SS#7 SIMULATION
User Manual

November 1990
Version 2.0

PREFACE

This manual is intended to provide a quick and easy-to-use instruction guide to the basic operation of the SS#7 Simulation. It should be used along with the basic User Manual and the SS#7 Monitor User Manual.

This manual is not intended to provide information concerning protocol specifications, nor is it intended as a programmer's manual. Refer to the SS#7 Programmer's Manual for programming information.

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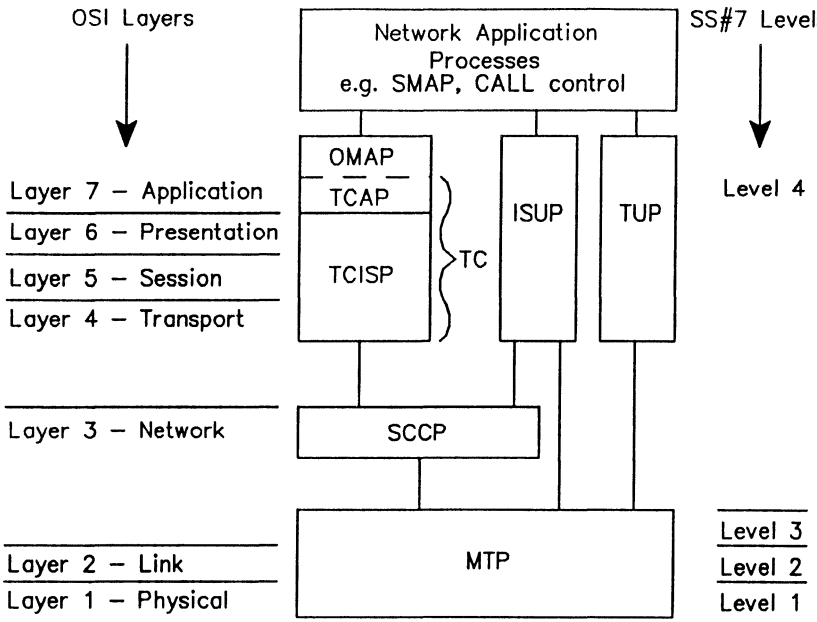
1. INTRODUCTION

SS#7 (Signalling System #7) is a specialized network designed for the purpose of operating a public telecommunications network. SS#7 differs from previously used signalling systems in that the signalling path:

- is physically separate from the data/voice path;
- can serve a very large number of circuits simultaneously as well as non-circuit related signalling or information retrieval functions; and
- can employ physical diversity and automatic rerouting in case of failures.

This version of the SS#7 Simulation fully supports the protocols defined by CCITT Blue Book Q Series Recommendations. National or network specific variations are also supported on a customized basis. The relationship of the various functional levels of the SS#7 protocol is shown in Figure 1-1.



Legend	
ISUP	ISDN User Part
OMAP	Operations Maintenance Application Part
MTP	Message Transfer Part
TC	Transaction Capabilities
TCAP	Transaction Capabilities Application Part
TCISP	Transaction Capabilities Intermediate Service Part
TUP	Telephone User Part
SCCP	Signalling Connection Control Part

