported in Firmware Versions R3742A and later.



### ***10.3.1.2 Summary of Steps to Change Network Parameters***

1. Copy the WKG memory into the AUX memory.
2. Make changes to the network parameters in the AUX memory.
3. Verify that all parameters in AUX memory are set as desired.
4. Copy the AUX memory into the WKG memory. This will cause the network connection to be closed, and the IMC operating system will be restarted.

A detail procedure is provided in the following section.

### ***10.3.1.3 Configure the LAN Interface Port***

- 1 Copy WKG memory to AUX memory.

Example:

```
CPY-MEM::NET:ABC001::WKG,AUX;
```

“ABC001” is the correlation tag. It is an arbitrary, user-defined string of up to six alphanumeric characters used to relate commands to their responses and acknowledgments. All commands must include a valid correlation tag. It may be useful to use your initials with sequential numbers for each command. In cases where there are two users sending commands at the same time, the commands and responses belonging to each user can be easily identified.

- 2 Set the SSU IP Address in the AUX memory.

Example:

```
ED-EQPT:::ABC001:::IPNEX=15.16.17.18;
```

The IP address can be a range of values from 0.0.0.0 to 255.255.255.255. In most situations, a block of IP addresses have been reserved for your network usage. Consult with your network administrator.

- 3 Retrieve the AUX memory setting to verify a changed parameter.

Example:

```
RTRV-EQPT:::ABC001:::PARAMETER=IPNEX;
```

After setting each network parameter, it is a good idea to verify the newly modified parameter by sending the retrieve command for each parameter. In this example, the SSU IP address is retrieved.

#### 4 Set the Subnetwork Mask IP Address.

Example:

```
ED-EQPT:::ABC001:::IPSUBNETX=15.16.17.0;
```

The IP address can be a range of values from 0.0.0.0 to 255.255.255.xxx. The last byte of the IP subnet mask can only be set to 0 or 128 (i.e., the last 7 bits must be zero). Consult with your network administrator.

#### 5 Set the Gateway Address IP Address.

Example:

```
ED-EQPT:::ABC001:::IPGATEX=15.16.17.18;
```

The IP address can be a range of values from 0.0.0.0 to 223.255.255.255. Consult with your network administrator.

#### 6 Set the Element Manager IP Address.

Example:

```
ED-EQPT:::ABC001:::IPEM1X=15.16.17.18;
```

The IP address for the primary element manager (EM) can be a range of values from 0.0.0.0 to 223.255.255.255. Consult with your network manager. Additionally, the 55400A supports an IP address for an alternate element manager (IPEM2X). The SSU will use the alternate address for event reporting in case of communication failure with the primary EM.

#### 7 Set the Local Manager IP Address.

Example:

```
ED-EQPT:::ABC001:::IPLM1X=15.16.17.18;
```

The IP address for the primary local manager (LM) can be a range of values from 0.0.0.0 to 255.255.255.255. Consult with your network manager. Additionally, the 55400A supports an IP address for an alternate local manager (IPLM2X). The SSU will use the alternate address for event reporting in case of communication failure with the primary LM.

---

**NOTE**

The Local Manager IP Address parameter allows you to specify the address of a local PC connected to the LAN port of the SSU. This controller can be used to test the LAN connection during installation. Use the 55450AM remote management software to simplify this task. The PC should be configured to communicate properly with a network device. When a local manager connection is made via the

LAN port, commands and automatic event reporting is merged by default, regardless of the AOMERGE setting.

---

### 8 Set the Command Port Number.

Example:

```
ED-EQPT:::ABC001:::PORTCMDSX=7588;
```

The Command Port Number has a range of 5001 to 20000. It specifies the port for command/response reporting. When the value of the AOMERGE parameter (explained below) is set to Y, both commands and automatic event reporting will be carried on this port. The default setting is 7588.

### 9 Set the Automatic Output Port Number.

Example:

```
ED-EQPT:::ABC001:::PORTAOX=7589;
```

The Automatic Output Port Number has a range of 5001 to 20000. It specifies the port for automatic event reporting. When the value of the AOMERGE parameter (explained below) is set to N, commands and automatic event reporting will be carried on separate ports. If set to Y, then events will not be reported on this port but will instead be sent to the Command Port. The default setting is 7589.

---

**CAUTION** Executing the command, *in the following step*, to copy the network parameters may generate a MAJOR alarm. To clear the alarm, send the OPR-ACO-ALL command (alarm cutoff function). After the LAN settings are completed, the next command will copy them to working memory and cause the Network IMC card to restart.

It is essential that the set of parameters in the AUX memory be correct before issuing the example CPY-MEM-SECU command below. **IF THEY ARE NOT CORRECT**, it may become impossible to reconnect to the LAN port! In this case, it will be necessary to use the Local port to re-establish valid parameters before network communication is possible.

In some cases, if the Network IMC determines an inconsistency among the network parameters, it will attempt to restore the IPNE, IPGATE, and IPSUBNET parameters to their earlier values. This is done in an attempt to allow communication to take place. However, this does not protect against the situation where the values are valid but are not what the user had intended to enter.

If the security feature is enabled (switch S4-1 is set On), the person issuing this command needs to have security-level access. If the security feature is not used (switch S4-1 is set Off), the CPY-MEM-SECU command can be sent by anyone. For details on establishing security access to the 55400A, see “Enabling the Security Feature” on page -9 in Chapter .

---

## 10 Copy AUX memory to WKG memory.

Example:

```
CPY-MEM-SECU::NET:ABC001::AUX,WKG;
```

<b>LAN Connection Will be Interrupted When the CPY-MEM-SECU Command is Issued</b>
-----------------------------------------------------------------------------------

The LAN connection will be interrupted when the CPY-MEM-SECU command is issued. The LAN connection must be reestablished before continuing.
---------------------------------------------------------------------------------------------------------------------------------------------

### ***10.3.1.4 Network Parameters Set Directly***

There are three LAN network parameters that do not use the dual-memory scheme. They are:

- INACTTIME
- AOMERGE
- SCRAMBLE

#### **Inactivity Time-out (INACTTIME)**

The INACTTIME setting specifies the length of time a connection to the PORTAO will continue without the occurrence of an automatic output message. The inactivity timer has a setting range of 0 to 10000, where each count 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 55400A PORTAO will be closed. The connection will be re-established when another automatic message occurs.

Range of values: 0 to 10000 in units of 100 ms, default = 10.

#### **To retrieve the value of INACTTIME:**

Example `RTRV-EQPT:::ABC001:::PARAMETER=INACTTIME;`

#### **To change the value of INACTTIME:**

Example `ED-EQPT:::ABC001:::INACTTIME=200;`

A value of 200 specifies a time-out value of 20 seconds.

#### **Automatic Output Merge (AOMERGE)**

This feature specifies whether the messages and commands will be carried separately on two different ports or combined onto one. The network parameters for the two ports are: PORTCMDS and PORTAO. When merged, the commands and automatic messages are carried on the command port (PORTCMDS). Operation using the 55451A or 55452A open synchronization management framework software (OSMF) requires that separate ports be used.

Values: Y or N, default = N.

---

**NOTE**

If the IP address of the manager matches IPLM1 or IPLM2, then the output will be merged, regardless of the AOMERGE value. In this case, it is assumed that the local manager software (55450AM) is being used which does not support having the commands and events carried on separate ports.

---

**To retrieve the value of AOMERGE:**

Example `RTRV-EQPT:::ABC001:::PARAMETER=AOMERGE;`

**To change the value of AOMERGE:**

`ED-EQPT:::ABC001:::AOMERGE=Y;`

The automatic output messages and commands will be carried on the command port.

---

**CAUTION** Following a firmware download to the Network IMC, the AOMERGE parameter may be reset to its default setting (AOMERGE=N). If one port had been used to carry both automatic events and commands, the AOMERGE setting should be checked and changed to AOMERGE=Y, if necessary.

---

**Scramble Communication (SCRAMBLE)**

The SCRAMBLE feature supports a low-level encryption for communications to and from the 55400A. It requires use of the 55451A or 55452A open synchronization management framework software and a network connection to the LAN port of the 55400A.

If the SCRAMBLE value is set to Y over the LAN port, whatever network program being used to communicate with the 55400A must also be capable of supporting the SCRAMBLE algorithm. Otherwise, a visit to the site of the SSU will be required to disable the SCRAMBLE feature via the Local port.

Changing the value of SCRAMBLE will close the network connection.
-------------------------------------------------------------------

Values: Y or N, default = N.

**To retrieve the value of SCRAMBLE:**

Example `RTRV-EQPT:::ABC001:::PARAMETER=SCRAMBLE;`

**To change the value of SCRAMBLE:**

Example `ED-EQPT:::ABC001:::SCRAMBLE=Y;`

Communications from the 55400A will be in a scrambled state.

---

## 10.4 NIMC X.25 Interface (Option 002)

10.4.1 This section describes a procedure to follow and the commands to send to prepare the SSU for connection to a X.25 Interface (Option 002).

10.4.2 The 55400A (SSU) can be managed on an X.25 network. X.25 is the most widely used interface standard for wide-area packet networks. It specifies the procedures for two packet-mode DTEs to communicate with each other through a network. Typically, the SSU will be managed over the network using the 55451A or 55452A Open Synchronization Management Framework software.

### 10.4.2.1 X.25 Interface Specifications

- Physical Layer
  - Compliance: RS-232/V.24 DTE
  - Data rate: Up to 64 kbps
  - Connector: 25 pin D-type female
  - Clocking: External transmit & receive clocks
- Frame Layer
  - Compliance: CCITT Rec. X.25, LAPB DTE (1988)
  - Sequencing: modulo-8
  - Frame window range: 1 through 7
  - User selectable parameters:
    - Frame window range
    - Retransmission timer T1
    - Acknowledgment timer T2
    - Idle Timer T3
    - Frame size N1
    - Retransmission count N2
- Packet Layer
  - Compliance: CCITT Rec. X.25, PLP (1988)
  - Number of SVCs used: 2 (bidirectional)
  - Number of PVCs used: none
  - Default window size: 2
  - Default packet size: 128
  - User settable parameters:
    - Window size
    - Maximum packet size
    - Bidirectional SVC start number
    - Bidirectional SVC end number

### ***10.4.2.2 Items Needed for X.25 Network Operation***

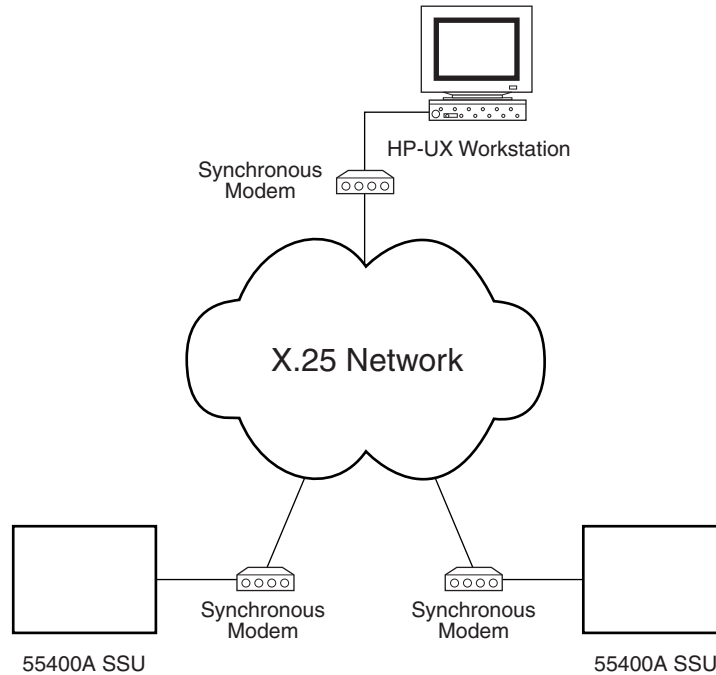
The following items are needed to support management of the SSU on an X.25 network:

- X.25 network service from a network provider
- 55442A Network Information Management Card with the X.25 option for the SSU and firmware version R3744E and later
- Straight-through modem cable connected from the Remote Port of the SSU to a network-compatible synchronous modem
- Open synchronization management framework for HP-UX or Windows NT for large networks (55451A or 55452A) or 55450AM remote management software for small networks.
- For use with 55451A or 55452A—Controller with an X.25 interface card and compatible connection to an X.25 network.
- For use with 55450AM—PC with a Packet Assembler/Disassembler (PAD)



### 10.4.2.3 Network Manager and 55400A Units in an X.25 Network

Figure 10-1 illustrates an X.25 network .



**Figure 10-1. X.25 Network Diagram**

The X.25 connection will be interrupted if the SSU is put into the download mode with the TL1 command “ACT-SWDL” or if the SSU is taken out of the download mode with the TL1 command “CANC-SWDL”. The X.25 connection must be re-established before continuing.

