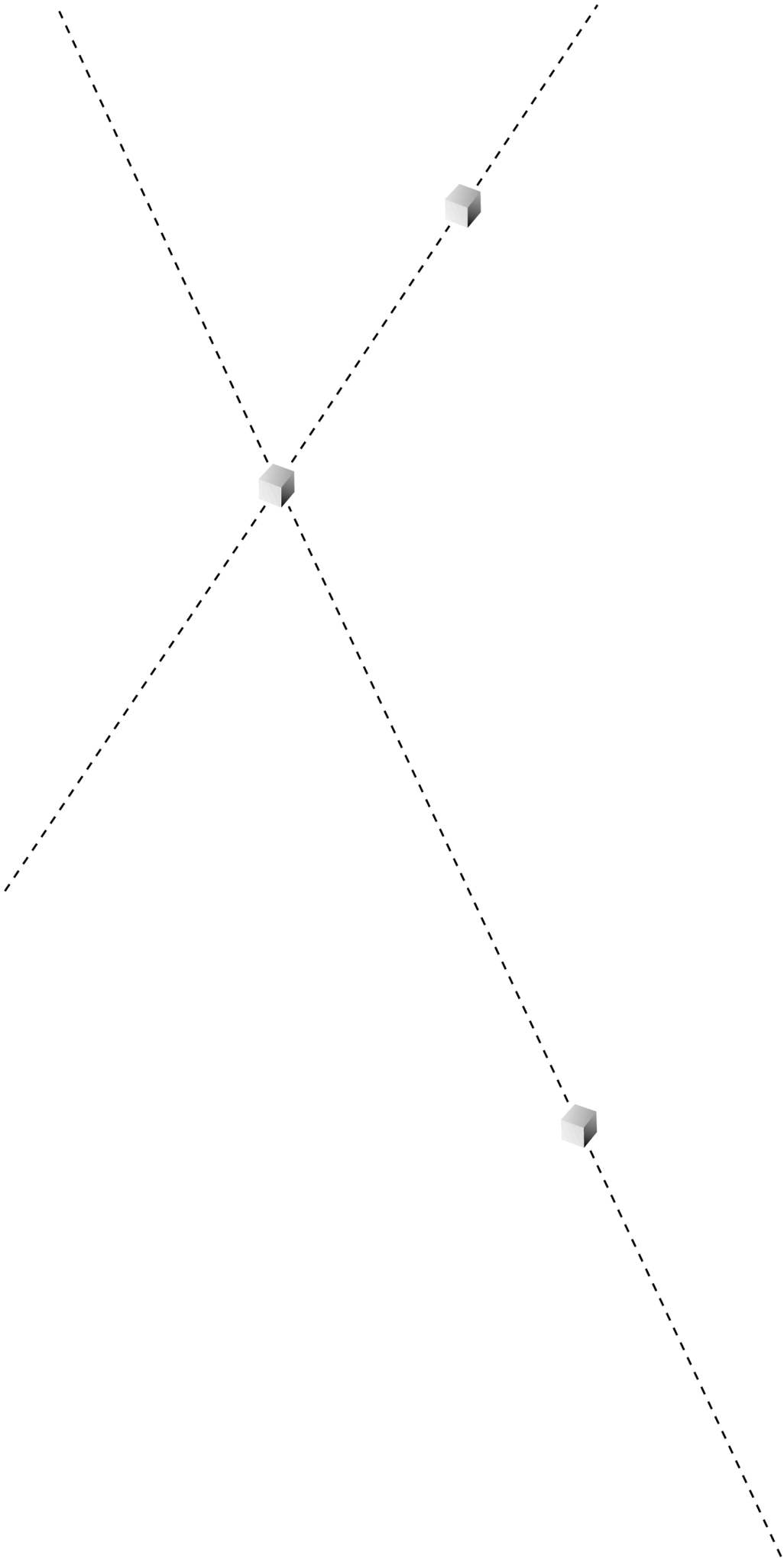


summafour

CCITT Integrated SS7 ISUP, V5.0 FSR00, Release Notes

61090302250-0BR

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generated, used, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manuals, may cause interference in which case the user will be required to correct the interference at his/her own expense.

NOTICE: Customers connecting this device to the network shall, upon request of the telephone company, inform the telephone company of the particular lines such connections are made, the FCC registration number, and ringer equivalence number of this device. This information is contained on the label located on the rear panel of the system.

If this device causes harm to the network, the telephone company may discontinue your service temporarily. If possible, they will notify you in advance. But if advance notice isn't practical, you will be notified as soon as possible. You will be advised of your right to file a complaint with the FCC.

Your telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the proper operation of your equipment. If they do, you will be notified in advance to give you the opportunity to maintain uninterrupted service.

If you experience trouble with the system, please contact Summa Four, Inc., 25 Sundial Avenue, Manchester, NH 03103-7251, (800) 978-6624 for repair information. The telephone company may ask you to disconnect this equipment from the network until the problem has been corrected, or you are sure that the equipment is not malfunctioning.

This equipment may not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs.

P/N 61090302250-0BR

Revised: 07.02.98

Summa Four, Inc. reserves the right to change specifications without prior notice.

For further information about this product, contact:

Summa Four Inc.

25 Sundial Avenue

Manchester, NH 03103-7251

(800) 978-6624

Printed In U.S.A.

This symbol on the product's nameplate means it has been tested by Electronic Testing Labs, Inc.

Table of Contents

Table of Contents

Preface

The *CCITT Integrated SS7 ISUP, V5.0 FSR00, Release Notes* provide important information about Version 5.0 FSR00 of CCITT Integrated SS7 ISUP software. This information includes

- A list of the enhancements and problems corrected since Version 3.0 FSR02.
- A description of the system requirements for V5.0 FSR00.
- A list of special considerations you should be aware of.
- A list of known design constraints.
- A list of known functional constraints and work arounds.

For information on how to install and use the CCITT Integrated SS7 product, refer to the *CCITT Integrated SS7, V5.0, System Supplement* (61090301250).

These release notes are intended for programmers familiar with SDS or VCO Systems, SS7 concepts, UNIX, and Ethernet.

Section 1
CONTENTS OF THE RELEASE

1.1 INTRODUCTION

CCITT Integrated SS7 ISUP, Version 5.0 FSR00, is an enhancement to the existing SS7 software; it supports the extended API of Generic V5.0 FSR00 system software for all SDS and VCO Series systems. Generic V5.0 FSR00 is designed to set the groundwork for the 4K port system. This section describes the enhancements and problems corrected since CCITT Integrated SS7 ISUP, Version V3.0 FSR02.

New features and enhancements in CCITT Integrated SS7, Version 5.0 FSR00, include:

- Extended Operational Mode Capability/Support for 4K Circuits
- Extended SS7 Commands and Reports to Support the Extended Host API
- Support for 63/223 Resource Groups
- Year 2000 Compliant Software/Support for Solaris 2.6
- Additional Information in CktInt Log File
- More Interactive **install_cktint.sh** Script
- Incoming Call Handling
- Startup Script Improvements
- Five New **CktInt.cfg** Feature Flags
- Dynamic Changing of Feature Flags
- New isup_console Feature
- Helpful UNIX Scripts/Alias Added
- SS7 Link Availability Reported to Host
- Host Control of Call Load
- Host Control Option
- Two New SS7 Commands ($C0 04 and $C0 05)
- New SS7 Report ($D9)
- Rotary/Cyclic Port Selection
- Singapore Number Portability
- 8-Link Capability

The fields in the SS7 commands and reports have been extended, and additional fields have been added, to accommodate the upgrade to 4K port support. However, this extended version of the API will only support 2K ports with existing hardware.