Figure 1–1 Functional Level of the SS#7 Protocol

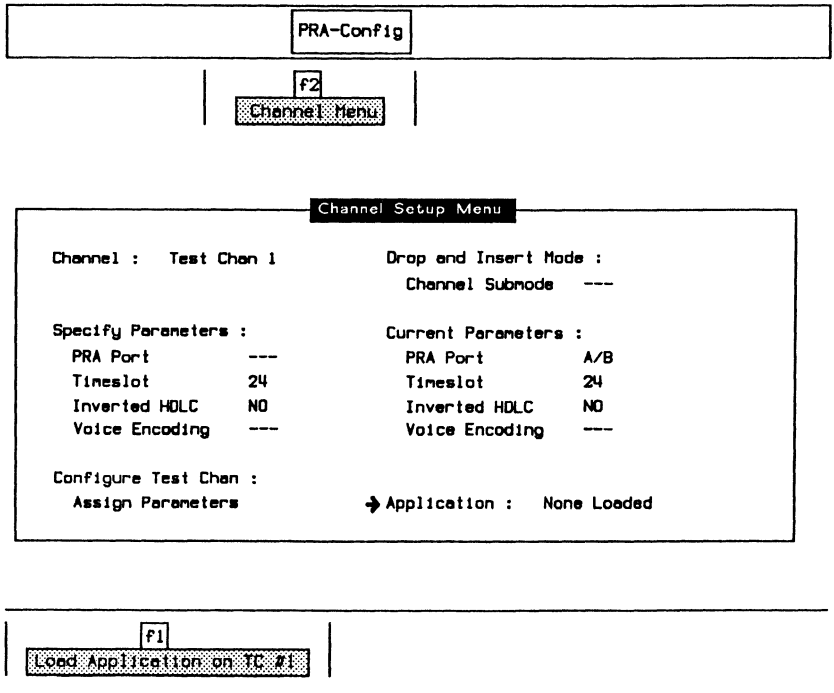
NOTE
TCAP forms the common layer 7 elements for users requiring transaction related services. The corresponding layers 4 through 6, which together with TCAP form the complete set of transaction capabilities, are currently undefined. The applications supported by transaction capabilities are, for the most part, network specific.

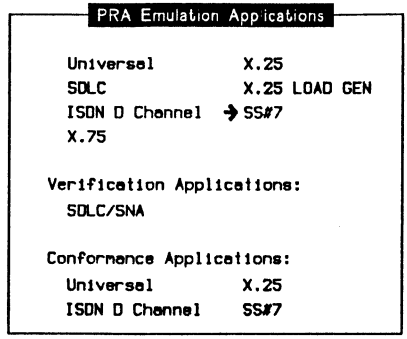
2. LOADING THE SS#7 SIMULATION PROGRAM

The SS#7 Simulation program can be loaded on a WAN interface or a PRA Test Channel. This section uses the PRA Test Channel 1 (timeslot 24) as an example.

NOTE
Refer to the basic User Manual for instructions to load an application on a WAN interface.

Before loading the program, ensure that the system is configured as described in the 'Emulating at the Primary Rate Access' section in the basic User Manual.





When the application has finished loading:

3. CONFIGURATION

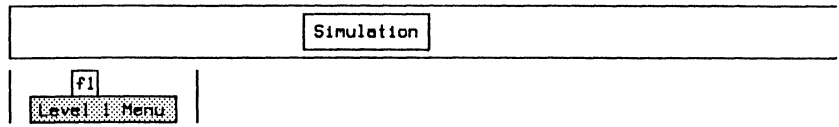
In the default configuration, the simulation is offline. SS#7 protocol files are not loaded, all triggers and filters are deactivated, disk recording is off, RAM capture is on, and the display is set to short format. The default settings can be changed on the Level 1 and Level 2 Configuration Menus and the appropriate protocol files selected. The simulation can then be placed online to send and receive live data.

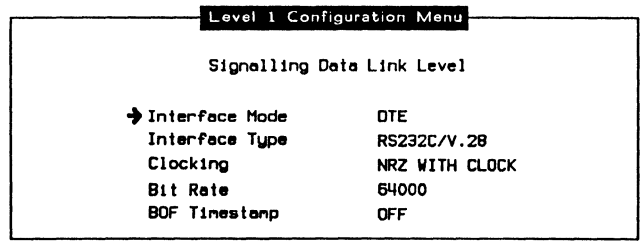
Additionally, a customized ITL script can be created to automatically configure the simulation when the application is loaded. Refer to the SS#7 Programmer's Manual for a sample configuration file.

3.1 Level 1

When running on a PRA interface, level 1 is configured on the Home processor prior to loading the application as described in the 'Emulating at the Primary Rate Access' section in the basic User Manual.

To configure level 1 for a WAN interface:





→ *Interface Mode*

DTE The tester receives the clock on the interface.