#### **10.4.2.4 55400A Remote Comm Port Pin Assignments for X.25 Option**

The **Remote Comm Port** connector is a 25-pin D-type female connector. The wiring connections are described in Table 10-2.

**Table 10-2. 55400A X.25 Option Remote Port Connector Pin Assignments (RS-232/V.24 Link Interface)**

Pin	Designation	Direction (DTE)	Function
1	—	—	No connection
2	TD	OUT	TX data
3	RD	IN	RX data
4	RTS	OUT	Request to send
5	CTS	IN	Clear to send
6	DSR	IN	Data set ready
7	SGND	—	Signal ground
8	DCD	IN	Carrier detect
9-14	—	—	No connection
15	TC	IN	TX CLK
16	—	—	No connection
17	RC	IN	RX CLK
18-19	—	—	No connection
20	DTR	OUT	Data terminal ready
21-25	—	—	No connection

---

**NOTE** The Remote Port can only be used for an X.25 network connection. The RTS and DTR signals are always asserted (active). The handshake signals, CTS, DSR, and, DCD are not used by the SSU.

---

The X.25 network connection for the 55400A requires the use of a leased-line synchronous modem, not a dial-up type.

#### **10.4.2.5 List of X.25 Network Parameters**

This section describes a procedure to follow and the commands to send to prepare the SSU for connection to an X.25 network.

It is important to note that the process of setting or changing most X.25 network parameters are different from the way non-network parameters are handled by the SSU. These parameters use a dual-memory scheme that separates parameter changes from the set of parameters currently in use by the SSU. This separation is intended to reduce the likelihood of accidental or incorrect settings causing interruptions in network communications. For example, if it were possible to inadvertently send the command to change the X.25 address of a network element, all communication with that device could be lost until on-site access could re-establish the correct settings. A dual-memory scheme, designated Working Memory and Auxiliary Memory is used to help avoid this situation.

In addition, changes to most network parameters force a closing of the network connection, and in some cases, even restarts the operating system in the Network IMC card. (This action erases any data stored in the automatic output log on the Network IMC card.)

Table 10-3 shows a listing of the network parameters for the *Option 002 55442A Network IMC* card. The keywords are shown for both the working and auxiliary memories. Table 15 shows the network parameters that can be set directly. All parameters are described in more detail following tables 10-3 and 10-4.

**Table 10-3. X.25 Interface Network Parameters for Option 002**

<b>X.25 Network TL1 Keywords (type of memory)</b>	<b>Range of Values</b>	<b>Description</b>
X25NE (WKG) X25NEX (AUX)	5 to 15 digits	<b>X.25 address of the network element.</b> Sometimes referred to as the X.121 address.
X25EM1 (WKG) X25EM1X (AUX) X25EM2 (WKG) X25EM2X (AUX)	5 to 15 digits	<b>X.25 address of the primary and alternate element manager.</b> The alternate address is used for event reporting in the case of communication failure with the primary element manager.
X25SRTSVC (WKG) X25SRTSVCX (AUX)	1 to 4095 (default = 1)  <i>Note: The X.25 NIMC is limited to a maximum of eight logical channel numbers. Therefore, X25ENDSVX must not be greater than X25SRTSVCX plus seven.</i>	<b>Starting Logical Channel Number.</b> Your X.25 service provider assigns a range of logical channel numbers for the bi-directional channels used by the SSU. This parameter specifies the start for this range.
X25ENDSVC (WKG) X25ENDSVCX (AUX)	1 to 4095 (default = 8)	<b>Ending Logical Channel Number.</b> See the X25SRTSVC description. This parameter specifies the end value of the range assigned to the bi-directional channels. The Ending Logical Channel number must be two, or more, larger than the Starting Logical Channel number.
X25L3PKSZ (WKG) X25L3PKSZX (AUX)	128, 256, or 512 (default = 128)	<b>Level 3 Packet Size.</b> Sets the maximum packet size to be transferred across the X.25 interface.

**Table 10-3. X.25 Interface Network Parameters for Option 002 (continued)**

<b>X.25 Network TL1 Keywords (type of memory)</b>	<b>Range of Values</b>	<b>Description</b>
X25L3W (WKG) X25L3WX (AUX)	1 to 7 (default = 2)	<b>Level 3 Window Size.</b> Sets the default value for the maximum number of packets that can be transmitted without acknowledgment over a switched virtual circuit.
X25L2K (WKG) X25L2KX (AUX)	1 to 7 (default = 7)	<b>Level 2 Window Size.</b> Sets the maximum number of frames that may be transmitted without acknowledgment.
X25T1 (WKG) X25T1X (AUX)	1 to 255 in units of 0.1 s (default = 30)	<b>Retransmission Timer.</b> Sets the T1 timer value. Started whenever a command frame which needs to be acknowledged is sent. Expiration before the frame is received causes a retransmission procedure to be activated up to the number of times specified by the N2 value. The T1 value must be set equal to, or greater than, the T2 value.
X25T2 (WKG) X25T2X (AUX)	1 to 255 in units of 0.1 s (default = 10)	<b>Acknowledgment Timer.</b> Sets the T2 timer value. Started whenever the first information frame of a sequence is received. Expiration of this timer causes the transmission of an RR frame ("Receiver Ready") to acknowledge the received frame, if it was not acknowledged earlier by other means.
X25T3 (WKG) X25T3X (AUX)	1 to 10000 in units of 0.1 s (default = 600)	<b>Idle Timer.</b> Sets the amount of time that a line can be idle before it is declared disconnected.
X25N2 (WKG) X25N2X (AUX)	0 to 255 (default = 20)	<b>Retransmission Count.</b> Sets the maximum number of re-tries for the transmission of a given frame before an error condition is reported. A setting of zero is not recommended.
X25N1 (WKG) X25N1X (AUX)	149 to 4103 (default = 149)	<b>Frame Size.</b> Sets the maximum number of octets that may be transmitted in a single frame.
SCRAMBLE (WKG) SCRAMBLEX (AUX)	Y or N (default = N)	Applies only to an element manager connected to the X.25 port. Y = Scramble communications from 55400A, N = do not scramble.

**Table 10-4. X.25 Interface Parameters Set Directly**

<b>X.25 Network TL1 Keywords</b>	<b>Range of Values</b>	<b>Description</b>
INACTTIME	0 to 10000 in units of 0.1 s (default = 10)	Sets the inactivity timer. Used to specify the length of time a connection will continue without the occurrence of an automatic output message.
AOMERGE	Y or N (default = N)	Applies only to an element manager (X25EM) connected to the X.25 port. Y = Merge commands and automatic output messages on the command port, N = carry on separate ports. AOMERGE must be set to N whenever OSMF-UX is being used to manage the SSU. However, AOMERGE should be set to Y if the local manager software (55450) is being used to manage the SSU. This is due to the fact that the OSMF-UX software can establish an AOPort (Automatic Output Port) connection with the SSU, but the local manager software cannot.

#### ***10.4.2.6 Set the Initial X.25 Network Parameters***

The Option 002 55442A Network IMC supports an X.25 network connection.

Before testing the X.25 port or installing the SSU on a network, the following network parameters must be set via the SSU Local Port (the TL1 keywords are shown in parentheses). For more information on how to connect a computer to the SSU and perform a logon, refer to the *55400A SSU System Manual*.

**Always set the following parameters:**

- X.25 address of network element/SSU (X25NEX)
- X.25 address of element manager (X25EM1X)
- Logical channel starting number (X25SRTSVCX)
- Logical channel ending number (X25ENDSVCX)

**Set the following parameters only if necessary. Default values are typically acceptable:**

- Level 3 packet size (X25L3PKSZ)
- Level 3 window size (X25L3WX)
- Level 2 window size (X25L2KX)
- Retransmission timer (X25T1X)
- Acknowledgment timer (X25T2X)
- Idle timer (X25T3X)

- Retransmission count (X25N2X)
- Frame size (X25N1X)

**Whenever communicating with the SSU via the X.25 port**, if using an internet utility, (for example, Telnet) set it to send data in line or packet mode, not character mode.

All critical network parameters are stored in two separate regions of Network IMC memory. The other network-related parameters are INACTTIME and AOMERGE, which do not use the dual-memory design. The two areas of memory are called: Working Memory (WKG) and Auxiliary Memory (AUX). The WKG memory contains the parameter settings being used by the network, while the AUX memory holds a backup copy of these parameters. The WKG memory parameters cannot be directly set. Any parameter modifications are first set in the AUX memory and then when you are sure the settings are correct, the CPY-MEM-SECU command is used to transfer the AUX memory to WKG memory.(See “Working and Auxiliary Memories Explained” on page -4 for more information on these memories.)

**Use Keyword With “X” Only When Setting or Retrieving Values for AUX Memory**

The network parameter settings in WKG memory can be accessed using the TL1 keywords listed above, without the “X.” Setting or retrieving the parameter values in AUX memory requires that an “X” be appended to the parameter keyword. For example, the X.25 address of the network element is retrieved from WKG memory using the keyword, “X25NE,” and from AUX memory using the keyword, “X25NEX.”

The RTRV-EQPT-TSG command is used to view the network parameter settings from either the WKG or AUX memory (use the WKG or AUX version of the keyword). Use the ED-EQPT-TSG command to modify settings in the AUX memory.

Copying the AUX memory into WKG memory forces the network connection to close, and the Network IMC operating system to be restarted. This action results in a loss of the automatic output log contained on the Network IMC.

#### ***10.4.2.7 Summary of Steps to Change Network Parameters***

1. Copy the WKG memory into the AUX memory.
  1. Make changes to the network parameters in the AUX memory.
  2. Verify that all parameters in AUX memory are set as desired.
  3. Copy the AUX memory into the WKG memory. This will cause the network connection to be closed, and the Network IMC operating system will be restarted.

A detail procedure is provided in the following section.

### ***10.4.2.8 Configure the X.25 Interface Port***

- 1** Copy WKG memory to AUX memory.

Example:

```
CPY-MEM::NET:ABC001::WKG,AUX;
```

“ABC001” is the correlation tag. It is an arbitrary, user-defined string of up to six alphanumeric characters used to relate commands to their responses and acknowledgments. All commands must include a valid correlation tag. It may be useful to use your initials with sequential numbers for each command. In cases where there are two users sending commands at the same time, the commands and responses belonging to each user can be easily identified.

- 2** Set the SSU X.25 Address in the AUX memory.

Example:

```
ED-EQPT:::ABC001:::X25NEX=X;
```

(where X = up to 15 digits)

The SSU X.25 address can be 5 to 15 digits (0-9) in length. In most situations, a block of X.25 addresses will have been reserved for your network usage. Consult with your network administrator.

- 3** Retrieve the AUX memory setting to verify a changed parameter.

Example:

```
RTRV-EQPT:::ABC001:::PARAMETER=X25NEX;
```

After setting each network parameter, it is a good idea to verify the newly modified parameter by sending the retrieve command for each parameter. In this example, the SSU X.25 address is retrieved.

- 4** Set the primary Element Manager X.25 Address

Example:

```
ED-EQPT:::ABC001:::X25EM1X=X;
```

(where X = up to 15 digits)

The element manager X.25 address can be 5 to 15 digits (0-9) in length. In addition, an alternate element manager can be assigned an address using the TL1 keyword `x25em2x`. The SSU will use the alternate address for event reporting in the case of communication failure with the primary element manager. Consult with your network administrator.

**5 Set the Logical Channel Starting Number.**

Example:

```
ED-EQPT:::ABC001:::X25SRTSVCX=1;
```

This command, and the next one, sets the number of bi-directional switched virtual channels (SVC) for use by the SSU. The starting number can be a value from 1 to 4095. Use values given on the subscription form provided by your X.25 service provider. If necessary, consult with your network administrator. (The default value is shown in the above example.)

**Logical Channel Number Settings in the Customer's X.25 Equipment MUST Match the SSU Setting EXACTLY**

The X.25 communications may fail after several days or may not work at all if the Logical Channel Number settings in the customer's X.25 equipment does not EXACTLY match the settings in X.25 NIMC card of the SSU.

**6 Set the Logical Channel Ending Number.**

Example:

```
ED-EQPT:::ABC001:::X25ENDSVCX=8;
```

This parameter sets the end of the range of bi-directional channels reserved for use by the SSU. The ending number can be as high as 4095. The Ending Logical Channel number must be 2, or more, larger than the Starting Logical Channel number. Use values given on the subscription form provided by your X.25 service provider. If necessary, consult with your network administrator. (The default value is shown in the above example.) This range of logical channels defines the number of user sessions that can be initiated.