The system can operate with either the standard (existing) version of the Host API or the extended API.

This release supports the CCITT standards listed in Table 1.1.

Table 1.1: CCITT Standards Supported by V5.0 FSR00

SS7 Layer	Standard
MTP-2	Q.701-Q.703, 1992
MTP-3	Q.704-Q.707, 1992
ISUP	Q.761-Q.764, 1992

NOTE: The country variants of Integrated SS7 ISUP, V5.0 FSR00, may not support all specifications for the standards listed in Table 1.1, and in some cases, additional messages are required. The differences for each supported country are described in Appendix E *of the* CCITT Integrated SS7, V5.0, System Supplement.

1.2 INSTALLATION

The startup procedure has changed for this release. **Prior to running the new software, you must complete the following steps**:

1. Remove all the ebs drivers.
2. Turn power off.
3. Turn power back on for the ecpt drivers to be seen by the system.

   NOTE: If you are running a 4-link or 8-link configuration, the ecp drivers will not be loaded. Instead, the ecpt drivers will get loaded. ***The port assignments for these drivers are slightly different from ecp. No matter which slot is occupied, the first occupied slot will have port numbers 1 through 4, the second one will have 5 through 8, and so on.***

   For example, if there are two 4-port cards in the Sbus on a system, and they occupy ecpt4 and ecpt5, the card that occupies ecpt4 will still take ports 1 through 4. Previously, ecp would have taken ports 17 through 20.
4. Follow the usual startup sequence as described in the *CCITT Integrated SS7, V5.0, System Supplement* (61090301233).

1.3 ENHANCEMENTS

1.3.1 Extended Operational Mode Capability/Support for 4K Circuits

SS7 can now run an Extended mode of operation to correspond to the extended operational mode of Generic V5.0.

NOTE: CktInt software reads the generic $DC Report at startup and automatically configures itself to the same mode of operation (Extended or Standard) as the Generic.

Extended Host API support is independent of 2K or 4K mode support. The extended API option is supported in either mode.

1.3.2 Extended SS7 Commands and Reports to Support the Extended Host API

For detailed information on extended SS7 commands and reports, refer to *Section 6.6* of the *CCITT Integrated SS7, V5.0, System Supplement*.

Changes to the standard SS7 $49 command and $EA report for extended mode include:

- Port address fields have been expanded to four bytes.
- Instances of "bit packing" in the port address fields have been eliminated; port address and other previously bit-packed fields are now separate fields.
- A tone plan identifier has been added to messages associated with the host.
- An additional host data field has been added to messages associated with the host.

Changes to the standard SS7 $30 commands and $B0 01 report for extended mode include:

- In the extended SS7 $30 commands, the Trunk Group ID has increased from one to three bytes (one byte for the Trunk Group ID and two bytes for the Trunk Group).
- In the extended SS7 $B0 01 report:
  - The Trunk Group has increased from one to two bytes.
  - Optional Circuit Segments (byte offsets 10...n) have increased from three to six bytes. A segment includes the Circuit Port Address (4 bytes), the Circuit State (1 byte), and the Circuit Call State (1 byte).

1.3.3 Support for 63/223 Resource Groups

Previously, the Integrated SS7 software only supported resource group values from 1 to 31. Now, you can define from 1 to 63 resource groups in standard mode and 1 to 223 resource groups in extended operational mode.

1.3.4 Year 2000 Compliant Software/Support for Solaris 2.6

V5.0 FSR00 software runs on either a Solaris 2.4 or Solaris 2.6 platform, but only Solaris 2.6 is Year 2000 compliant.

1.3.5 Additional Information in CktInt Log File

The log files generated by CktInt now include the side (A or B), status (Active or Standby), and mode (Extended or Standard).

1.3.6 More Interactive install_cktint.sh Script

The **install_cktint.sh** script now looks for user inputs while overwriting an existing **/export/home/cktint** directory.

1.3.7 Incoming Call Handling

Any incoming call on any circuit during initial group resets, or when there is no host connected, will now be released.

1.3.8 Startup Script Improvements

The startup software script has been modified to include the following improvements:

- Automatically checks for EBS and cktint processes already running.
- If the CktInt software fails during startup (using "start_ss7.sh" script), it automatically attempts to come up one more time. The message "Circuit Interworking failed to startup, Retrying..." will flash on the screen during this attempt.

1.3.9 Five New CktInt.cfg Feature Flags

There are five new feature flags for the CktInt.cfg file:

- **-FEATURE_FLAG05**—Enables the Host Control Option. Allows only one host to control a call. A secondary host can assume control of a controlling host's calls by sending an SS7 $C0 05 command (see *Section 1.3.15* and *Section 1.3.16*).
- **-FEATURE_FLAG06**—Causes MTP link alarms to be processed by cktint and an SS7 $F0 alarm report to be sent to the host (see *Section 1.3.13*).
- **-FEATURE_FLAG07**—An incoming CGB/CGU/GRS from the network, system, or isup_console generates an SS7 $D9 Circuit Group Status report to the host instead of individual $D3 System Port Status reports (see *Section 1.3.17*).
- **-FEATURE_FLAG08**—Host message queue is not flushed when socket is dropped.
- **-FEATURE_FLAG09**—Does not drop host socket connection if the socket write is blocked.

1.3.10 Dynamic Changing of Feature Flags

You can now use the "f" command in the **isup_console** program to toggle each feature flag. The same feature flags can be specified in the CktInt.cfg file (see *Section 4.4* in the *CCITT Integrated SS7, V5.0, System Supplement*).

1.3.11 New isup_console Feature

Feature Flags (f) — Allows feature flags to be enabled or disabled. Displays all the feature flags that have been enabled. If no feature flags are enabled, the message "No feature flags are enabled" is displayed.

The **isup_console** program is located in the **~/sys/CktIntAnEnv** (**$XNV**) directory. For detailed information on the isup_console, see *Section 5.6* in the *CCITT Integrated SS7, V5.0, System Supplement.*

1.3.12 Helpful UNIX Scripts/Alias Added

The following alias and scripts have been included to streamline processes:

Script/Alias Name	Function	Usage
tcp-links	Displays current TCP link status.	tcp-links
ss7-links	Displays status of SS7 links.	ss7-links
dbs	Displays the CktInt debug flags that are turned ON.	dbs
dbc	Toggles the status of the debug flags specified. Type command name, followed by an empty space and the number of the flag(s) to be toggled (i.e. dbc 2 3 4).	dbc <debug flag(s)>
ebslog	Turns EBS logging ON/OFF.	ebslog <on/off>
msg	Displays the status of circuits associated with the input circuit group(s) as seen by EBS. Type command name, followed by a space, then the point code number and group number(s) (i.e. msg 1 1).	msg <pcno> <grpids>
px	Prints information about SS7 processes now running with a full listing.	px
rcg	Issues a "reset circuit" for each circuit in the trunk group(s). Type command name, followed by space, and group number(s) (i.e. rcg 4).	rcg <trnkgrpid>
sg	Displays the status of circuits associated with the input group(s) as seen by CktInt. Type command name, followed by space, and the group number(s) (i.e. sg 4).	sg <trnkgrpid>
rg	Used to issue a "reset circuit group" for each input trunk group. Type command name, followed by space, and the range of number(s) (i.e. rg 1 -or- rg 1 2 3 -or- rg 1-3).	rg <trnkgrpid>
rmdb	An alias to remove all EBS database files.	rmdb