DCE The tester transmits the clock on the interface.

→ *Interface Type*

The WAN connector module contains three interface connectors:

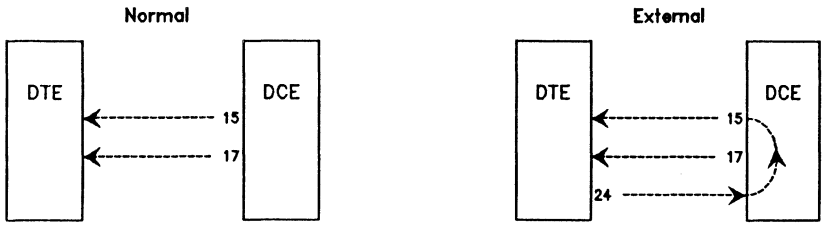
- V.28/RS-232C (default)
- V.35 or V.36
- V.11/X.21

→ *Clocking*

There are two clocking modes:

- *NRZ WITH CLOCK* (Normal)
- *EXTERNAL WITH CLOCK* (External)

Using normal clocking on the EIA-RS-232C (V.24/V.28) interface, the DCE provides the transmit and receive clock for the DTE on pins 15 and 17, respectively. Using external clocking, the DTE provides the transmit clock on pin 24 and the DCE echoes the transmit clock on pin 15; the DCE provides the receive clock for the DTE on pin 17.



15 Transmit clock from DCE (DCE provided)
17 Receive clock from DCE (DCE provided)
24 Transmit clock to DCE (DTE provided)

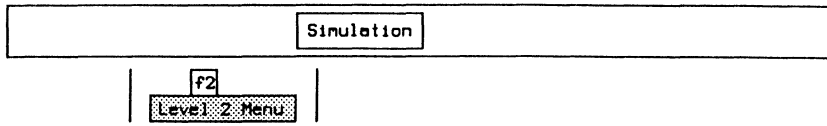
→ *Bit Rate* (WAN and PRA Interface)
The interface speed can be selected from preset values, set to a user-defined speed, or measured depending on the simulation interface and clocking selections.

Interface	Clocking	Action
DCE WAN	NRZ WITH CLOCK	Select
DTE WAN	NRZ WITH CLOCK	Measure
DCE WAN	EXTERNAL WITH CLOCK	Measure
DTE WAN	EXTERNAL WITH CLOCK	Select
PRA	---	Measure

→ *BOF Timestamp* (WAN and PRA Interface)
Specifies whether a beginning of frame timestamp is saved for each incoming message (default is off).

NOTE
End of frame timestamps are always saved.

3.2 Level 2




```
                    Level 2 Configuration Menu

                          Signalling Link Level
→ SU Compression      MAX          FISU Idling          OFF

  SUERM Function      ON           Octet Counting Mode  AUTO
    T   Threshold     64             Maximum SIF        272

                       Initial Alignment Counters
  Tin Threshold 4        Tie Threshold 1        M   Max Retry 5

                          Timers (10th secs)
  T1  410          T3  12          T4e 5            T6  46
  T2  750          T4n 82          T5  1            T7  13
```

→ *SU Compression*
Successive identical FISU's or LSSU's on the same channel can be captured and displayed as a single frame with an indication of the number of copies received.

Modify Count	Sets compression to a specified maximum number of successive identical FISU's or LSSU's on the same channel.
MAX (default)	Sets compression of successive identical FISU's or LSSU's on the same channel up to 99,999,999 copies.
OFF	Compression is not performed.

WARNING
High levels of FISU or LSSU traffic, with reduced or eliminated compression, can result in machine overload.

→ *SUERM Function*
Selects whether errors are simulated according to the SUERM specification. Every SU received with an error increments the SUERM counter. Every 256 SU's received with or without an error decrements the counter. When the SUERM counter reaches the preset T Threshold, a link failure indication is reported to the user and the SUERM function is turned off (default is on).

→ *T Threshold*
Sets the threshold for reporting a link failure (default is 64). Used with the *SUERM function*.