**7 If necessary, set the Level 3 Packet size, by sending, for example:**

```
ED-EQPT:::ABC001:::X25L3PKSZX=128;
```

This parameter sets the maximum packet size to be transferred across the X.25 interface. The possible values are: 128, 256, or 512. The default is 128 for inbound and outbound packets. Use the value assigned by your X.25 service provider. If necessary, consult with you network administrator. (The default value is shown in the above example.)



- 8** If necessary, set the Level 3 Window Size, by sending, for example:

```
ED-EQPT:::ABC001:::X25L3WX=2;
```

This parameter sets the default value for the maximum number of packets that can be transmitted without an acknowledgment over a switched virtual circuit. The range is 1 through 7. The default is 2 for inbound and outbound transmission. Use the number assigned by your X.25 service provider. If necessary, consult with your network administrator. (The default value is shown in the above example.)

- 9** If necessary, set the Level 2 Window Size, by sending, for example:

```
ED-EQPT:::ABC001:::X25L2KX=7;
```

This parameter sets the maximum number of frames that may be transmitted without an acknowledgment. The range is 1 through 7, with the default being 7. Use the value assigned by your X.25 service provider, if supplied. If necessary, consult with your network administrator.

- 10** If necessary, set the Retransmission Timer, by sending, for example:

```
ED-EQPT:::ABC001:::X25T1X=30;
```

This parameter sets the T1 timer value. The timer starts whenever a command frame which needs to be acknowledged is sent. If the timer counts down to zero before the acknowledgment is received, a retransmission procedure is initiated up to the number of times specified by the retransmission count value (N2). The range is 1 to 255, in units of 0.1s. The default is 30. Use the value assigned by your X.25 service provider, if supplied. The T1 value must be set equal to, or greater than, the T2 value. If necessary, consult with your network administrator. See also Idle Timer and Retransmission Count.

- 11** If necessary, set the Acknowledgment Timer, by sending, for example:

```
ED-EQPT:::ABC001:::X25T2X=10;
```

This parameter sets the amount of time to wait after the first information frame of a sequence is received, before sending an acknowledgment. If the timer counts down to zero, an RR frame ("Receive Ready") will be transmitted to acknowledge the received frame, if it was not acknowledged earlier by other means. The range is 1 to 255 in units of 0.1s. The default is 10. Use the value assigned by your X.25 service provider, if supplied. If necessary, consult with your network administrator.

- 12** If necessary, set the Idle Timer, by sending, for example:

```
ED-EQPT:::ABC001:::X25T3X=600;
```

This parameter sets the amount of time that a line can be idle before it is declared disconnected. This value should be greater than, or equal to, the Retransmission Timer (T1) times the Retransmission Count (N2). The range is 1 to 10000 in units of 0.1s. The default is 600. Use the value assigned by your X.25 service provider, if available. If necessary, consult with your network administrator.

- 13** If necessary, set the Retransmission Count, by sending, for example:

```
ED-EQPT:::ABC001:::X25N2X=20;
```

This parameter sets the maximum number of times that a frame which needs acknowledgment from the remote may be transmitted before an error condition is reported. The range is 0 to 255. The default is 20. Use the value assigned by your X.25 service provider, if supplied. A setting of zero is not recommended because there will be no retries if a frame is not sent successfully. If necessary, consult with your network administrator.

- 14** If necessary, set the Frame Size, by sending, for example:

```
ED-EQPT:::ABC001:::X25N1X=149;
```

This parameter sets the maximum number of octets that may be transmitted in a single frame. The range is 149 to 4103. The default is 149. Use the value assigned by your X.25 service provider, if supplied. If necessary, consult with your network administrator.

---

**CAUTION**

Executing the command, *in the following step*, to copy the network parameters may generate a MAJOR alarm. To clear the alarm, send the OPR-ACO-ALL command (alarm cutoff function). After the X.25 settings are completed, the next command will copy them to working memory and cause the Network IMC card to restart.

It is essential that the set of parameters in the AUX memory be correct before issuing this command. IF THEY ARE NOT CORRECT, it may become impossible to reconnect to the X.25 port! In this case, it will be necessary to use the Local Port to re-establish valid parameters before network communication is possible.

If the security feature is enabled (switch S4-1 is set On), the person issuing this command needs to have security-level access. If the security feature is not used (switch S4-1 is set Off), the CPY-MEM-SECU command can be sent by anyone. For details on establishing security access to the 55400A, see "Enabling the Security Feature" on page -9 in Chapter .

---

- 15 Copy AUX memory to WKG memory by sending, for example:

```
CPY-MEM-SECU: :NET:ABC001: :AUX, WKG;
```

**X.25 Connection Will be Interrupted When the CPY-MEM-SECU Command is Issued**

The X.25 connection will be interrupted when the CPY-MEM-SECU command is issued. The X.25 connection must be reestablished before continuing.

---

## 10.5 NIMC TP4 Interface (Option 003)

10.5.1 This section describes a procedure to follow and the commands to send to prepare the SSU for connection to a TP4 Interface (Option 003).

10.5.2 It is important to note that the process of setting or changing most TP4 network parameters is different from the way non-network parameters are handled. This difference is intended to reduce the likelihood of accidental or incorrect settings causing interruptions in network communications. For example, if it were possible to inadvertently send the command to change the Network Service Access Point (NSAP) address of a network element, all communication with that device could be lost until on-site access could re-establish the correct settings. A dual-memory scheme, designated Working Memory and Auxiliary Memory is used to help avoid this situation.

10.5.3 In addition, changes to most network parameters force a closing of the network connection, and in some cases, even restarts the operating system in the Network IMC card. (This action erases any data stored in the automatic output log stored on the Network IMC card.)

Table 10-5 shows a listing of the network parameters for the *Option 003 55442A Network IMC* card. The keywords are shown for both the working and auxiliary memories.

**Only Available in Firmware Versions R3833C and Later**

The TP4 keywords are only available in firmware versions R3833C and later.

**Table 10-5. TP4 Interface Network Parameters for Option 003**

<b>TP4 Network TL1 Keywords (type of memory)</b>	<b>Range of Values</b>	<b>Description</b>
NSAPNE (WKG) NSAPNEX (AUX)	8 to 20 bytes entered in hexadecimal format.	NSAP address of the network element.
NSAPEM1 (WKG) NSAPEM1X (AUX) NSAPEM2 (WKG) NSAPEM2X (AUX)	8 to 20 bytes entered in hexadecimal format.	NSAP address of the primary and alternate element manager. The alternate address is used for event reporting in the case of communication failure to the primary element manager.
TSAPCMDS (WKG) TSAPCMDSX (AUX)	1 to 32 ASCII characters. Default is "7588".*	Used to specify the port number for the command/response reporting. (Lowercase characters will be converted to uppercase.)
TSAPAO (WKG) TSAPAOX (AUX)	1 to 32 ASCII characters. Default is "7589".*	Used to specify the port number for the automatic event reporting. (Lowercase characters will be converted to uppercase.)
SCRAMBLE (WKG) SCRAMBLEX (AUX)	Y or N (default = N)	Applies only to a network manager (NSAPEM) connected to the TP4 interface. Y = Scramble communications from 55400A, N = do not scramble.
INACTTIME	0 to 10000 in units of 100 ms (0.1 s). Default is 10.	Sets the inactivity timer. Used to specify the length of time a connection will continue without the occurrence of an automatic output message.
AOMERGE	Y or N (default = N)	Applies only to a network manager (NSAPEM) connected to the TP4 interface. Y = Merge commands and automatic output messages on the command port, N = carry on separate ports. AOMERGE must be set to N whenever OSMF-UX is being used to manage the SSU. However, AOMERGE should be set to Y if the local manager software (55450) is being used to manage the SSU. This is due to the fact that the OSMF-UX software can establish an AOPort (Automatic Output Port) connection with the SSU, but the local manager software cannot.

\* DO NOT set the Command Port address and the Automatic Output Port address to the same value.

### ***10.5.3.1 Set the Initial TP4 Parameters***

The 55442A Option 003 Network IMC supports a 10Base-T connection. Before using the TP4 interface or installing the SSU on a network, the following network parameters must be set via the SSU Local Port (the TL1 keywords are shown in parentheses):

- NSAP address of network element/SSU (NSAPNEX)
- NSAP address of element manager (NSAPEM1X/NSAPEM2X)
- TSAP for command port (TSAPCMD SX)
- TSAP for automatic output port (TSAPAOX)
- Low-level encryption of communications (SCRAMBLEX)

All network parameters that require address settings or port numbers are stored in two separate regions of Network IMC memory. The other network-related parameters are INACTTIME and AOMERGE, which do not use the dual-memory design.

### ***10.5.3.2 Summary of Steps to Change Network Parameter***

1. Copy the WKG memory into the AUX memory.
2. Make changes to the network parameters in the AUX memory.
3. Verify that all parameters in AUX memory are set as desired.
4. Copy the AUX memory into the WKG memory. This will cause the network connection to be closed, and the IMC operating system will be restarted.

A detail procedure is provided in the following section.

### ***10.5.3.3 Configure the TP4 Interface Port***

- 1 Copy WKG memory to AUX memory.

Example:

```
CPY-MEM::NET:ABC001::WKG,AUX;
```

“ABC001” is the correlation tag. It is an arbitrary, user-defined string of up to six alphanumeric characters used to relate commands to their responses and acknowledgments. All commands must include a valid correlation tag. It may be useful to use your initials with sequential numbers for each command. In cases where there are two users sending commands at the same time, the commands and responses belonging to each user can be easily identified.

**2** Set the SSU NSAP Address in the AUX memory.

Example:

```
ED-EQPT:::ABC001:::NSAPNEX=47112233445566A0;
```

The NSAP (Network Service Access Point) address can be a range of values from 8 to 20 bytes entered in hexadecimal format. The last byte should not be zero.

**3** Retrieve the AUX memory setting to verify a changed parameter.

Example:

```
RTRV-EQPT:::ABC001:::PARAMETER=NSAPNEX;
```

After setting each network parameter, it is a good idea to verify the newly modified parameter by sending the retrieve command for each parameter. In this example, the SSU NSAP address is retrieved.

**4** Set the Element Manager NSAP Address.

Example:

```
ED-EQPT:::ABC001:::NSAPEM1X=4711223377889901;
```

The NSAP address for the primary element manager (EM) can be a range of values from 8 to 20 bytes entered in hexadecimal format. Additionally, the 55400A supports an NSAP address for an alternate element manager (NSAPEM2X). The SSU will use the alternate address for event reporting in case of communication failure with the primary EM.

**5** Set the Command Port TSAP.

Example:

```
ED-EQPT:::ABC001:::TSAPCMDSX=7588;
```

The Command Port TSAP (Transport Service Access Point) has a range of 1 to 32 ASCII characters. It specifies the port for command/response reporting. The characters can be any number or letter. (Lowercase characters will be converted to uppercase.) The following characters are not allowed: & ~ , : “ Embedded spaces are allowed. The default setting is 7588. When the value of the AOMERGE parameter (explained below) is set to Y, both commands and automatic event reporting will be carried on this port.

Do not set the Command Port TSAP to the same value as for the Automatic Output Port.

## 6 Set the Automatic Output Port TSAP.

Example:

```
ED-EQPT:::ABC001:::TSAPAOX=7589;
```

The Automatic Output Port TSAP has a range of 1 to 32 ASCII characters. It specifies the port for automatic event reporting. The characters can be any number or letter. (Lowercase characters will be converted to uppercase.) The following characters are not allowed: & ~ , : “ Embedded spaces are allowed. The default setting is 7589. When the value of the AOMERGE parameter (explained below) is set to N, commands and automatic event reporting will be carried on separate ports.

Do not set the Automatic Output Port address to the same address value as for the Command Port.

---

**CAUTION**

Executing the command, *in the following step*, to copy the network parameters may generate a MAJOR alarm. To clear the alarm, send the OPR-ACO-ALL command (alarm cutoff function). After the TP4 settings are completed, the next command will copy them to working memory and cause the Network IMC card to restart.

It is essential that the set of parameters in the AUX memory be correct before issuing this command, especially if changes are made over the TP4 interface. IF THE SETTINGS ARE NOT CORRECT, it may become impossible to reconnect to the TP4 interface! In this case, it will be necessary to use the Local Port to re-establish valid parameters before network communication is possible.

If the security feature is enabled (switch S4-1 is set On), the person issuing this command needs to have security-level access. If the security feature is not used (switch S4-1 is set Off), the CPY-MEM-SECU command can be sent by anyone. For details on establishing security access to the 55400A, see “Enabling the Security Feature” on page -9 in Chapter .