1.3.13 SS7 Link Availability Reported to Host

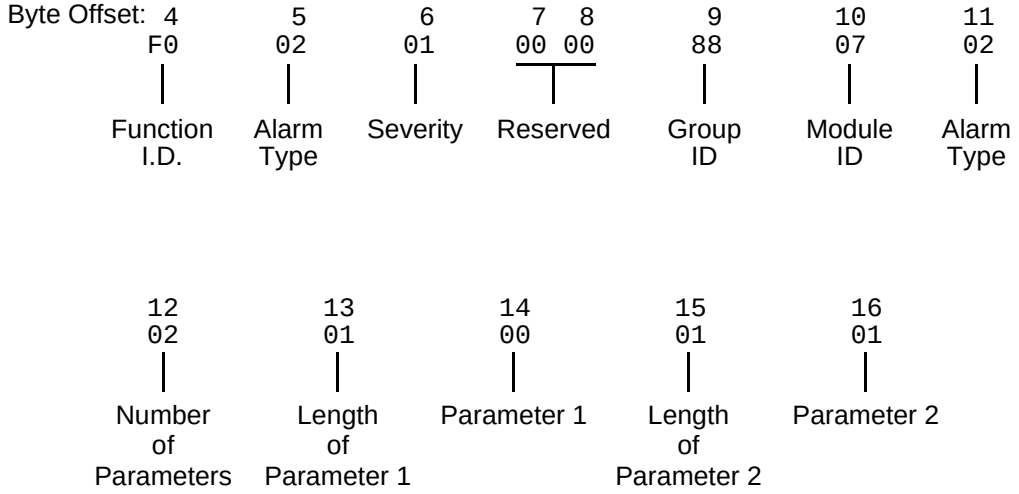
You can now transport two SS7 alarms—Link Unavailable (880702) and Link Available (880704)—from the MTP level to the host. See the *NewNet AccessManager Maintenance Manual* for more information on specific alarms.

Cktint sends SS7 Alarm Condition $F0 reports to the host indicating these system alarms are being generated, including type and severity. This enhancement allows the host the flexibility to take corrective action from a remote facility.

A new feature flag, -FEATURE_FLAG 06, causes the MTP link alarms to be processed by cktint and an $F0 alarm report to be sent to the host.

> *NOTE: You must include this flag in the CktInt.cfg file and restart Circuit Interworking to receive the $F0 report at the host.*

The following is an example of the SS7 $F0 report format:



For detailed information on the SS7 Alarm Condition $F0 Report, see the *CCITT Integrated SS7, V5.0, System Supplement*.

1.3.14 Host Control of Call Load

Cktint now supports enabling the Host Control of Call Load feature in the Generic software, which allows the host to control call processing. The Integrated SS7 software supports dynamic changing of the status of the Host Control of Call Load feature after startup.

The new SS7 $C0 04 command (see *Section 1.3.16*) allows the Host Control of Call Load feature to function in an SS7 system. The SS7 $C0 04 command controls host call processing and can be used to gracefully start or stop call processing. *The Host Control of Call Load feature must be enabled through the System Host Configuration screen in the Generic software* for the SS7 $C0 04 command to be processed by cktint.

> *NOTE:* ***On an SS7 system, the $C0 04 command destination VCA must be set to $C0****; otherwise, this could result in tcp link state mismatches between cktint, the SDS/VCO, and the host.*

Cktint uses two new tcp link states (ONLINE_NOT_READY and ONLINE_RESTRICTED) to process the Host Control of Call Load feature. The tcp link state and call processing message type determine the system's ability to process incoming or outgoing calls.

> *NOTE: If calls are present when the host goes ONLINE_NOT_READY, there can be a mismatch of circuit states among the SDS/VCO, cktint, and the host.*
>
> *When the Host Control of Call Load feature is enabled and there is a connection to the host, the initial tcp link state in cktint is ONLINE_NOT_READY. It stays in this state until receiving an SS7 $C0 04 command from the host requesting a host link state change.*

A new debug flag, -DEBUG16, prints related diagnostic messages in the cktint log file concerning the Host Control of Call Load feature.

1.3.15 Host Control Option

This feature allows only one host to control a call. When enabled, if cktint receives a message from any host except the controlling host, the message will be rejected as "Invalid Controlling Host." A secondary host can only assume control of a controlling host's calls by sending an appropriate SS7 $C0 05 command.

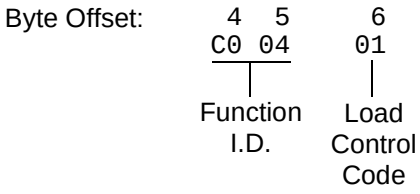
A new feature flag, -FEATURE_FLAG05, enables the Host Control Option (see *Section 1.3.15*).

> *NOTE: You must include this flag in the CktInt.cfg file and restart Circuit Interworking to enable the Host Control Option.*

1.3.16 Two New SS7 Commands ($C0 04 and $C0 05)

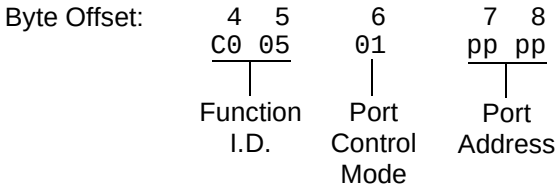
The SS7 $C0 04 command is used in conjunction with the Host Control of Call Load feature in the Generic software (refer to the System Host Configuration screen in the *System Administrator's Guide*). When the feature is enabled, this command allows the host to indicate its ability to process all calls, existing calls only, or no calls.

The following is an example of the SS7 $C0 04 command format:



The SS7 $C0 05 command allows a host process to relinquish control of a call assigned to itself, or assume control of a call that has been assigned to a different host.

The following is an example of the SS7 $C0 05 command format:



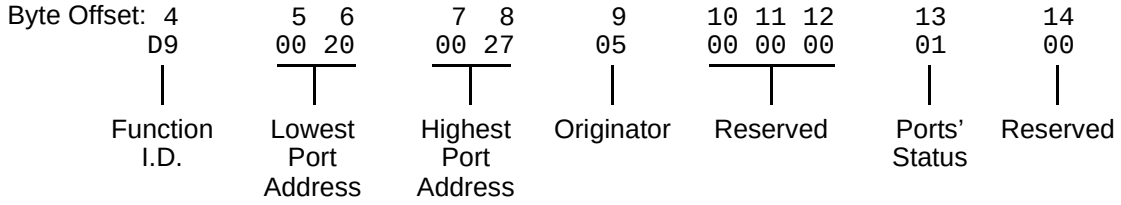
For detailed information on the SS7 $C0 04 or $C0 05 command, see the *CCITT Integrated SS7, V5.0, System Supplement*.