→ *FISU Idling*
Determines if the tester transmits identical repeating FISU's when there is no other data to send (default is off). Data can be sent via the **Send** topic or in a test script.

→ *Octet Counting Mode*
Selects the method of octet counting. When active, the SUERM counter is incremented every 16 octets received. The start and stop of octet counting is reported to the user (see the SS#7 Programmer's Manual).

AUTO (default)	Starts octet counting when an octet containing seven successive '1' bits is received, or when an SIF is received with a length greater than the specified maximum SIF. Stops octet counting when an octet containing six successive '1' bits is received.
ON	Continuously performs octet counting without conditions.
OFF	Octet counting is not performed.

→ *Maximum SIF*
Specifies the maximum length of the signalling information field used with octet counting. Valid values are 1 through 999 (default is 272 octets).

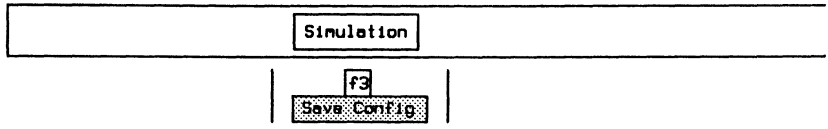
Initial Alignment Counters
Presets the test manager counters (see the SS#7 Programmer's Manual for more detail).

Timers (10th secs)
Presets the test manager timers (see the SS#7 Programmer's Manual for more detail).

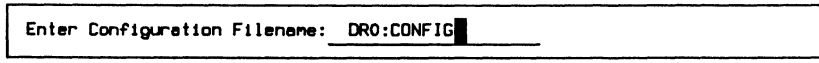
3.3 Saving Configurations

Previously defined configuration settings can be saved to disk for later retrieval.

Example:
Save the current configuration in a file named CONFIG on floppy drive DR0.



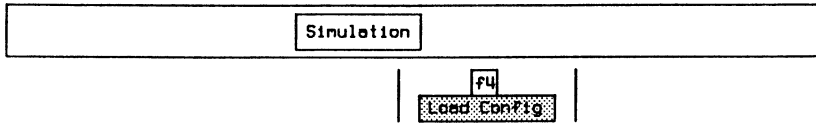
- Enter the filename and press ↵ (RETURN).



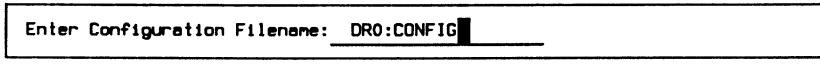
3.4 Loading Configurations

Previously saved configuration settings can be retrieved from disk.

Example:
Retrieve a configuration saved in the file named CONFIG on floppy drive DR0.



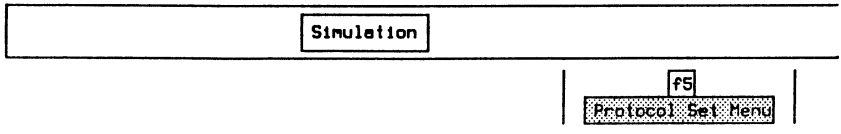
- Enter the filename and press ↵ (RETURN).

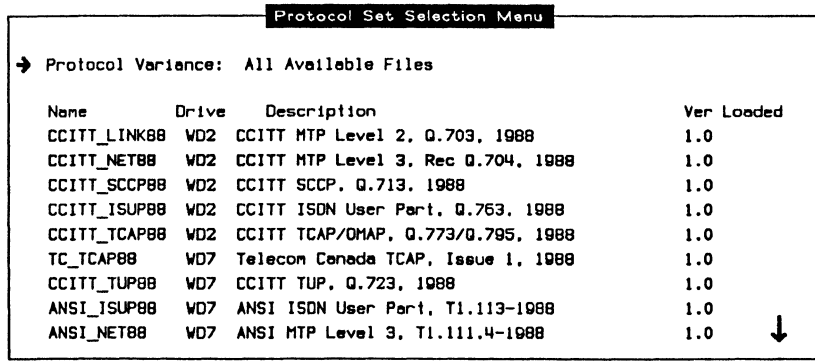


3.5 Selecting Protocol Sets

All or individual functional parts of a selected protocol set can be selected and then loaded. The protocol filename (less the suffix – .T), drive, description, version, and an indication of whether the file is loaded are listed on the Protocol Set Selection Menu.