---

## 7 Copy AUX memory to WKG memory.

Example:

```
CPY-MEM-SECU::NET:ABC001::AUX,WKG;
```

---

## 10.6 Configuring the SSU for 55452A OSMF for UX Operation

- 1 Locate the 55442 Network Information Management card (NIMC). If it has already been installed, loosen the two retaining screws and remove the NIMC card from the NSU subrack.
- 2 Verify that the Security (S4-1) and Local Port Force Enable (S4-3) switches are set to the Off position.
- 3 Install the 55442 NIMC card into the NSU subrack. Verify that the Power LED is lit.
- 4 Establish communication with the NIMC local port by using the 55450A local craft terminal software or a terminal communications program such as HyperTerminal. A 9-pin "straight" one-to-one cable is used to connect the PC (DTE) to the NIMC local port (DCE). The default NIMC local port communications settings are 9600 baud, 8 data bits, 1 stop bit, no parity.
- 5 Set the date and time using the 55450A Service menu item "Set SSU Date and Time". This can also be performed by manually sending the command ED-DAT::- 6 Optional: Delete any User IDs and Passwords currently in the NIMC database. In 55450A this action is performed by using the User Administration item on the Service menu to deleting all users. This action can also be performed by manually sending the command DLT-SECU::- 7 Choose a password. Passwords are case sensitive, must be less than 10 characters long, must contain at least one special character (such as a period, asterisk, ampersand, or percent), and must contain at least one additional non-alphabetical character (such as a number, or a special character). For example, "chess.1" is a valid password. The password you have chosen will be used later when managing the NSU with 55450A.
- 8 Create the User ID "svsec" with a SECURITY security level and the password you have chosen. Again, in SV-PC this action is performed using the User Administration dialog. To perform this action manually, send the command:

```
ENT-USER-SECU::SVSEC:SC1::<password>, , SECURITY;
```

where <password> is the password you have chosen.

- 9 Verify that the Automatic Output is configured properly. On the 55450A Communications form, type the following commands:

```
RTRV-EQPT:::SC1:::PARAMETER=RMTAO;
```

```
RTRV-EQPT:::SC1:::PARAMETER=AOMERGE;
```



**Configuring the SSU for 55452A OSMF for UX Operation**

The RMTAO parameter should be set to ALWAYS, and the AOMERGE parameter should be set to N. If necessary, send the following command(s):

```
ED-EQPT:::SC1:::RMTAO=ALWAYS;
```

```
ED-EQPT:::SC1:::AOMERGE=N;
```

- 10** Set the following network parameters using the 55450A Configure Network IMC item on the Service menu. These parameters can be configured manually by using the command format:

```
ED-EQPT:::SC1:::IPNEX=15.16.17.18;
```

Description	Keywords		Value
	WKG Mem	AUX Mem	
NSU IP address	IPNE	IPNEX	set per sys admin
SV-UX Host1 address	IPEM1	IPEM1X	set per sys admin
Gateway Address	IPGATE	IPGATEX	set per sys admin
Sub-Net Mask	IPSUBNET	IPSUBNETX	set per sys admin*
Scramble	SCRAMBLE	—	Y

\* Note that the Subnet Mask must end in either 128 or 0. For example, 255.255.255.0 is valid, but 255.2555.255.192 is not.

The following network parameters should not require any changes from their default values:

Description	Keywords		Default Value
	WKG Mem	AUX Mem	
SV-UX Host2 address	IPEM2	IPEM2X	0.0.0.0
Local manager1 address	IPLM1	IPLM1X	0.0.0.0
Local manager2 address	IPLM2	IPLM2X	0.0.0.0
Command Port	PORTCMDS	PORTCMDSX	7588
Auto Output Port	PORTAO	PORTAOX	7589
Inactivity Time	INACTTIME	—	100

The following network parameters are obsolete, although they may appear on the 55450A NIMC configuration menu:

Port Bulk (obsolete)

Poll Time (obsolete)

Ack Time (obsolete)

Net Retry (obsolete)

Net Timer1 (obsolete)

- 11** After the network parameters have been configured, press the Apply button and then confirm the changes at the prompts. To perform this action manually, send the command:

```
CPY-MEM-SECU: :NET:SC1: :AUX,WKG;
```

- 12** Wait 1 minute for the NIMC card to reboot, then exit the 55450A program.
- 13** Disconnect the local port cable.
- 14** Remove the NIMC card and set switches S4-1 and S4-3 to the On position.
- 15** Re-insert the NIMC card and tighten the two retaining screws.
- 16** Attach the 10Base-T LAN connector. Verify that the Link LED is lit.

The SSU is now configured to communicate with 55452A OSMF.

---

A

---

Downloading Firmware

---

## **A.1 Appendix Content**

A.1.1 This appendix provides information on how to download new firmware to the 55400A.

A.1.2 This appendix is organized as follows:

- 55400A Firmware Revision Information page A-3
- Download Process Overview page A-4
- Firmware Download Process page A-6
- Emergency Overrides page A-7
- TL1 Messages page A-7
  - Normal Response page A-8
  - Error Response page A-8
- Download Command Summary page A-8

## A.2 55400A Firmware Revision Information

A.2.1 Table A-1 summarizes the features and products that have been introduced since the initial release of the 55400A. For each table entry there is a listing of the affected card and the firmware it requires to support the new feature of product.

**Table A-1. Firmware Revisions**

Feature or Product	Firmware Revision
Modem Control	3640C and later
Mixed ITH Operation	3640C and later
55442A Network IMC (LAN interface) card	3703 and later
55484 1/5/10 MHz card	3703 and later
55485 1544kbps card	3703 and later
Option 001 for ITH cards (adds four reference inputs)	3703 and later
55481B 2048 kbps card (includes programmable traffic pattern capability)	3724A and later
Expansion Subrack	3724A and later
Version B ITH cards	3724A and later
55471A Traffic Re-Synchronization (TRSC) card	3744E and later
Single ITH Operation	3744E and later
55442A Network IMC Option 002 (X.25 interface)	3744E and later
55442A Network IMC Option 003 (TP4 interface)	3833B and later
55442A Network IMC Option 004 (Expanded Memory for CTIE Measurements)	3851B and later
Mini SSU 55429B	3851B and later

---

### A.3 Download Process Overview

The firmware of the 55400A SSU resides in the **Electrically Erasable, Programmable Read Only Memory (EEPROM)** on:

- the Interface Management Card (IMC),  
or  
the Network Interface Management Card (NIMC)
- the Input Track and Hold (ITH1 and ITH2) cards,
- the Expansion IMC, and
- the Expansion Synchronization card(s).

---

**NOTE**

Firmware can be downloaded to any of the aforementioned cards (referred to as **EEPROM cards** throughout the remaining of this appendix). While the download is in progress, the card is not in service. (*Except in Emergency Override, you should NOT download to an active ITH or active Expansion card.*). Use the SW-DX-EQPT command to switch the active ITH card (see Chapter .)

The normal download process consists of downloading firmware to each of the **EEPROM cards** (that is, IMC, ITH1, ITH2, Expansion IMC card, and Expansion card(s)). It is recommended that you download firmware to the IMC card first.

Each card has three memory areas: Boot, Main, and Backup. The Main and Backup memories are erasable and of the same size, whereas the Boot memory is non-erasable and relatively smaller.

Under normal mode of operations, the Main memory contains the currently active firmware. During download mode of operations, the Backup memory is used to save the current firmware while the Boot memory is used to transfer the new firmware received from a PC to the Main memory.

---

**NOTE**

When you download new firmware to the 55400A IMC/NIMC card and then log in, the system will not remember that you logged in before the firmware download (e.g., in the Completed Response to ACT-USER). The system will remember the date (if it had been set) and that you are a valid user in the Security Database.

**CAUTION — Disable Auto Performance Measurement Upload (AUTOPM)**

Symmetricon strongly recommends that you disable all Automatic Performance Measurement Upload (AUTOPM) reporting before you begin downloading firmware.

**CAUTION —Both ITH Cards Should be Online When Downloading to Expansion Sync Cards**

Symmetricom strongly recommends that both ITH cards be online when downloading to the Expansion Synchronization cards. Be aware that ITH1 only supplies signals to Expansion Synchronization 1 card (in all expansion racks), and that ITH2 only supplies signals to Expansion Synchronization 2 card (in all expansion racks). Therefore, if, for example, ITH1 is not operating (that is, removed or in download mode) and an attempt is made to download code to an Expansion Synchronization 2 card, all outputs from the Expansion Subrack will be lost.

**The firmware provides no protection or warning about this constraint.**

## A.4 Firmware Download Process

The following figure depicts the flow of a firmware download process to an EEPROM card in the 55400A. To position the EEPROM card for a firmware download, the EEPROM card is placed in download mode, and the current firmware is copied from the Main memory to the Backup memory. After erasing the Main memory, new firmware is downloaded to, and verified by, the Boot memory segment by segment. The Boot memory automatically transfers each segment of the firmware to the Main memory.

Read notes and cautions provided on page A-4.

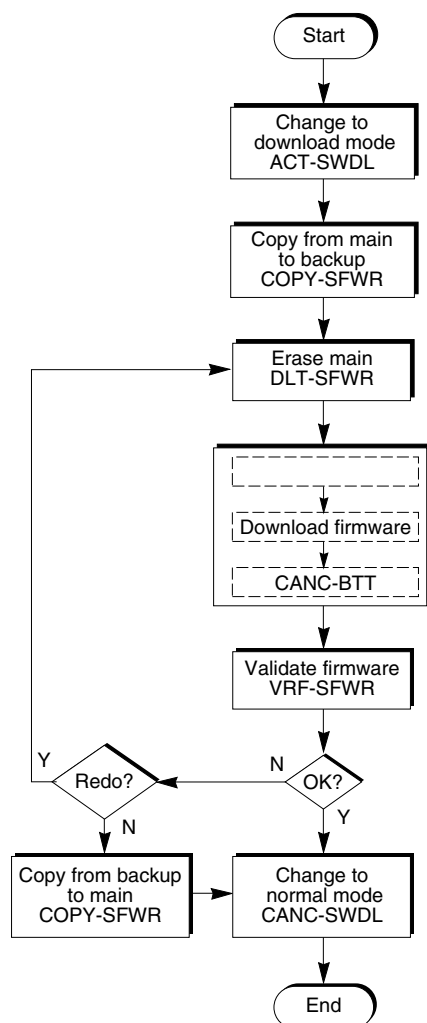


Figure A-1. Firmware Download Process



After all the segments of the firmware are downloaded, the entire firmware is validated by the EEPROM card. Finally, the firmware is activated when the EEPROM card is restored back to its normal mode of operations.

In the event the firmware could not be validated by the EEPROM card, you choose how you want to continue. The choices are:

- Abandon the firmware download by copying the current firmware from the Backup memory back to the Main memory and restoring back to the normal mode of operations.
- Erase the Main memory and repeat the firmware download.

---

## A.5 Emergency Overrides

If absolutely essential to download firmware to an Active ITH card (with the understanding this will cause a loss of operation of the SSU), the following two-command sequence may be used.

For example, to force a download to ITH card 1:

```
RMV-EQPT:::SC1::FRCD;  
ACT-SWDL:::ITH1:SC1;
```

The RMV-EQPT command allows the system to start downloading firmware (ACT-SWDL command) to the active ITH card. Entering any command other than ACT-SWDL after the RMV-EQPT command, will undo the effect of the RMV-EQPT command.

---

### **NOTE**

The SSU does not allow having any two cards in Firmware Download mode at the same time.

---

## A.6 TL1 Messages

A.6.1 This section presents the types of TL1 messages that you may encounter while downloading firmware to each EEPROM card in the 55400A.

---

### **NOTE**

In the following examples, the <tid> is designated as SSU, and the <aid> is the IMC card.

In a normal firmware download, you would repeat the download process for each card (except the output cards).

A.6.2 There are two types of responses to a Downloading command: Normal and Error Responses.

### A.6.2.1 Normal Response

```
SSU 98-07-04 10:10:10
M S01 COMPLD
;
```

### A.6.2.2 Error Response

```
SSU 98-07-04 10:10:10
M S01 DENY
/*optional textual description*/
;
```

The optional description is enclosed by /\* \*/ and specifies the reason for the error response. This facilitates troubleshooting the problems encountered by the EEPROM card.

---

## A.7 Download Command Summary

Table A-2 lists the 55400A Download Commands.

**Table A-2. Download Command Summary**

Command	Description
ACT-BTT	Enter bulk transfer mode
ACT-SWDL	Activate download mode of operation
CANC-BTT	Cancel bulk transfer mode
CANC-SWDL	Return to normal mode of operation.
COPY-SFWR	Copy firmware from main to backup memory or backup memory to main memory
DLT-SFWR	Erase firmware from main memory
RMV-EQPT	Remove equipment
VRF-SFWR	Verify firmware integrity

The following sections present individual TL1 Download Commands and system responses. Since normal responses are straight forward (COMPLD), the output responses presented here focus mostly on error responses.