1.3.17 New SS7 Report ($D9)

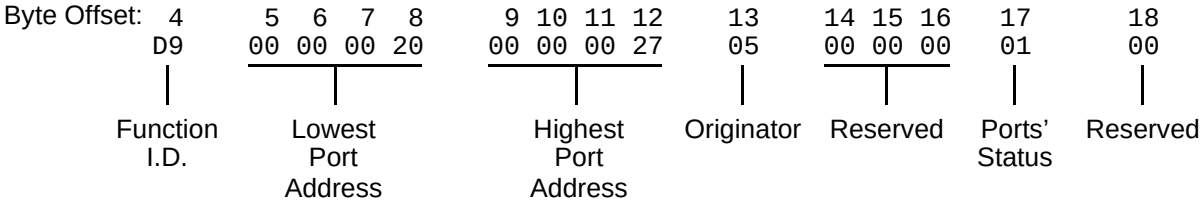
An incoming CGB/CGU/GRS from the network, system, or isup_console now generates an SS7 $D9 Circuit Group Status report to the host instead of individual $D3 System Port Status reports. A new feature flag, -FEATURE_FLAG07, enables the the sending of SS7 $D9 reports (see *Section 1.3.9*).

> *NOTE: You must include this flag in the CktInt.cfg file and restart Circuit Interworking to enable the sending of SS7 $D9 reports.*

The following is an example of the standard SS7 $D9 report format:



The following is an example of the extended SS7 $D9 report format:

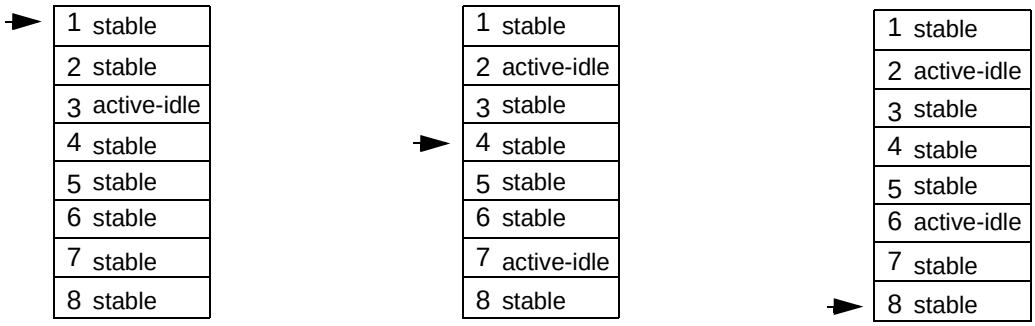


For detailed information on the SS7 Circuit Group Status $D9 Report, see the *CCITT Integrated SS7, V5.0, System Supplement*.

1.3.18 Rotary/Cyclic Port Selection

V5.0 FSR00 is enhanced to include a new resource group configuration file, and a new parameter in CktInt.cfg, which allows you to specify the mode that the system uses for hunting and allocating a circuit for a call. The hunt modes are either CYCLIC or ROTARY.

In CYCLIC mode, the system selects the circuits from the resource group in a sequential manner; the next IDLE circuit in the group is selected for the new call. After the system has selected the last circuit in the sequence, it begins hunting from the first circuit in the group. Figure 1.1 is an example of CYCLIC mode in an eight-port resource group.



1) Eight-port resource group with several stable calls.

2) **New call 1** - System begins hunting through the group beginning at circuit # 1. The system selects circuit # 3 for new call because it's the first idle circuit in the sequence.

3) Circuit #s 2 and 7 have gone stable to idle because old calls have ended.

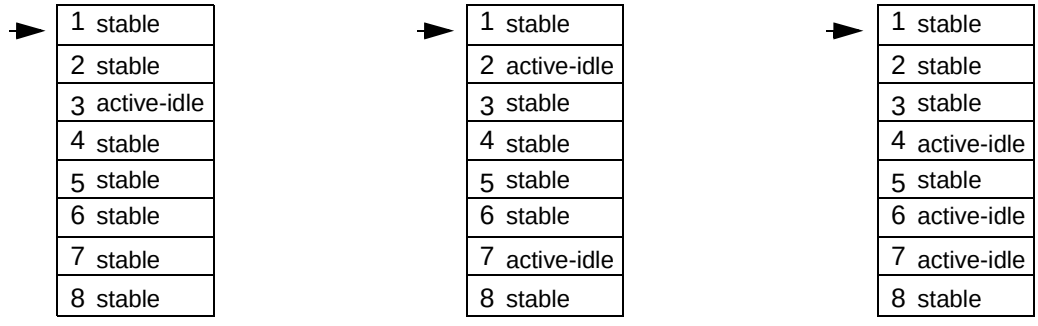
4) **New call 2** - System begins hunting at circuit #4 because circuit #4 is the next circuit in sequence. The system selects circuit # 7 because it is the next idle circuit.

5) Circuit # 6 has gone from stable to idle because old call has ended.

6) **New call 3** - System begins hunting at circuit # 8. Because # 8 is the last circuit in sequence, the system restarts searching at circuit # 1. System selects circuit # 2.

Figure 1.1: CYCLIC Hunting Example

In ROTARY mode, the system always begins hunting sequentially from circuit # 1. The first IDLE circuit in the sequence is always selected for the new call. Figure 1.2 is an example of ROTARY mode in an eight-port resource group.



1) Eight-port resource group with several stable calls.

2) **New call 1** - System hunts through the group beginning at circuit # 1. The system selects circuit # 3 for new call because it's the first idle circuit in the sequence.

3) Circuit #s 2 and 7 go from stable to idle because old calls have ended.

4) **New call 2** - System begins hunting at circuit # 1 again. The system selects circuit # 2 because it is the first idle circuit in the sequence.

5) Circuit #s 4 and 6 go from stable to idle because old calls have ended.

6) **New call 3** - System begins hunting at circuit # 1 again. The system selects circuit # 4 because it is the first idle circuit in the sequence.

Figure 1.2: Rotary Hunting Example

You can modify the default resource group file, called res_grp.cfg in the $XNV directory, to suit the needs of your installation with any UNIX text editor. You can rename the file, but the renamed file must still reside in the $XNV directory for this feature to work. Figure 1.3 is an example of a res_grp.cfg file with 12 resource groups configured.

Resource Group	SDS/VCO Device	Circuit Selection Mode
1	0	ROTARY
2	0	ROTARY
3	0	ROTARY
4	0	ROTARY
5	0	CYCLIC
6	0	CYCLIC
7	0	CYCLIC
8	0	ROTARY
9	0	ROTARY
10	0	ROTARY
11	0	ROTARY
12	0	CYCLIC

Figure 1.3: Resource Group Configuration File Example

Table 1.2 summarizes the fields in the resource group configuration file.

Table 1.2: Resource Group Configuration File Fields

Field	Definition
Resource Group	You can define from 1 to 63 resource groups in standard mode and 1 to 223 resource groups in extended operational mode.
SDS/VCO Device	Reserved. Always 0.
Selection Mode	CYCLIC or ROTARY. This mode applies to all circuits in the resource group.

NOTE: The default behavior of the res_grp.cfg file is to hunt resource groups in CYCLIC mode.