Example:
Select the CCITT protocol set and load all the associated files.

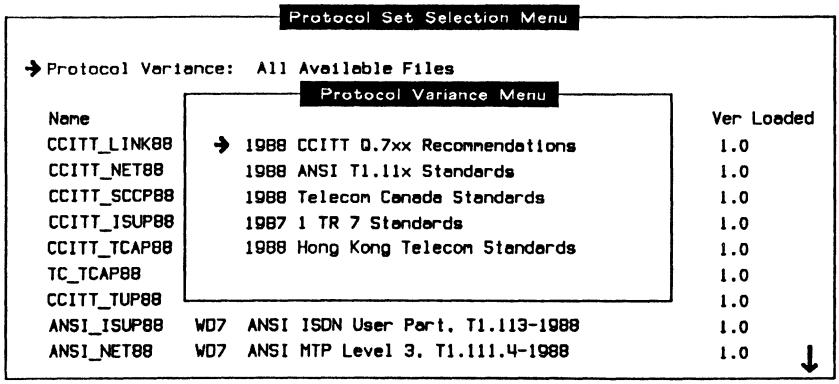


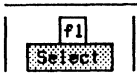


All Available Files — Displays all protocol files found on the current drives.

Scan Drives — Scans the current drives and updates the list of files found (useful for protocols stored on floppy disks).

NOTE
If a file is not found, the drive field is dashed on the menu and the version field is blank.


Protocol Set Selection Menu
Protocol Variance: All Available Files
Protocol Variance Menu
Name
Ver Loaded
CCITT_LINK88
1988 CCITT Q.7xx Recommendations
1.0
CCITT_NET88
1988 ANSI T1.11x Standards
1.0
CCITT_SCCP88
1988 Telecom Canada Standards
1.0
CCITT_ISUP88
1987 1 TR 7 Standards
1.0
CCITT_TCAP88
1988 Hong Kong Telecom Standards
1.0
TC_TCAP88
1.0
CCITT_TUP88
1.0
ANSI_ISUP88 WD7 ANSI ISDN User Part, T1.113-1988
1.0
ANSI_NET88 WD7 ANSI MTP Level 3, T1.111.4-1988
1.0


f1
Select


f5
Execute

Protocol Set Selection Menu

Protocol Variance: CCITT Q.7xx Recommendations

	Name	Drive	Description	Ver Loaded
→	CCITT_LINK88	WD2	CCITT MTP Level 2, Q.703, 1988	1.0
	CCITT_NET88	WD2	CCITT MTP Level 3, Rec Q.704, 1988	1.0
	CCITT_SCCP88	WD2	CCITT SCCP, Q.713, 1988	1.0
	CCITT_ISUP88	WD2	CCITT ISDN User Part, Q.763, 1988	1.0
	CCITT_TCAP88	WD2	CCITT TCAP/OMAP, Q.773/Q.795, 1988	1.0
	CCITT_TUP88	WD7	CCITT TUP, Q.723, 1988	1.0