**Example Commands are Underlined in the following Section**

In the example commands, *user* input is underlined.

---

## A.8 ACT-BTT (Activate Bulk Transfer Mode)

The ACT-BTT command instructs an EEPROM card to enter into bulk text transfer mode prior to downloading segments of firmware.

### Normal Response

```
ACT-BTT:SSU:IMC:S04;
SSU 98-07-04 09:11:00
M S04 COMPLD
```

Upon a successful activation of the bulk text transfer mode, segments of the firmware are sent sequentially as follows:

```
"100 ASCII characters";
.
.
"100 or fewer ASCII characters";
```

After receiving each firmware segment and validating the checksum associated with the segment, the EEPROM card responds with a good (OK) or no good (NG) status as follows:

```
OK <segment address>
or
NG <segment address>
```

In the event that a firmware segment received a NG response, it may be sent again immediately or later.

After all the segments of the firmware have successfully been downloaded onto the EEPROM card, the following input command cancels the bulk text transfer mode in the EEPROM card and simultaneously signals the end of the firmware segments:

```
CANC-BTT:SSU:IMC:S05;
SSU 98-07-04 10:30:01
M S05 COMPLD
;
```

---

## A.9 ACT-SWDL (Activate Download Mode of Operation)

The ACT-SWDL command places an EEPROM card in the firmware download mode prior to a firmware download. It inhibits any activities that are not associated with a firmware download. However, this command is denied if the ITH card is the only available card. See RMV-EQPT command above for more information.

### Error Response

```
ACT-SWDL:SSU:ITH2:S01;  
SSU 98-07-04 09:10:11  
M S01 DENY  
"SROF"  
/*Status Requested Operation Failed*/  
/*ITH is MASTER and the twin cannot take over*/  
;
```

---

**NOTE**

The LAN connection will be interrupted if the SSU is put into the download mode with the TL1 command "ACT-SWDL" or if the SSU is taken out of the download mode with the TL1 command "CANC-SWDL". The LAN connection must be re-established before continuing.

---

---

## A.10 CANC-BTT (Cancel Bulk Transfer Mode)

The CANC-BTT command cancels the bulk transfer mode. It signifies that all data segments have been sent.

### Error Response

```
CANC-BTT:SSU:IMC:S07;  
SSU 00-00-00 00:00:00  
M S07 DENY  
"SROF"  
/*Status, Requested Operation Failed*/  
/*CANC-BTT: BTT Not Started Yet*/  
;
```

---

## A.11 CANC-SWDL (Change to Normal Mode)

The CANC-SWDL command returns to the normal mode of operation, executing code from the Main memory.

```
CANC-SWDL:SSU:IMC:S08;
```

```
IP S08
```

```
<IP S08
```

```
<IP S08
```

```
<IP S08
```

```
<IP S08
```

```
<IP S08
```

```
<IP S08
```

```
SSU 00-00-00 00:00:00
```

```
M S08 COMPLD
```

```
;
```

---

**NOTE**

The LAN connection will be interrupted if the SSU is put into the download mode with the TL1 command “ACT-SWDL” or if the SSU is taken out of the download mode with the TL1 command “CANC-SWDL”. The LAN connection must be re-established before continuing.

---

---

## A.12 COPY-SFWR (Copy Firmware from Main to Backup Memory)

The COPY-SFWR command copies the current firmware from the Main memory to the Backup memory (or vice versa) in an EEPROM card and requests the EEPROM card to validate the checksum of the memory transfer. This command is denied if the EEPROM card is not in the download mode of operations.

### Error Response

```
COPY-SFWR:SSU:IMC-MAIN:S02;  
SSU 98-07-04 09:10:15  
M S02 DENY  
"SROF"  
/*Status, Requested Operation Failed*/  
/*COPY-SWFR: SWDL Not Started Yet*/  
;
```

An <aid> of IMC-BKUP (instead of IMC-MAIN as shown above) would copy firmware from Backup memory to Main memory.

---

## A.13 DLT-SFWR (Erase Firmware from Main Memory)

The DLT-SFWR command erases the Main memory of an EEPROM card before downloading new firmware onto it. This command is denied if a copy of a valid firmware is not in the Backup memory.

### Error Response

```

DLT-SFWR:SSU:IMC-MAIN:S03;
IP S03
<IP S03
<IP S03
<IP S03
<IP S03
<IP S03
<IP S03
<IP S03
SSU 00-00-00 00:00:00
M S03 DENY
  "SROF"
  /*Status, Requested Operation Failed*/
  /*Backup memory failed checksum check*/
;
```

You can use the FRCD parameter to force the clearing of Main memory even if the backup copy could not be made. For example:

```
DLT-SFWR::IMC-MAIN:SC1::FRCD;
```

If necessary, this command can be used to erase the Backup memory by using the latter's <aid> (e.g., IMC-BKUP).

When you want to clear Backup memory, you have to use the option "FRCD".



---

## A.14 RMV-EQPT (Remove Equipment)

The RMV-EQPT command is used in *rare* situations when you need to take the entire SSU offline to download new firmware. This command is used when you have only one working ITH or Expansion Sync card (the other ITH card has failed or doesn't exist) and you want to download new firmware to the only functioning ITH card. In normal cases, when you download new firmware, one ITH card receives the new firmware while the other ITH card operates normally. In the case where you have only one functioning ITH card, you will lose operation of the SSU if you download to that card. The equipment will normally disallow this—the RMV-EQPT command overrides this protection.

---

**NOTE**

This command will allow downloading even if doing so takes the system out of service.

This command must be followed immediately by the ACT-SWDL command. Executing any other command immediately after RMV-EQPT will undo the effect of the RMV-EQPT command. The RMV-EQPT command itself has no effect on the SSU except to enable the following ACT-SWDL command to take the entire SSU out of service.

The RMV-EQPT command is also used for the completely unrelated purpose of removing an output card from the inventory (see Chapter ).

---

### Normal Response

```
RMV-EQPT:::SC1::FRCD;  
SSU 98-07-04 09:11:00  
M S04 COMPLD  
;
```

---

## A.15 VRF-SFWR (Verify Firmware Integrity)

The VRF-SFWR command requests an EEPROM card to validate the checksum of the firmware in the Main memory. It is used mostly to confirm the completion of a firmware download by validating the checksum of the firmware received in the Main memory. This command is denied if the checksum could not be validated.

### Error Response

```

VRF-SFWR:SSU:IMC-MAIN:S06;
IP S06
<IP S06
<IP S06
<IP S06
<IP S06
<IP S06
<IP S06
<IP S06
SSU 00-00-00 00:00:00
M S06 DENY
  "SROF"
  /*Status, Requested Operation Failed*/
  /*Error Computing Checksum*/
;

```

If you get an error response as shown above, copy the software from the Backup memory to Main memory using the COPY-SFWR command.

If necessary, this input command can be used to validate the checksum of the firmware in the Backup memory by using the latter's <aid>.

---

# B

---

Example SSU TL1 Commands

---

## B.1 Appendix Contents

B.1.1 This appendix provides examples on how to use Transaction Language 1 (TL1) commands to remotely perform some of the common network management tasks.

B.1.2 This appendix is organized as follows:

- General Command Syntax Conventions page B-4
- General Syntactical Description of Parameters page B-5
- Example Commands for Setting Communication Ports page B-6
  - Setting the Parameters of the Local or Remote Port page B-6
  - Retrieving the Parameters of the Local or Remote Port page B-6
- Example Commands for Operating the 55400A System page B-8
  - Setting the System ID page B-8
  - Setting the Date and Time page B-8
  - Retrieving the Header Information page B-8
  - Retrieving the Automatic Message Log page B-8
  - Setting the State of an Input Port page B-10
  - Setting the State of an Output Port page B-11
  - Setting the State of Output Cards page B-14
  - Setting Measurement Actions page B-15
  - Restarting All Measurements on an Input Channel page B-18
  - Setting Event Actions page B-18
  - Retrieving the Settings for an Input Port or Measurement page B-20
  - Retrieving the Settings for an Output Port page B-21
  - Retrieving Performance Monitoring Data page B-22
- About Security Commands page B-24
  - Security Access Levels page B-24
  - User ID and Password page B-24
- Initial Security Setup page B-25
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  - Changing Your Own Password page B-28
  - Determining Your Own Security Level page B-28
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**Appendix Contents**

– Establishing a New User	page B-29
– Deleting a User From the Security Database	page B-30
– Changing the User ID, Security Level, or Password of a User	page B-30
– Retrieving the Security Level of All Authorized Users or of a Specific User	page B-35

---

## **B.2 General Command Syntax Conventions**

- The DEL character deletes all inputs up to that point.
- In general, commands are case insensitive. Exceptions are the password and ctag fields, where case is preserved.
- CR and LF are ignored on input. All commands must terminate with a semicolon.
- In general, extra spaces may be inserted for readability, except within an identifier. Note, however, that in some cases hyphens are treated as part of the identifier and extra spaces are therefore not allowed around these hyphens (examples are the hyphens in the command and montype fields. Also, spaces in the middle of some identifiers (such as sid, ctag, and password) may be treated as part of the identifier.
- The “< >” (e.g., <tid>, < ctag>, etc.) indicates that you must enter a value or name for the command parameter block.
- An element or parameter inside brackets “[ ]” is optional.

---

### B.3 General Syntactical Description of Parameters

B.3.1 Table B-1 lists and provides syntactical descriptions of the parameters that are used in the example TL1 commands provided in this appendix.

**Table B-1. Syntactical Description of Parameters Used in this Appendix**

Parameter	Name	Description	Comments
<tid>	Target identifier	String of 1 to 20 alphanumeric characters. This field may be left empty.	—
<ctag>	Correlation tag	String of 1 to 6 alphanumeric characters, but not all zeroes.	ABC001 is used as the ctag in the examples of this chapter.
<inchan>	Input channel	Integer from 0 to 9	—
<outchan>	Output channel	Integer from 1 to 16	—
<inchan_list>	Input channel list	inchan_list_item inchan_list & inchan_list_item	—
<inchan_list_item>	Input channel list item	inchan inchan && inchan	&& indicates an inclusive range of inchans
<outchan_list>	Output channel list	outchan_list_item outchan_list & outchan_list_item	—
<outchan_list_item>	Output channel list item	outchan outchan && outchan	&& indicates an inclusive range of outchans

---

## B.4 Example Commands for Setting Communication Ports

B.4.1 This section provides example commands for setting the parameters of the local and remote RS-232 serial ports. Refer to Running H/F 2 on page 5 in Chapter of this manual for communication port settings to establish communications with the 55400A.

B.4.2 The following subsections provide TL1 command examples for changing communication settings.

### *B.4.2.1 Setting the Parameters of the Local or Remote Port*

**To set the baud rate of the remote port to 9600 (must be executed at the local port):**

Example     ED-EQPT:::ABC001:::RMTBAUD=9600;  
 Syntax     ED-EQPT:::<ctag>:::<keyword=value>;

**To set the baud rate of the local port to 19200 and turn Hardware Flow Control ON (must be executed from the remote port):**

Example     ED-EQPT:::ABC001:::LCLBAUD=19200,LCLFLOW=HARDWARE;  
 Syntax     ED-EQPT:::<ctag>:::<keyword=value>;

#### **Caution**

Hardware switches on the IMC card should be used to set the communications parameters for normal operation.

The above commands are intended for making *temporary* changes to these parameters. Pressing the “Reset Comm Ports” (or Reset Local Port” on the NIMC) switch will restore these parameters to the values set by the hardware switches. In some cases, downloading new firmware can also cause these parameters to be reset.

### *B.4.2.2 Retrieving the Parameters of the Local or Remote Port*

**To retrieve the baud rate and flow control parameters of the Local communications port:**

Example     RTRV-EQPT:::ABC001:::PARAMETER=LCLBAUD;  
 Syntax     RTRV-EQPT:::[<IMC>]:<ctag>:::PARAMETER=<keyword>;

Example     RTRV-EQPT:::ABC001:::PARAMETER=LCLFLOW;  
 Syntax     RTRV-EQPT:::[<IMC>]:<ctag>:::PARAMETER=<keyword>;



**Example Commands for Setting Communication Ports**

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Table B-2 lists valid entries for <keyword> and <value>.