1.3.19 Singapore Number Portability

Cktint now supports Number Portability (NP) within the Singapore variant of ITU. NP is the addition of the parameter "Additional Calling Party Number" (0xFA) within the IAM message. Only the SINGAPORE variant of ITU supports this parameter, and you must include the following line in your isup mml configuration:

```
MODIFY-ISUPCONF:CFGNAME=CF0,VARIANT=SINGAPORE,MNTIND=ON;
```

1.3.20 8-Link Capability

V5.0 FSR00 is enhanced to support eight SS7 network links from the SPARC CPU5V/Sbus assembly. The additional four ports replace the current modem card in the Sbus assembly.

> *NOTE:* ***There is no modem capability with an 8-link system****. Instead, you must arrange dial-up to a local network and Telnet access to the SS7 subsystem.*

To upgrade an existing system, you must purchase an 8-link Upgrade Kit (PN 35026650100, basic; PN 35026750100, redundant) that includes all necessary hardware and NewNet licensing. For more information, contact your Summa Four sales representative.

Hardware installation requires removing the modem card in the Sbus assembly (see Figure 1.4) and replacing it with a 4-port card (see Figure 1.5). Then, follow the directions in the *CCITT Integrated SS7, V5.0, System Supplement* for attaching the additional SS7 network link cables.

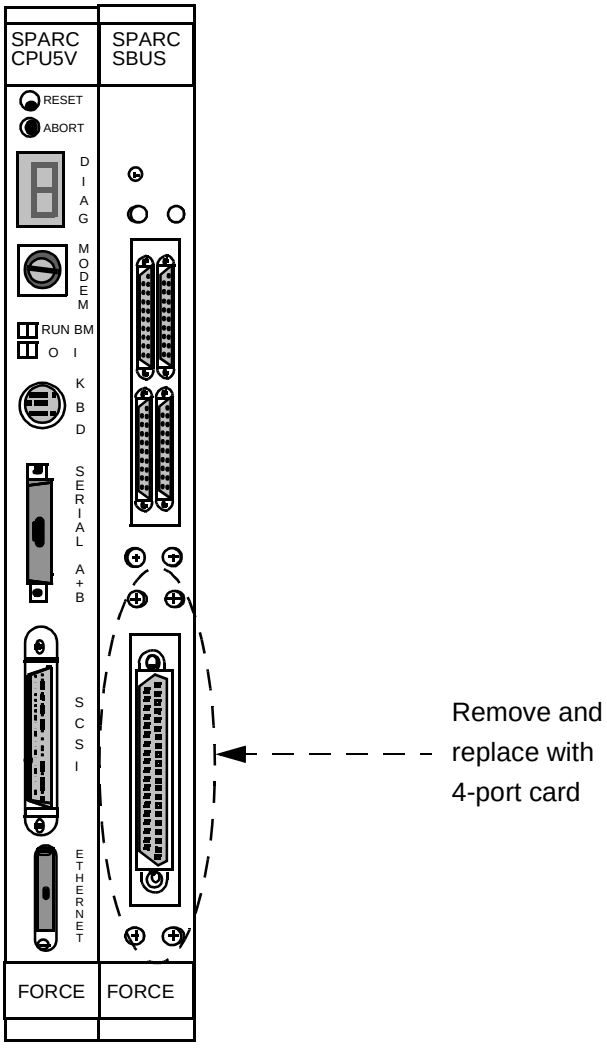


Figure 1.4: 4-link Sbus

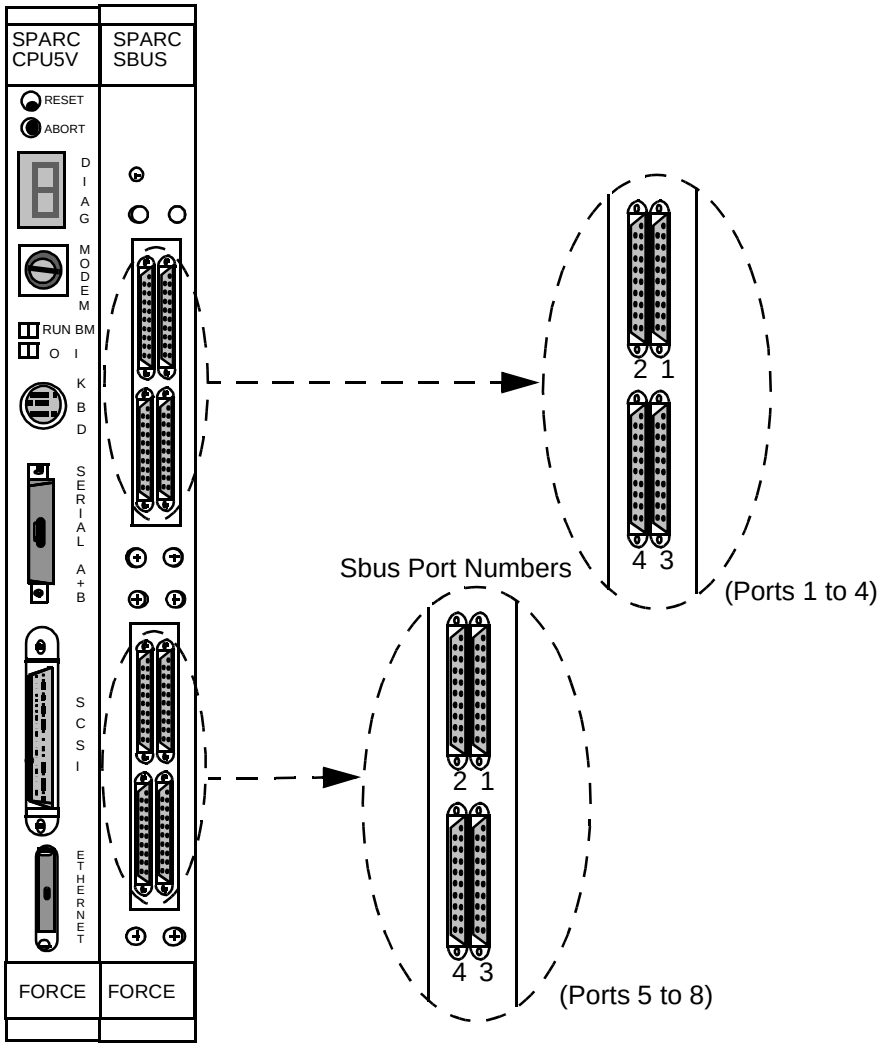


Figure 1.5: 8-link Sbus

After the hardware installation, you must modify the MTP Level 2 Provisioning part of the MTP configuration file in **/export/home/cktint/sys/SPcc** (**$SPC**) to include additional links and link sets for the SS7 network links you have added. For more information, see *Section 4.3* in the *CCITT Integrated SS7, V5.0, System Supplement*.