3.6 Turning the Simulation Online

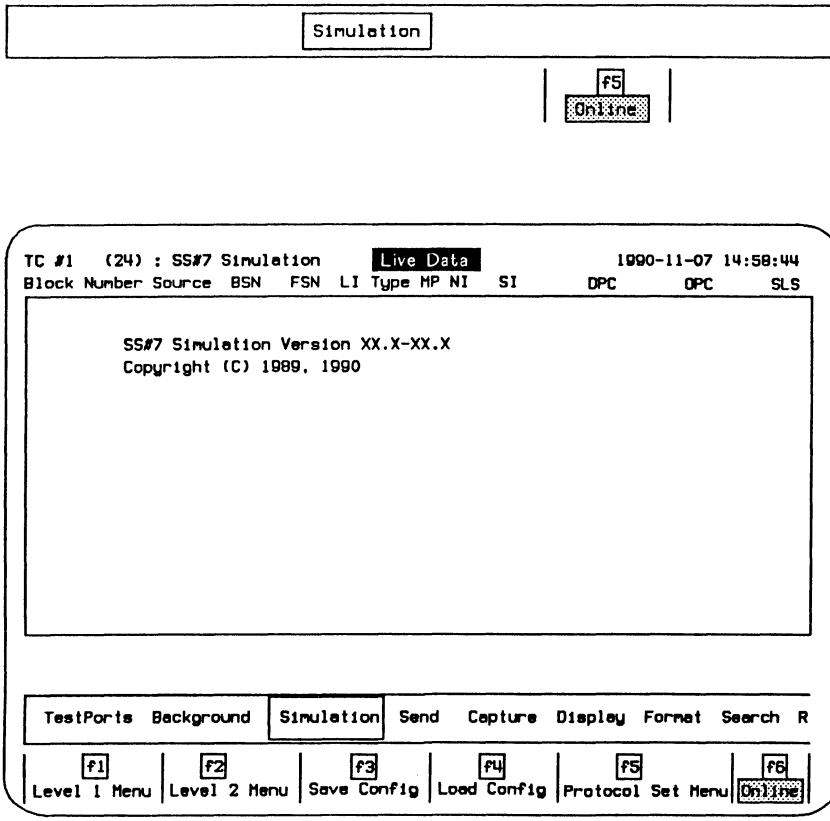


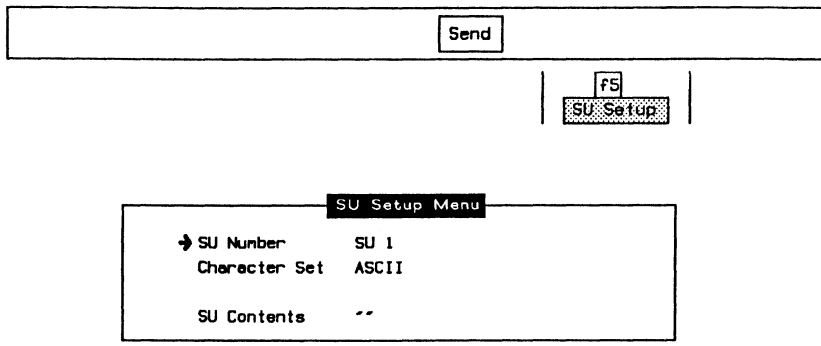
Figure 3–1 SS#7 Simulation Program Display

The received data is captured to RAM, decoded, and displayed as shown above. The SS#7 Simulation program has no automatic responses to incoming data. Responses can be sent via the **Send** topic or by test scripts.

4. SIGNAL UNITS

Four separate signal units (messages) can be defined and transmitted, with or without FISU idling occurring in the background. See Section 3.2 for information about FISU idling.

4.1 Defining Signal Units



→ *SU Number*
Selects a signal unit for displaying and editing.

→ *Character Set*
Selects either hexadecimal or ASCII character sets for displaying and editing.

→ *SU Contents*
Specifies the contents of the current signal unit selected in *SU Number.*

Example:
Define SU 2 as an FISU with an FSN (forward sequence number) of 3, a BSN (backward sequence number) of 4, an FIB (forward indicator bit) of 1, and a BIB (backward indicator bit) of 0.

→ *SU Number*

→ *Character Set*

→ *SU Contents*

- Enter the hex string (048300) and press ↵ (RETURN).

```
Enter SU (HEX) : 048300
```

NOTE
The entire SU setup can be saved to disk using the Save Config function (see Section 3.3).

4.2 Sending Signal Units

After a pre-defined signal unit has been transmitted, FISU idling is resumed if enabled (see Section 3.2).

Example:
Transmit SU 2 previously defined in Section 4.1.