**Table B-2. Valid <keyword> and <value> Entries for Commands that Set Parameters of the Serial Ports**

<b>Keyword</b>	<b>Valid Values</b>	<b>Description</b>
LCLBAUD	1200 2400 9600 (default) 19200	Local Port Baud Rate
RMTBAUD	1200 2400 9600 (default) 19200	Remote Port Baud Rate
LCLFLOW	NONE (default) HARDWARE	Local Port Flow Control
RMTFLOW	NONE (default) HARDWARE	Remote Port Flow Control
LCLECHO	Y (default) N	Local Port Echo
RMTECHO	Y (default) N	Remote Port Echo

### ***B.4.2.3 Example Commands for Operating the 55400A System***

This section is not intended to provide complete description of the syntax or of all the permutations of a command. Only the more typical or expected uses are included. See Chapter 4, “TL1 Command Reference,” and Chapter 5, “TL1 Keyword Reference,” for complete details of the TL1 commands.

### ***B.4.2.4 Setting the System ID***

**To set the System Identifier to TSG1:**

Example     SET-SID:::ABC001::TSG1;  
 Syntax     SET-SID:<tid>::<ctag>::<sid>;

### ***B.4.2.5 Setting the Date and Time***

**To set the date to Dec. 12, 1995 and time to 5:50:42 p.m.:**

Example     ED-DAT:::ABC001::95-12-15,17-50-42;  
 Syntax     ED-DAT:<tid>::<ctag>::yy-mm-dd,hh-mm-ss;

### ***B.4.2.6 Retrieving the Header Information***

**To produce a normal completed response showing the sid, date, and time. (Sometimes used to test that the NE is responding.)**

Example     RTRV-HDR:::ABC001;  
 Syntax     RTRV-HDR:<tid>::<ctag>;

### ***B.4.2.7 Retrieving the Automatic Message Log***

Messages are retrieved either by “atag” number or by “msgtype” or both. If no filter is specified, then the entire log will be retrieved.

#### **List Specific Messages and Ranges From Earliest to Latest**

When retrieving specific messages or ranges of messages, list them from earliest to latest. Message numbers wrap from 9999 to 0001, but this should be handled properly. For example: requesting a message range of 9998&&0002 will retrieve 9998, 9999, 0001, and 0002.

**To retrieve just the last message in the log:**

Example     RTRV-AO:::ABC0001:::ATAGSEQ=LAST;  
 Syntax     RTRV-AO:<tid>::<ctag>:::<filter\_list>;

**Example Commands for Setting Communication Ports****To retrieve just the first message in the log:**

Example RTRV-AO:::ABC001:::ATAGSEQ=FIRST;  
Syntax RTRV-AO:<tid>::<ctag>:::<filter\_list>;

**To retrieve all messages in the log:**

Example RTRV-AO:::ABC001:::ATAGSEQ=FIRST&&LAST;  
or use the following shorthand:

Example RTRV-AO:::ABC001;  
Syntax RTRV-AO:<tid>::<ctag>;

**To retrieve messages 4, 17, and 25 through 30 from the log:**

Example RTRV-AO:::ABC001:::ATAGSEQ=4&17&25&&30;  
Syntax RTRV-AO:<tid>::<ctag>:::<filter\_list>;

**To retrieve all alarmed messages in the log:**

Example RTRV-AO:::ABC001:::MSGTYPE=ALM;  
Syntax RTRV-AO:<tid>::<ctag>:::<filter\_list>;

**To retrieve all non-alarmed messages with atags between 4 and 10:**

Example RTRV-AO:::ABC001:::ATAGSEQ=4&&10,MSGTYPE=EVT;  
Syntax RTRV-AO:<tid>::<ctag>:::<filter\_list>;

***B.4.2.8 Setting the State of an Input Port*****To set input 3 to a priority of 4:**

Example ED-SYNC::ITH-3:ABC001:::PRIORITY=4;

Syntax ED-SYNC::ITH-<inchan\_list>:<ctag>:::<keyword=value>;

See also:

“Setting Measurement Actions” starting on page B-15.

Table B-3 lists valid entries for <keyword> and <value>.

**Table B-3. Valid <keyword> and <value> Entries for Commands That Set the State of an Input Port**

Keyword	Valid Values	Comments*
ENABLE	Y (default) N	Controls whether an input will be considered as a reference source.
PRIORITY	integer	Specifies a priority for an input. A lower number represents a higher priority.
FORMAT	SQW (default) E1	Tells the system which format (2048 kbps or 2048 kHz) to expect from a particular input channel. SQW = 048 kHz; E1 = 2048 kbps).
SIGMODE	CAS CCS (default)	Allows you to control whether an E1 input channel should expect valid CAS/CSS information and whether CAS/CSS errors will disqualify an input. CAS=PCM30; CCS=PCM31
CRC4	Y N (default)	Controls whether an E1 input channel should expect valid CRC4 information and disqualifies the input when CRC4 channel errors are found.
PRC5MHZ	Y N (default)	For input 0 only. Allows you to tell the system to expect a 5 or 10 MHz signal on the PRC input channel. The initial setting for this parameter is specified by a switch on the ITH cards.
SSMENB	Y N (default)	Enables the reading of the SSM (Synchronization Status Message) bit for the specified input. If this keyword is disabled (SSMENB = N), the assumed SSM value (QLEVEL) will be used instead.
QLEVEL	integer	Specifies the assumed SSM (Synchronization Status Message) quality level for the specified input signal. This assumed SSM level is used when SSM Reading has been disabled (SSMENB = N) for an E1 input or when a non-E1 input has been selected (FORMAT = SQW).
QCUTOFF	integer	Specifies the minimum SSM (Synchronization Status Message) quality level, in order, for an input to be used. SSM sync mode must be enabled (SYNCMDE = SSM) for the QCUTOFF to operate.

**Table B-3. Valid <keyword> and <value> Entries for Commands That Set the State of an Input Port (continued)**

Keyword	Valid Values	Comments*
AUTOPM	Y N (default)	Inhibits or allows automatic upload of performance data for a particular input channel. The data to be uploaded is determined by the setting of the PM property of the performance monitoring measurements (e.g., MRTIE, TDEV, LMRTIE, FFOFF, SPRD).
TCNST	integer	Sets the loop tracking time constant for each input. Once the system is in "slow" tracking, there are several possible time constants for the tracking: 192,768, 3072, 12288, 49152. The default depends on the type of ITH card.
SSMBIT	SA4 (default) SA5 SA6 SA7 SA8	Specifies the SA bit used for carrying SSM (Synchronization Status Message) information in the Time Slot 0 (TS0) bits for a Non Frame Aligned Signal (NFAS) frame of an E1 signal. The bits are numbered 1 (MSB) to 8, with one of the last five bits (SA4, SA5, SA6, SA7, or SA8) carrying the SSM information.
CURRSSM	integer	<b>For retrieval only! DO NOT set!</b> Retrieves the current SSM (Synchronization Status Message) value from the specified E1 input channel. If SSM Reading has been enabled (SSMENB = Y), the SSM value in the specified bit position (SSMBIT) will be retrieved.

---

\* See Chapter of this manual for complete descriptions of these keywords.

### ***B.4.2.9 Setting the State of an Output Port***

#### **To squelch output 3 on output cards in slot B:**

Example ED-SYNC::OUTB-3:ABC001:::SQUELCH=Y;

Syntax ED-SYNC::OUT<card>-<outchan\_list>:<ctag>:::<keyword=value>;

#### **To unsquelch outputs 1 through 16 on output card in slot D:**

Example ED-SYNC::OUTD-1&&16:ABC001:::SQUELCH=N;

Syntax ED-SYNC::OUT<card>-<outchan\_list>:<ctag>:::<keyword=value>;

**Table B-4. Valid <keyword> and <value> Entries for Commands That Set the State of an Output Port**

Keyword	Valid Values	Comments*
SQUELCH	Y N (default)	Specifies which output channels are to be squelched. Y = Squelched the Output Sync; N = Unsquelched the Output Sync.

---

\*See Chapter of this manual for a complete description of this keyword.

### ***B.4.2.10 Setting the State of Input Track and Hold Cards***

#### **To set the selection algorithm to Manual Mode:**

Example ED-EQPT::ITH:ABC001::SYNCMDE=MANUAL;

Syntax ED-EQPT::ITH:<ctag>::<keyword=value>;

#### **To set the selection algorithm to Manual Mode and use Channel 2:**

Example ED-EQPT::ITH:ABC001::SYNCMDE=MANUAL,MANCHAN=2;

Syntax ED-EQPT::ITH:<ctag>::<keyword=value>;

Table B-5 on page B-13 lists valid <keyword> and <value> entries for commands that set the state of Input Track and Hold Cards.

See also:

“Setting Event Actions” starting on page B-18

**Table B-5. Valid <keyword> and <value> Entries for Commands that Set the State of Input Track and Hold Cards**

Keyword	Valid Values	Comments*
SYNCMDE	FORCED MANUAL AUTO (default) SSM	Controls how the input channel is chosen as a synchronization source.
MANCHAN	integer	Allows you to specify which channel is to be used in the manual or forced synchronization mode.
HFQLEVEL	integer	Defines the quality assumed for the local oscillation in virtual SSM (Synchronization Status Message) mode. This value is used for placing SSM bits onto the output stream when in Holdover mode, if the holdover action (HLDACT) keyword) is set to create an E1 signal.
REVERT	Y (default) N	Controls how an input reference is chosen in Automatic and Forced mode.
PIRANGE	integer	Controls how far the input can be off from the absolute LO frequency before it is disqualified. Since this is over the lifetime of the oscillator, this is not a substitute for frequency deviation. Unit is Parts/billion (ppb).
WTRSS	integer (default is 30 sec.)	Controls how long an input channel must wait to re-establish all its operating parameters before it will be considered for use as a synchronization source. Range 0 to 1000 seconds.
SPRDCHN	inchan_list (default is 2 sec.)	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.
DSCTIME	number (default is 2 sec.)	Use to determine the number of consecutive seconds with severe errors the system will wait before disqualifying the channel. Range 0 to 15 seconds.

---

\*See Chapter of this manual for a complete descriptions of these keywords.

***B.4.2.11 Setting the State of Output Cards*****To set output card or cards in slot C to squelch when in holdover mode:**

Example     ED-EQPT::OUTC:ABC001:::HLDACT=SQUELCH;  
 Syntax     ED-EQPT::OUT<card>:<ctag>:::<keyword=value>;

**To set output card or cards in slot D to squelch when in holdover and to output AIS otherwise:**

Example     ED-EQPT::OUTD:ABC001:::HLDACT=SQUELCH,AIS=Y;  
 Syntax     ED-EQPT::OUT<card>:<ctag>:::<keyword=value>;

**Table B-6. Valid <keyword> and <value> Entries for Commands that Set the State of Output Cards**

Keyword	Valid Values	Comments*
HLDACT	SQUELCH AIS CONTINUE (default)	Controls what happens to the Output cards when the system is in Holdover mode.
AIS	Y N (default)	Forces a formatted output board to generate AIS instead of the usual formatted signal.
SABITS	integer	Allows you to set certain bits in the non-frame aligned word on 2048 kbps outputs.
SSMBIT	SA4 (default) SA5 SA6 SA7 SA8	Specifies the SA bit used for carrying SSM (Synchronization Status Message) information in the Time Slot 0 (TS0) bits for a Non Frame Aligned Signal (NFAS) frame of an E1 signal. The bits are numbered 1 (MSB) to 8, with one of the last five bits (SA4, SA5, SA6, SA7, or SA8) carrying the SSM information.

---

\*See Chapter of this manual for a complete descriptions of these keywords.



**B.4.2.12 Setting Measurement Actions**

**To set the threshold for the 1 second TDEV measurement on input port 3 to 100 ns:**

Example ED-SYNC::ITH-3:ABC001:::TDEV-1S=THR-100;

Syntax ED-SYNC::ITH-<inchan\_list>:<ctag>:::<montype>=<property\_defined\_list>;

**To set the properties of the 1 second TDEV measurement on input port 3 as follows:**

- Threshold set to 100 ns,
- Threshold crossing not to be used as a selection criteria,
- Threshold crossing to be treated as an event, and
- Each new measurement to be unconditionally reported as it occurs.

Example ED-SYNC::ITH-3:ABC001:::TDEV-1S=THR-100&CRI-N&RPT-Y&PM-Y;  
or

ED-SYNC::ITH-3:ABC001:::TDEV-1S=T-100 & C-N & R-Y & P-Y;

Syntax ED-SYNC::ITH-<inchan\_list>:<ctag>:::<montype>=<property\_defined\_list>;

**To cause Frequency 3 Second Spread measurements to be reported as they occur (note difference from previous examples):**

Example ED-EQPT::ITH:ABC001:::SPRD-3S=PM-Y;

<p><b>Frequency Spread Measurements are Different</b></p> <p>Frequency Spread measurements are slightly different, in that they do not relate to a single input channel and, therefore, the command is ED-EQPT instead of ED-SYNC. The syntax for setting Spread measurement actions is:</p> <p>ED-EQPT::ITH:ctag:::montype=property_defined_list;</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Syntax ED-SYNC::ITH-<inchan\_list>:<ctag>:::<montype>=<property\_defined\_list>;

Valid entries for <montype> are listed in Table B-7 on page B-16.