The following are sample lines in an .mml file for MTP Level 2 Provisioning with an 8-link configuration:

```
MML-CONFIG:LOG=OFF,TIMEOUT=4000;
MODIFY-SP:NAME=SUMMA,SPC=0-0-1,NI=INTERNATIONAL,TYPE=SEP;
MODIFY-SP:SPC=0-0-1,RESTART=ON,SLTC=ON;
ADD-LSET:LSET=STP1,DPC=0-0-2,ACTIVE=8,LOADED=8,TYPE=ALINK,BR=64000;
ADD-LINK:LINK=STP1-0,LSET=STP1,SLC=0,PORT=1,TYPE=DTE,PRIORITY=0;
ADD-LINK:LINK=STP1-1,LSET=STP1,SLC=1,PORT=2,TYPE=DTE,PRIORITY=1;
ADD-LINK:LINK=STP1-2,LSET=STP1,SLC=2,PORT=3,TYPE=DTE,PRIORITY=2;
ADD-LINK:LINK=STP1-3,LSET=STP1,SLC=3,PORT=4,TYPE=DTE,PRIORITY=3;
ADD-LINK:LINK=STP1-4,LSET=STP1,SLC=4,PORT=5,TYPE=DTE,PRIORITY=4;
ADD-LINK:LINK=STP1-5,LSET=STP1,SLC=5,PORT=6,TYPE=DTE,PRIORITY=5;
ADD-LINK:LINK=STP1-6,LSET=STP1,SLC=6,PORT=7,TYPE=DTE,PRIORITY=6;
ADD-LINK:LINK=STP1-7,LSET=STP1,SLC=7,PORT=8,TYPE=DTE,PRIORITY=7;
ADD-RTSET:RTSET=ATT4E-CC,DPC=0-0-7,ROUTE1=STP1;
MODIFY-LSET:LSET=STP1,ADMINSTATE=ACTIVE;
MODIFY-L2TIMER:TIMER=T2,value=10000;
DISPLAY-L2TIMER:TIMER=*;
DISPLAY-RTSET:RTSET=*;
DISPLAY-LSET:LSET=*;
MODIFY-ALARM-CONFIG:DISPLAY=OFF;
EXIT:;
```

1.4 CORRECTED PROBLEMS

The following are the corrected problems in CCITT Release V5.0 FSR00:

	CktInt no longer hangs during initialization if there are cards out of service when you start CktInt.
U508155173	CktInt now timestamps debug entries.
U606240002	If the Integrated SS7 system was configured with more than six hosts, some sometimes links would not be released when the hosts were disconnected and the isup_console program listed the link status as ONLINE_READY. These issues have been fixed.
U609060005	The Integrated SS7 system no longer acknowledges SLTAs with invalid patterns.
U610010003	CktInt no longer core dumps if the ckt_ss7_to_sds files are configured with circuit numbers greater than 0x1F.
U701290007	The isup_console prompt no longer lists the unsupported “a” and “q” options.
U702060002	DRS functionality for Hong Kong variant has been fixed. Previously, when cktint received a delayed release, the circuit state was cleared as if a normal release had been received. The circuit became idle, and when the host tried to respond with a release, it was rejected and the release would not go to the network. This has been fixed so that the delayed release is passed on to the host and the circuit state is not idled. This allows the host to send a release to the network. In order for this fix to work, your mtp mml configuration must have a national indicator of NATIONAL and your isup mml field must have a variant of HONGKONG.
U702260005	When the Debug 9 flag was set with flags 2 and 5, non-SS7 messages were not being traced in the CktInt log file. For example, if the host sends a $66 command to the SDS/VCO, this event should be recorded in the log file. Instead, the event was not recorded until the command was returned from the SDS/VCO. This issue has been fixed.
U703120006	When no host was connected, CktInt did not block circuits. Now, if no host is connected and CktInt receives an IAM, it returns an REL with a "temporary failure" cause code.
U703130001/ U70318001	When the SS7 links and carrier were restored, after they both were down, CktInt reported that the circuit states were active and idle, but the SS7 stack reported that the circuit states were LR-blocked. This issue has been fixed.
U703140001	When a network-initiated SUSPEND or RESUME was sent from the host to cktint, cktint accepted them, but NewNet rejected them as invalid messages. This issue has been fixed.
U703140003	If only one host was up and running in a multihost environment, the ROUNDROBIN mode for host load sharing did not work correctly. This issue has been fixed.

U703230001	If the SDS/VCO Host Control of Call Load feature (set from the System Host Configuration screen of the SDS/VCO Administration Console) was enabled when CktInt started up, all of the $70 commands CktInt sent to the SDS/VCO to ensure that all of the SS7 ports were on hook were rejected with a network status byte of 3C ($6C or $72 command received before host issued $C0 04 command). If the Host Control of Call Load feature was not enabled, the $C0 04 command failed, but the $70 commands succeeded. Cktint now supports both the Host Control of Call Load feature and processing of $C0 04 commands.
U703240001	When a host sent a $30 01 Command to CktInt to get the circuit status of a trunk group, the $B0 01 Report returned by CktInt reported only the lower byte of the port address. This issue has been fixed.
U705050005	The isup_console d option has been corrected to act in the following way. When the d option from isup_console is used to display the debug flags, all of the flags that are turned ON are displayed. If no debug flags are ON, the message, “No debug switches are active,” is displayed. Also, if you toggle any debug flag, the current and previous states (i.e., ON, OFF) are displayed.
U705190005	The Integrated SS7 software is enhanced with four new debug flags: • Debug flag 33—When this flag is on, detailed information gets printed in the log file concerning invalid SS7 messages. • Debug flag 34—When this flag is on, detailed information gets printed in the log file concerning protocol violations. • Debug flag 35—When this flag is on, detailed information gets printed in the log file concerning an IAM message that was received in an invalid state. • Debug flag 36—When this flag is on, detailed information gets printed in the log file concerning call object creation and deletion.
U705190012	When the SS7 stacks sent CktInt an unblock message with an ISUP_MAINTENANCE primitive, CktInt incorrectly responded to the message with an unblock ACK. An unblock message with this primitive type is used to inform CktInt of the maintenance state, and CktInt should not attempt to process the message. Processing this message sometimes caused CktInt’s circuit states to get out of synch with the actual circuit states. This problem has been fixed.
U705200004	When CktInt attempted to respond to the SS7 stack with an ACK for a circuit group block or circuit group unblock, the SS7 stack rejected the message. This issue has been fixed.
U706060004	In non-redundant configurations, when the SS7 stack sent CktInt an MTP PAUSE message for one or more SS7 links, CktInt reset all configured trunk groups after it received the MTP RESUME. This caused stable calls to be torn down. This issue is fixed.
U706260004	The isup_console tool accepted hexadecimal trunk group input for circuit-related operations and decimal for group operations. This has been changed so the trunk group input is decimal for both circuit- and group-related operations.