**Table B-7. Valid Entries for <montype>**

BPVC_1S	FFOFF-3S	TDEV-1S	MRTIE-1S	LMRTIE-1S	SPRD-3S	TIE-1S
BPVC_1M	___	___	MRTIE-1M	LMRTIE-1M	___	TIE-1M
BPVC_15M	FFOFF-12S	TDEV-4S	MRTIE-15M	LMRTIE-15M	SPRD-12S	TIE-5M
___	FFOFF-48S	TDEV-16S	MRTIE-30M	LMRTIE-30M	SPRD-48S	TIE-30M
BERC_1S	FFOFF-192S	TDEV-64S	MRTIE-1H	LMRTIE-1H	SPRD-192S	TIE-1H
BERC_1M	FFOFF-768S	TDEV-256S	MRTIE-2H	LMRTIE-2H	SPRD-768S	TIE-2H
BERC_15M	FFOFF-3072S	TDEV-1024S	MRTIE-8H	LMRTIE-8H	SPRD-3072S	TIE-8H
	___	___	MRTIE-24H	LMRTIE-24H	___	TIE-24H

**Note on Automatic Upload Measurements**

It is easily possible to request uploading of more data than the communications channels can handle. Depending on the baud rate, the limiting factor may be either the Local or Remote ports, or the communications between the ITH and IMC cards. If this occurs, some upload reports may be lost. This problem is particularly likely to occur if the user uploads data at one second intervals.

To assist in avoiding this problem, provision has been made to upload 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 user does explicitly enable reporting of the 1-second data, then it will be uploaded every second (except for MRTIE which is only calculated at 15-minute intervals).

See Table B-8 on page B-17.

**Example Commands for Setting Communication Ports**

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**Table B-8. LMRTIE\***

Meas	Requested							
	1 SEC	1 MIN	15 MIN	30 MIN	1 HR	2 HR	8 HR	24 HR
1 sec	✓	✓ (every 1 min)	(every 15 min)					
1 min		✓	✓ (every 15 min)					
15 min			✓					
30 min				✓				
1 hr					✓			
2 hr						✓		
8 hr							✓	
24 hr								✓

\* Also applies to MRTIE, except results will not be reported at less than 15-minute intervals.

**Table B-9. Valid <keyword> and <value> Entries for Commands that Set Measurement Actions**

Keyword	Valid Values	Comments
THR T	number	Threshold value
CRI C	Y N	Use as selection criteria? (Not allowed for SPRD)
RPT R	Y N	Is threshold crossing an Event?
PM P	Y N	Report each new measurement as it occurs?

***B.4.2.13 Restarting All Measurements on an Input Channel*****To restart all measurements on input channel 3:**

Example      INIT-REG-TSG::ITH-3:ABC001;  
 Syntax      INIT-REG-TSG::ITH-<inchan>:<ctag>;

**This Command Normally Restarts Measurements on Both ITH Cards**

This command normally restarts the measurements on both ITH cards. It is also possible, although not generally recommended, to specify a particular ITH card, in which case the other card will not be affected. For example:

```
INIT-REG-TSG::ITH2-3:ABC001;
```

will only restart the channel 3 measurements on ITH card 2.

***B.4.2.14 Setting Event Actions*****To set the Input Loss of Signal event to generate a non-alarmed report:**

Example      ED-EQPT::ITH:ABC001:::INPLOS=ALM-NONALM;  
 Syntax      ED-EQPT::ITH:<ctag>:::<evttype>=<property\_defined\_list>;

**To set the Input Loss of Signal event to be logged and to generate a Major alarm:**

Example      ED-EQPT::ITH:ABC001:::INPLOS=ALM-MAJOR&LOG-Y;  
               or  
               ED-EQPT::ITH:ABC001:::INPLOS=A-MAJOR& -Y;  
 Syntax      ED-EQPT::ITH:<ctag>:::<evttype>=<property\_defined\_list>;

Valid entries for <evttype> are listed in Table B-10 on page B-19.

**Example Commands for Setting Communication Ports****Table B-10. Valid Entries for <evttype>**

CFGCHD	ITHCDIN	NETCLOS****	SNSSM
CFGRST	ITHCDRM	OPCDFL	SNPWRA <sup>1</sup>
IMCCRST	ITHCOFFL	OPCDIN	SNPWRB <sup>1</sup>
IMCRST****	ITHDISA	OPCDMS	SNTRCK
INDISQ	ITHFAIL	OPCDNA	SWDL
INEXPH	ITHGONE	OPCDNP	RCKALM0 <sup>4</sup>
INMEAS	ITHHLTH	OPCDPMM <sup>2</sup>	RCKALM1 <sup>4</sup>
INPAIS	ITHNCOM	SEACTV	RCKALM2 <sup>4</sup>
INPLOS	ITHWARM	SNDRIFT	RCKALM3 <sup>4</sup>
INPOOF	LOGCLRD	SNFAIL	RCKALM4 <sup>4</sup>
INPRCDQ	LSTCFGC	SNFREE	RCKALM5 <sup>4</sup>
INPSSM	MEASRNG	SNHAVL	RCKALM6 <sup>4</sup>
INPULL	MEASRP	SNHOLD	RCKALM7 <sup>4</sup>
ITHNVFL	MODMONL <sup>3</sup>	SNOPER	XFER
ITHACTV	MODMRDY <sup>3</sup>	SNSAVL	—

<sup>1</sup> SNPWRA and SNPWRB are only supported with IMC hardware Rev 3 and later.

<sup>2</sup> OPCDPMM is only supported with Sub-Rack Rev C and later.

<sup>3</sup> MODMRDY and MODMONL are not used in the Network IMC, as they relate to the modem.

<sup>4</sup> RCKALMn, NETCLOS, and IMCRST are only available in the Network IMC.

**Restrictions on Values for Event Type (<evttype>)**

For some <evttype> there are restrictions on the values that the user can configure. These are described in more detail in Chapter 6, "Events," of this manual.

**Table B-11. Valid Entries for <property> and <value>**

Keyword	Valid Values	Comments
ALM A	NONE NONALM MINOR MAJOR FAIL	Do not report. Report as non-alarmed event. Report as Minor Alarm Report as Major Alarm See "ALARM NOTE" below.
LOG L	Y N	Log the event?

**ALARM NOTE**

If the ALM property is set to FAIL, the alarm will be reported as CRITICAL if the card is not part of a protected pair (e.g., if it is an unprotected output card) or if the other card of the pair is also indicating FAIL. Otherwise, the alarm will be reported as MAJOR.

***B.4.2.15 Retrieving the Settings for an Input Port or Measurement*****To retrieve the priority of input 3:**

Example     RTRV-SYNC::ITH-3:ABC001::PARAMETER=PRIORITY;

Syntax     RTRV-SYNC::ITH-<inchan>:<ctag>::PARAMETER=<keyword>;

**To retrieve the priority of input 3 and whether it is enabled:**

Example     RTRV-SYNC::ITH-3:ABC001::PARAMETER=PRIORITY&ENABLE;

Syntax     RTRV-SYNC::ITH-<inchan>:<ctag>::PARAMETER=<keyword\_list>;

**To retrieve the properties for a 1 Second TDEV measurement on input 3:**

Example     RTRV-SYNC::ITH-3:ABC001:::PARAMETER=TDEV-1S;  
 Syntax     RTRV-SYNC::ITH-<inchan>:<ctag>:::PARAMETER=<keyword>;

Valid entries for <keyword> are listed in Table B-7 on page B-16.

***B.4.2.16 Retrieving the Settings for an Output Port*****To retrieve whether Output 3 on Output Card 4 is Squelched:**

Example     RTRV-SYNC::OUT4-3:ABC001:::PARAMETER=SQUELCH;  
 Syntax     RTRV-SYNC::OUT<card>-<outchan>:<ctag>:::PARAMETER=<keyword>;

Valid entries for <keyword> are listed in under Table B-4 on page B-12.

***B.4.2.17 Retrieving the Settings for an Input Card or Event Action*****To retrieve the selection algorithm setting:**

Example     RTRV-EQPT::ITH:ABC001:::PARAMETER=SYNCMDE;  
 Syntax     RTRV-EQPT::ITH:<ctag>:::PARAMETER=<keyword>;

**To retrieve the selection algorithm setting and the selected manual channel number:**

Example     RTRV-EQPT::ITH:ABC001:::PARAMETER=SYNCMDE&MANCHAN;  
 Syntax     RTRV-EQPT::ITH:<ctag>:::PARAMETER=<keyword\_list>;

**RTRV-SYNC versus RTRV-EQPT Commands**

The RTRV-SYNC command is used when specifying a particular input or output port.

The RTRV-EQPT command is used when no port is to be specified.

**To retrieve the properties for the Input Loss of Signal event:**

Example RTRV-EQPT::ITH:ABC001:::PARAMETER=INPLOS;  
 Syntax RTRV-EQPT::ITH:<ctag>:::PARAMETER=<keyword>;

Valid entries for <keyword> are listed in Table B-5 on page B-13.

***B.4.2.18 Retrieving the Settings for an Output Card*****To retrieve the Holdover Action setting for Output Card 4:**

Example RTRV-EQPT::OUT4:ABC001:::PARAMETER=HLDACT;  
 Syntax RTRV-EQPT::OUTcard:ctag:::PARAMETER=keyword;

**To retrieve the Holdover Action and whether AIS is the normal output for Output Card 4:**

Example RTRV-EQPT::OUT4:ABC001:::PARAMETER=HLDACT & AIS;  
 Syntax RTRV-EQPT::OUTcard:ctag:::PARAMETER=keyword\_list;

Valid entries for keyword are listed under “Setting the State of Output Cards” starting on page B-14.

***B.4.2.19 Retrieving Performance Monitoring Data*****To retrieve the MRTIE data for input channel 3:**

Example RTRV-PM-TSG::ITH-3:ABC001::MRTIE;  
 Syntax RTRV-PM-TSG::ITH-<inchan>:<ctag>::<montype>;

**To retrieve the TDEV data for input channel 3:**

Example RTRV-PM-TSG::ITH-3:ABC001::TDEV;  
 Syntax RTRV-PM-TSG::ITH-<inchan>:<ctag>::<montype>;

Valid entries for <montype> are listed in Table B-7 on page B-16.



**To retrieve the Frequency Spread data (note that an inchan is not specified):**

Example RTRV-PM-TSG::ITH:ABC001::SPRD;

Syntax RTRV-PM-TSG::ITH-<inchan>:<ctag>::<montype>;

In addition to the <montype> values in Table B-12, any of the <montype> values listed in Table B-7 on page B-16 are valid.

**Table B-12. Valid Entries for <montype>**

TDEV	MRTIE	LMRTIE	FFOFF
SPRD (see NOTE below)			

**NOTE**

For SPRD, no inchan is specified. The syntax is simply:

RTRV-PM-TSG::ITH:<ctag>::SPRD

---

## B.5 About Security Commands

B.5.1 This section discusses the Security Commands.

### ***B.5.1.1 Security Access Levels***

If the Password Required switch on the IMC card is in the ON position, users must log on before using most of the commands described in this appendix. If the switch is in the OFF position, all commands can be executed without first logging on (although it is still possible to log on).

Each TL1 command has been assigned a default Security Level. *Users can configure the security level of most commands, if they do not agree with the factory defaults.* The available Security Levels (and their default usage) are:

Security Level	Primary Use
NONE	Commands that can be executed without logging on. If the Password Required switch is OFF, then all commands behave as if their Security Level were NONE.
USER	Commands that only allow retrieving information.
ADMIN	Commands that allow changing the configuration.
SECURITY	Commands that modify the Security Database. These commands also are used to download new firmware.

### ***B.5.1.2 User ID and Password***

Up to *ten* User ID's can be installed in the Security Database. Each user ID has an associated Password and Security Level (USER, ADMIN, or SECURITY) that is set by the administrator when the User ID is added to the database. A user may change his own password at any time. A user may execute any command at or below his own security level. Characteristics that the User ID and Password must have are described in the following table.

User ID:	A string of up to <i>ten</i> alphanumeric characters. The User ID is not case sensitive.
Password:	A string of up to <i>ten</i> characters meeting the following TL1 rules: <ul style="list-style-type: none"> <li>•At least two characters must not be letters of the alphabet.</li> <li>•At least one special character must be included.</li> </ul> In this implementation a special character is any printing character other than a letter of the alphabet, a number, a comma, a colon, or a semicolon. The password is case sensitive.

User IDs, Passwords, and Security Levels are retained if the IMC card is removed from the rack. Users should be aware that if Full Duplex data transmission is in use (echo is on) then the password will be echoed back whenever it is entered as part of a command.

---

## **B.6 Initial Security Setup**

B.6.1 Upon initial installation, the following procedure should be followed to setup the security database:

**1** Set the Password Required switch to the OFF position.

**2** Delete any User IDs and Passwords currently in the database (optional):

```
DLT-SECU:::ABC001;
```

**3** Establish a new user with the highest level of security authorization (SECURITY).

For example, to establish a user with User ID of XYZ, Password of MN.1, and security authorization of SECURITY:

```
ENT-USER-SECU::XYZ:ABC001::MN.1,,SECURITY;
```

**4** Test the new user id. For example:

```
ACT-USER::XYZ:ABC001::MN.1;
```

A logon message should be displayed, and the Port LED should light.

**5** Log off:

```
CANC-USER:::ABC001;
```

The Port LED should go out.

**6** Set the Password Required switch to the ON position.

**7** Test that security is enabled:

```
RTRV-HDR:::ABC001;
```

An error response should be returned, showing the status code of PICC.

**Initial Security Setup**

Issue 2: Jul 00

**8** Log on. For example:

```
ACT-USER::XYZ:ABC001::MN.1;
```

A logon message should be displayed, and the Port LED should light.

**9** Try typing:

```
RTRV-HDR:::ABC001;
```

A normal completed response should be returned.

**10** Log off (if desired):

```
CANC-USER:::ABC001;
```

**Communication Ports**

There are two communication ports (Remote and Local/Craft), and it is therefore possible for two users to be logged on at the same time (one at each port). A user (with proper authorization level) at either port can disable the execution of commands at the other port. However, an internal hardware switch on the IMC card can be set to force enabling of the Local port (no such capability exists with respect to the Remote port).

---

## B.7 Example Security Commands

B.7.1 This section provides example security commands.

### *B.7.1.1 Logging On*

**To log on with a user id of XYZ and a password of MN.1:**

Example     ACT-USER::XYZ:ABC001::MN.1;  
 Syntax     ACT-USER::<user\_id>:<ctag>::<password>;

The response will be of the form:

```
SSU 1995-12-29 19:01:34
M ABC001 COMPLD
"XYZ:1995-12-28 11:23:15,2"
;
```

This response indicates that the previous log on for XYZ was at 11:23:15 a.m. on December 28, 1995, and that since then there have been 2 unsuccessful attempts at logging on (using the wrong password).

An Automatic Message will also be generated, which will be sent only to this port. It is of the form:

```
SSU 1995-12-29 19:01:34
A 0012 REPT EVT SESSION
"LOCAL"
/* NOTICE: This is a private computer system.
Unauthorized access or use may lead to prosecution. */
;
```

### *B.7.1.2 Logging Off*

**To log off:**

Example     CANC-USER:::ABC001;  
 Syntax     CANC-USER:: [<user\_id> ] : <ctag>;

***B.7.1.3 Changing Your Own Password*****To change the password of user XYZ from MN.1 to RS.2:**

Example ED-PID::XYZ:ABC001::MN.1,RS.2;

Syntax ED-PID::&lt;user\_id&gt;:&lt;ctag&gt;::&lt;old\_password,new\_password&gt;;

***B.7.1.4 Determining Your Own Security Level*****To determine your own SECURITY Level:**

Example RTRV-USER:::ABC001;

Syntax RTRV-USER:: [&lt;user\_id&gt;]:&lt;ctag&gt;;

The response will be of the form:

```

SSU 1995-12-29 19:01:34
M ABC001 RTRV
"XYZ:LOCAL,ADMIN"
;

```

This response indicates that your user id is XYZ, you are logged on at the LOCAL port, and you have a security level of ADMIN.

***B.7.1.5 Determining Who is Logged On*****To determine who is logged on:**

Example RTRV-STATUS:::ABC001;

Syntax RTRV-STATUS:::&lt;ctag&gt;;

Response is of the form:

```

SSU 1995-12-29 19:01:34
M ABC001 RTRV
:LOCAL&REMOTE,XYZ&MN,RS&GH&KL"
;

```

This response indicates users XYZ and MN are logged on at the LOCAL and REMOTE ports, respectively, and that the security administrator has inhibited users RS, GH, and KL from logging on.

***B.7.1.6 Deleting All Users From the Security Database*****To delete all users from the security database:**Example `DLT-SECU:::ABC001;`Syntax `DTL-SECU:::ctag;`**DLT-SECU Can Only be Executed if Password Required Switch is Set to OFF**

This command can only be executed if the Password Required switch is set to OFF. It will force an immediate logoff of anyone logged on at either port, including the person executing this command. If it were executed with the Password Required switch ON (which is not permitted) it would disable anyone from logging on, and would make it impossible to establish an authorized user!

This command will also enable both communications ports (which might have been disabled with the ED-CID-SECU command).

***B.7.1.7 Establishing a New User*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To establish a user XYZ with password MN.1 and a Security Level of ADMIN:**Example `ENT-USER-SECU:::XYZ:ABC001::MN.1,,ADMIN;`Syntax `ENT-USER-SECU:::<user_id>:<ctag>::<password,,security_level>;`

Valid values of security\_level are:

USER

ADMIN

SECURITY

***B.7.1.8 Deleting a User From the Security Database*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To delete user XYZ:**

Example     DLT-USER-SECU::XYZ:ABC001;  
 Syntax     DLT-USER-SECU::<user\_id><ctag>;  
 where <user\_id> is the user being deleted.

***B.7.1.9 Changing the User ID, Security Level, or Password of a User*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To change the security level of user XYZ to USER:**

Example     ED-USER-SECU::XYZ:ABC001::,, ,USER  
 Syntax     See “Syntax Details” below.

**To change the user id of XYZ to MN and change the password to y.z%:**

Example     ED-USER-SECU::XYZ:ABC001::MN,Y.Z%;  
 Syntax     See “Syntax Details” below.  
 Syntax  
 Details     ED-USER-SECU::old\_uid:ctag::new\_uid,new\_pid,,security\_level;  
 where:

old_uid:	Existing User ID
new_uid:	New User ID
new_pid:	New Password
security_level:	New Security Level

If <new\_uid>, <new\_pid>, and/or <security\_level> are not specified, the existing values are unchanged. The field for new parameters is position dependent; if a new parameter is not specified then adjacent commas indicate the empty field (empty fields at the end of the command may be omitted).



### ***B.7.1.10 Retrieving the Security Level of All Authorized Users or of a Specific User***

<p><b>Requires SECURITY Level</b></p>
---------------------------------------

<p>This task requires SECURITY level authorization.</p>
---------------------------------------------------------

**To retrieve the security level associated with all authorized users:**

Example     RTRV-USER-SECU:::ABC001;

Syntax     RTRV-USER-SECU:: [<user\_id>]:<ctag>;

If no <user\_id> is specified, information will be retrieved for all users.

**To retrieve the security level associated with user MN:**

Example     RTRV-USER-SECU::MN:ABC001;

Syntax     RTRV-USER-SECU:: [<user\_id>]:<ctag>;

If no <user\_id> is specified, information will be retrieved for all users.

A user may retrieve his own security level with the RTRV-USER command. The RTRV-USER-SECU command allows a system administrator (with SECURITY level authorization) to retrieve the authorization level associated with other users.

### ***B.7.1.11 Temporarily Inhibiting a User From Logging On***

<p><b>Requires SECURITY Level</b></p>
---------------------------------------

<p>This task requires SECURITY level authorization.</p>
---------------------------------------------------------

**To prevent user MN from logging on:**

Example     INH-USER-SECU:::ABC001::MN;

Syntax     INH-USER-SECU:::<ctag>::<user\_id>;

This command inhibits a user from logging on without removing the user from the security database. Use the ALW-USER-SECU command to reinstate the users ability to log on.

***B.7.1.12 Reinstating an Inhibited User's Ability to Log On*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To reinstate user MN:**

Example:     ALW-USER-SECU:::ABC001::MN;

Syntax     ALW-USER-SECU:::<ctag>::<user\_id>;

This command removes the inhibit condition applied by the INH-USER-SECU command.

***0.0.0.1 Logging Off Any Specific User*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To log off user XYZ:**

Example     CANC-USER-SECU:::XYZ:ABC001;

Syntax     CANC-USER-SECU:::<user\_id>:<ctag>;

The <user\_id> must be specified. If a user specifies their own <user\_id> they will be logged off, although normally a user will use the CANC-USER command to log off themselves. An Automatic Message will be sent to the port corresponding to the user that is logged off.

***B.7.1.13 Logging Off a User at a Specific Communication Port (Local or Remote)*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To log off the user at the LOCAL port:**

Example     CANC-CID-SECU:::LOCAL:ABC001;

Syntax     CANC-CID-SECU:::<port\_id>:<ctag>;

where:

port\_id:

LOCAL

REMOTE

If a user specifies their own port, they will be logged off.

**Example Security Commands****To log off the user at the REMOTE port:**

Example CANC-CID-SECU::REMOTE:ANC001;  
 Syntax CANC-CID-SECU::<port\_id>:<ctag>;

where:

port\_id:  
 LOCAL  
 REMOTE

If a user specifies their own port, they will be logged off.

***B.7.1.14 Disabling Logging in at a Specific Communications Port*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To prevent executing commands at the LOCAL port:**

Example ED-CID-SECU::LOCAL:ABC001::DISABLED;  
 Syntax See “Syntax Details” below.

**Example To allow executing commands at the REMOTE port:**

ED-CID-SECU::REMOTE:ABC001::ENABLED;  
 Syntax See “Syntax Details” below.  
 Syntax ED-CID-SECU::<port\_id>:<ctag>::<chap>;  
 Details where:

port\_id:  
 LOCAL  
 REMOTE

chap: (Channel Access Privileges)  
 ENABLED  
 DISABLED

**Notes**

- It is not possible to disable your own port.
- Disabling a port to which a user is logged on will cause a log off of that user.
- Disabling a port does not prevent automatic messages from being sent to the port.
- Any command sent to a disabled port will be denied.
- The Password Required hardware switch has no bearing on whether or not a communication port is enabled.
- The DLT-SECU command will enable both communication ports.
- A Hardware Switch can be set which overrides the disabling of the LOCAL port (no such switch exists for the REMOTE 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.
- It is possible to ENABLE your own port. This is useful if the hardware override switch has been used to force enabling of the port. For example, if the local port has been inadvertently left disabled, it is possible to:
  1. Set the Hardware Override Switch to force enabling of the local port.
  2. Logon (if necessary) at the local port.
  3. Use the ED-CID-SECU command to enable the local port.
  4. Set the Hardware Override Switch back to its normal position.

***B.7.1.15 Retrieving the State of a Communications Port*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To retrieve the state of the LOCAL port:**

Example      `RTRV-CID-SECU::LOCAL:ABC001;`

Syntax      `RTRV-CID-SECU::<port_id><ctag>;`

where:

port\_id:

LOCAL

REMOTE

**Example Security Commands**

The response will be of the form:

```
SSU 1995-12-29 19:01:34
M ABC001 RTRV
"LOCAL:ENABLED"
;
```

This response indicates that the remote port is enabled. The reported Channel Access Privilege can be:

```
ENABLED
DISABLED
HWENABLE
```

The last one of these (HWENABLE) can only be reported for the Local port, and indicates that the internal Hardware Switch is set to force the enabling of that port.

***B.7.1.16 Changing the Security level of a Command*****Requires SECURITY Level**

This task requires SECURITY level authorization.

**To change the ED-DAT command to require SECURITY level authorization:**

```
Example ED-CMD-SECU::ED-DAT:ABC001::SECURITY;
Syntax ED-CMD-SECU::<command>:<ctag>::<cmd_security_level>;
```

where:

```
cmd_security_level:
NONE
SECURITY
```

***B.7.1.17 Retrieving the Security Level of a Command***

**To retrieve the authorization level of the ED-DAT command:**

```
Example RTRV-CMD-SECU::ED-DAT:ABC001;
Syntax RTRV RTRV-CMD-SECU::<command>:<ctag>;
```

**Example Security Commands**

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---

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<aid>, 5-6  
    access identifier, 5-7, 8-11  
<almcde>alarm severity code, 5-7  
<atag>, 5-53  
    automatic message tag, 5-7  
<conddescr>trouble condition description, 5-7  
<condeff>condition effect, 5-7  
<ctag>, 5-6  
    correlation tag, 5-7  
<date>current date, 5-7  
<errcde>error code, 5-7  
<montype>monitored parameter type, 5-8  
<monval>monitored value, 5-8  
<ntfcncde>notification code, 5-8  
<pid>password identifier, 5-8  
<sid>  
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