U707030003	In previous releases, circuit states became stuck when cktint received a continuity check request from the network. During a successful continuity check request, NewNet's circuit state would become stuck in IN-BUSY. This has been fixed. During an unsuccessful continuity check request, the circuit sub-state would become stuck in "continuity." This has also been fixed.
U707250002	The first call after a switchover was creating a core file in the $EBSHOME/access/dat directory, which caused AccessISUP to fail. This problem has been corrected.
U708110001	Under heavy traffic conditions, the circuit sub-state was getting stuck in the "released" state because CktInt was hunting on circuits in "released" state. This issue is fixed. CktInt now selects only idle circuits.
U709190004	In previous releases, if there were ports out of service when cktint started up, those ports would stay stuck in a locally blocked state. This issue has been fixed. Now, when circuits are out of service on start-up and then cktint receives an In Service $D9 message, cktint will unblock those circuits.
U709190005	Cktint no longer tries to unblock circuits on the standby side when it receives In Service $D9 and $D3 messages. Also, ports will not get stuck in a locally blocked state after a switchover.
U709250004	In previous releases, when cktint received an MTP PAUSE for a particular SP, cktint would still attempt to send SS7 messages to NewNet for that SP. This caused unexpected behavior from NewNet. This issue has been fixed. When all the SS7 links are down for an SP, cktint rejects all SS7 messages for that SP with an NSB of 0xD1 (Far End SP Unavailable). The host is responsible for re-sending the message once the links come back in service.
U709250006	When NewNet initiates a reset, it sends cktint a reset message with a START_RESET primitive. CktInt incorrectly responded to this message with a release complete (RLC). A reset message with this primitive type is used to inform CktInt of the reset, and CktInt should not attempt to process the message. This issue has been fixed. CktInt no longer sends an RLC in response to a START_RESET primitive.
U709250008	Cktint was printing invalid error messages for errors numbered 85 and above. This problem has been fixed and cktint now prints all the correct error messages.

<table>
<tr><td>U709250010</td><td>In previous releases, when there was a problem with an element in the network, such as the loss of power to a transceiver, cktint never closed the correct host and system sockets.

When a host transceiver or hub is powered down, there are two situations that can occur. First, Solaris may declare the socket to the host as a "Broken Pipe." Second, nothing happens. Previously, cktint was not recognizing the broken pipe and would not close that socket to the host or the system. In the second case, the tcp variable was too large. Once the variable was changed to 30 seconds, Solaris would declare a time-out on the host socket. After this time-out occurred, cktint still did not close the host or system sockets.

These problems have been corrected. When Solaris declares a broken pipe or socket time-out, cktint will close that socket from that particular host to the system.</td></tr>
<tr><td>U709250012</td><td>If the SDS/VCO closes a socket, cktint will now close the associated host socket.</td></tr>
<tr><td>U709250016</td><td>In previous releases, Cktint did not consistently track the SDS Port In Service and SDS Card In Service flags for the isup_console status command. These flags now do the following:

<table>
<tr><th></th><th>SDS Port In Service</th><th>SDS Card In Service</th></tr>
<tr><td>$D3 out of service</td><td>NO</td><td>No change</td></tr>
<tr><td>$D3 in service</td><td>YES</td><td>No change</td></tr>
<tr><td>$D9 out of service</td><td>NO</td><td>NO</td></tr>
<tr><td>$D9 in service</td><td>YES</td><td>YES</td></tr>
</table>

The following are minor functional constraints:

• On start-up, cktint cannot tell if a card is out of service (OOS); it can only detect that each port on that card is OOS. This causes no functional problems, just a display mismatch. If cktint is started while the card is OOS, cktint will show NO, YES (Port OOS, Card IS (In Service)) and locally block all the ports on that card. When the card is put back IS, the ports are unblocked and cktint will show YES, YES (Port IS, Card IS).

• On start-up, the standby side will always show YES, YES (Port IS, Card IS) and L-BLKED. Again, this causes no functional problems, just a display mismatch. After a switchover, it will be consistent with the active side.</td></tr>
<tr><td>U709260007</td><td>If the host opens and closes its socket very fast, <defunct> processes are no longer created.</td></tr>
</table>

U709290001	When cktint received a non-SS7 Out of Service $D9 message, depending on how many SS7 circuits were configured, it could take more than a minute to process. This has been corrected by eliminating unnecessary processes.
U710020001	When the host opened a socket and then closed that socket to cktint within the same second, extra _tcprcvclnt processes were often created. This issue has been fixed. Rapid host connections and disconnects no longer produce extra processes.
U710140002	If the standby side of the SS7 stack was brought up first, and the active side of the stack was brought up later, the circuit states were stuck in LR-BLKED after a switchover. This problem has been fixed.
U711110002	Invalid parameter formats were resulting in cktint core dump. This has been corrected.
U712010004	When the VCO has circuits in maintenance mode, now isup_console will not allow a reset of a circuit group that contains these hardware-blocked circuits.
U802130003	When the TCP/IP buffer is full, the host socket write process gets blocked, causing buffer buildup into the cktint software. Now, the write operation is timed and the socket is dropped if the write operation is blocked for more than 20 seconds. Enabling feature flag 9 will keep the socket connected.
U802250002	When cktint received a BLO from the network, the circuit state became remotely blocked in cktint. If the network then sent a CCR, the circuit state became active instead of remotely blocked in cktint. This issue has been fixed.
U803170003	If a continuity check has been performed and a COT indicating “continuity check successful” is received, cktint disconnects the internal loopback.
U803250008	When cktint received a BLO from the network, the circuit state became remotely blocked in cktint. If the network then sent an RSC, Newnet EBS would pass a UBL message with a MAINTENANCE primitive instead of an UNBLOCK or RESET primitive. Since cktint did not process the UBL, the circuit was stuck in a remotely blocked state. This issue has been fixed.
U804140002	If the disconnect control byte in the SS7 $49 command was dynamically changed by the host, cktint did not adapt to these changes. This issue has been fixed.
U804160001	If the system switched over after receipt of a SUS message on an active call, the subsequent RES message was not passed to cktint from EBS on the newly active side. This issue has been fixed.

1.5 REFERENCES

You may want to refer to the following documents that apply to your configuration.

- *CCITT Integrated SS7, V5.0, System Supplement*
- *Generic V5.0 FSR00 Release Notes*
- *V5.0 Extended API Programming Reference*

Section 2
SYSTEM REQUIREMENTS

2.1 INTRODUCTION

This section provides a listing of system requirements for running CCITT Integrated SS7 ISUP, V5.0 FSR00. These requirements are divided into hardware, firmware and software. Contact Summa Four, Inc. Technical Support for any site-specific information.

2.2 HARDWARE REQUIREMENTS

CCITT Version 5.0 FSR00 requires the following hardware:

- one of the following systems:
  - — an SDS-1000
  - — a VCO/80
  - — a VCO/20 with an SS7 VME shelf
  - — a VCO/4K with an SS7 VME shelf
- a SPARC CPU5V card
- 32 MB RAM (2K Mode) or 64MB RAM (4K Mode) available on the system

2.3 FIRMWARE REQUIREMENTS

There are no special firmware requirements for V5.0 FSR00. However, the firmware in the SDS-1000 or VCO must have the appropriate revision level required by the Generic. For information, refer to the *Generic Release Notes*.

2.4 SOFTWARE REQUIREMENTS

Version 5.0 FSR00 requires the following software:

- SDS/VCO Generic V4.2 (Standard/2K Mode only) or Generic V5.0
- Solaris Release V2.4 or V2.6

Valid software checksums and file sizes for the CCITT Version 5.0 FSR00 software running on either Solaris V2.4 or V2.6 are listed in *Table 2.1*.

Table 2.1: Cktint Version: CCITT Version 5.0 FSR00

Filename	Checksum /usr/bin/sum	Size ls -l
cktint.cpio.Z	44384 3495	1789105
install_cktint.sh	40085 11	5140

NOTE: To get the version of cktint, run the following command in ***$XNV****:*

% version cktint

Valid software checksums and file sizes for the AccessManager Version 3.5.3 FP3 QF17 software running on either Solaris V2.4 or V2.6 are listed in *Table 2.2*.

Table 2.2: EBS Version: 3.5.3_FP3_QF17

Filename	Checksum /usr/bin/sum	Size ls -l
ebs.cpio.Z	62943 11719	5999801
install_ebs.sh	15890 7	3523

NOTE: To get the version of EBS, run the following command in ***$EBSHOME/access****:*

% more version.dat

Section 3
SPECIAL CONSIDERATIONS

3.1 INTRODUCTION

This section describes the special considerations you should be aware of while using CCITT Integrated SS7, V5.0 FSR00. This section provides explanations for the following areas:

- Commands and reports
- Debug flags
- Host Considerations
- Redundancy
- Routing alarm messages to the console

3.2 COMMANDS AND REPORTS

3.2.1 CktInt Requires $DA And $DB Reports

Do not suppress the $DA and $DB Reports in your SS7 application. These reports are required by CktInt for non-SS7 to SS7 calls and SS7 to non-SS7 calls because of the disconnect control byte. Cktint must see an on-hook.

3.3 DEBUG FLAGS

Turning on the debug flags may negatively impact performance.

NOTE: Make sure all debug flags are turned off for production systems.

3.4 HOST CONSIDERATIONS

3.4.1 Multiple Hosts Affect Call Handling

Additional TCP connections affect SDS/VCO call handling capacity. Optimal performance can be achieved with four or fewer simultaneously active TCP connections.

3.5 REDUNDANCY

3.5.1 No Switchover When Ethernet Fails

If Ethernet fails, the system does not switch over.

Workaround

Add a routine to your host application that can detect when the Integrated SS7 system is unreachable and initiates a switchover.

3.5.2 ASCII Terminals On Redundant Systems

If you turn the Integrated SS7 console off, or power to the terminal is lost, the SPARC5V CPU may abort and return to the boot prompt.

It is possible to connect a single ASCII terminal to both side A and side B via an electronic A/B selector switch. However, the selector must be capable of providing surgeless, spikeless change-overs. If the selector switch does not have this feature, the SPARC5V CPU may abort and return to the boot prompt when a change-over occurs.

3.5.3 Calls During Switchover

Only stable (answered) calls are preserved by the system during a redundancy switchover.

3.5.4 Loss of Network or SS7 Selector Switch Links

The loss of any network links do not cause a switchover. Also, the loss of SS7 selector switch links do not cause a switchover. If you are going to perform maintenance on any of the links, you must first switch the system over to the standby side.

3.5.5 SDS and VCO/80 Do Not Boot Without SPARC CPU Installed

An SDS or VCO/80 system configured for SS7 does not boot if one of the SPARC CPUs is removed from the Control Subrack. The NBC does not download, the NBC's LEDs stay illuminated, and the SDS/VCO system freezes.

3.6 ROUTING ALARM MESSAGES TO THE CONSOLE

To route alarm messages to the system console, complete the following steps:

1. Start the MML utility by entering the following command and pressing **Return**:

   mml 0

2. At the system prompt, enter the following command and press **Return**:

   MODIFY-ALARM-CONFIG:DISPLAY=ON;

3. Exit the MML utility by entering the following command and pressing **Return**:

   EXIT:;

Section 4
DESIGN CONSTRAINTS

4.1 INTRODUCTION

Summa Four, Inc. has identified and evaluated design constraints in Integrated SS7 ISUP V5.0 FSR00. This section provides explanations and, where applicable, workarounds in the area that follows:

- Initialization
- Redundancy

4.2 INITIALIZATION

4.2.1 U611070001: CktInt Loses Info. When No Host Connected

CktInt does not maintain a socket connection dedicated to the SDS/VCO. If no host is connected, circuit state change information from the system is lost.

4.3 REDUNDANCY

4.3.1 U705050007: No Switchover When SS7 Is Stopped On Active Side

The system does not switch over automatically when one of the following conditions occur:

- If the Active CktInt and EBS stacks are stopped
- If CktInt hangs or dies
- If any EBS stack process dies and the MONITOR_OPTION is OFF (needs to be off to fix the problem where the Ethernet cable is detached and the system will flip flop sides).

Work Around

Set the All Host Link Failure Action, on the SDS System Host Configuration Screen, to Conditional Switchover. When the Conditional Switching option is selected, a major alarm is generated if all host links fail and a system switchover is initiated if the Standby controller is on-line (file sync. completed) and has active host links.

4.3.2 U707160004: Associated Ports Are Lost After Switchover

CktInt associates ports as specified in the SS7 $49 Command and the association is maintained until call tear down. If the controlling port is an SDS/VCO port, and the associated port is an SS7 port, the two ports are associated until one or the other is released by the host. When one of the ports is released, CktInt automatically releases the other.

However, if the system switches over while the call is stable, CktInt, on what is now the Active side, has no knowledge of port association established prior to switchover. This is because the CktInt on side A does not communicate with CktInt on side B and vice versa. If the host attempts to release the call by its port association, the release will fail.

If the system switches over a second time, and the call is still stable, the CktInt module that established the port association is now on the Active side, and host can release the call by its port association.

Workaround

Do not use the port association option in host applications.

Section 5
KNOWN FUNCTIONAL CONSTRAINTS

5.1 INTRODUCTION

Summa Four, Inc. has identified and evaluated functional constraints in Integrated SS7 ISUP V5.0 FSR00. This section provides explanations, and where applicable, workarounds for functional constraints in the areas that follow:

- Commands and Reports
- Initialization
- Redundancy/Switchover
- SS7 Messages and Parameters

5.2 COMMANDS AND REPORTS

5.2.1 U706160003: Outgoing Continuity Checks Do Not Work

All outgoing continuity check requests initiated by the Host via the SS7 $49 command coded "continuity check required on this circuit" or "continuity check required on the previous circuit" do not work.

5.2.2 U708200007: Controlling Host Is Set By Rejected Command

If an SS7 $49 Command is rejected, the host that sent the command becomes permanently associated with the circuit (or circuit group) specified in the command. This may stop other hosts from using the circuit.

Workaround

To clear this condition, perform a circuit or circuit group reset.

5.3 INITIALIZATION

5.3.1 U708200008: Warmboot With Autostart Takes 20 Minutes

If autostart is configured and the system is warm booted, it will take at least 20 minutes for the SS7 software to start.

5.4 REDUNDANCY/SWITCHOVER

5.4.1 U803110006: Synchronization Failure

If EBS and cktint are brought down and back up on the standby side, sometimes the "tli" process does not sync up with the tli process on the active side and the following messages are repeatedly displayed:

srv_connect:: An event requires attention

Enabling connect timer ....

This impacts the redundancy operation of the system.

Workaround

Kill tli processes on both sides. Then, bring both tli processes back up.

5.5 SS7 MESSAGES AND PARAMETERS

5.5.1 U803130006: Outbound CCR Not Working

When a CCR is sent from the host, continuity check fails with the following messages:

SsIsTx()- FAILED PUTTING header:

isup_error- EINVPRMTYP (0x12c)

spmerr@pid(2514): [300] invalid primitive