Dialogic®

Dialogic® SS7 Protocols MAP Test Utility (MTU) and Responder (MTR) User Guide

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Revision History

Issue	Date	Description
A	03-Oct-01	Initial Issue
1	15-Feb-02	Updated after review
2	31-Jan-03	Branding changed: Septel PCI now SPCI4/SPCI2S and Septel cP now CPM8.
3	01-Oct-07	Changed copyright to Dialogic Corporation. Remove reference to PCCS6, include non-circuit protocol configuration commands in config.txt and add support for SIGTRAN M2PA links

Contents

1 Introduction

The Dialogic® MAP Test Utility (MTU) and the responder (MTR) are example applications for demonstrating the use of the Dialogic® MAP module, using the direct interface to the protocol module. This user guide describes the design, building and usage of this application for developers.

The MTU and MTR demonstrate the behavior of the Dialogic® MAP module by offering simple functionality while showing real examples of the interface to the module. The MTU and MTR applications can also be used to provide simple verification of system configuration and set-up.

This user guide is intended for users who choose to develop their own applications that will interface with and use the functionality provided by the MAP module.

1.1 Software requirements

The MTU/MTR application requires the following software:

1. Dialogic® SS7 Development Package

2. Dialogic® User Part Development Package

3. For TDM-based configurations:
   - ss7.dc3 or ss7.dc4 codefile
   - Dialogic® MTP3, SCCP, TCAP, MAP host binaries, as required
4. For SIGTRAN-based configurations:
   - Dialogic® M2PA, MTP3, SCCP and TCAP, MAP host binaries, as required

Software can be downloaded from
http://www.dialogic.com/support/helpweb/signaling/software3.htm

2 MTU Application

The Dialogic® MTU and MTR applications may be used to demonstrate sending MAP services in a GSM network. MTU is able to generate the following services:

- MAP-SEND-IMSI
- MAP-SEND-ROUTING-INFO-FOR-GPRS
- MAP-FORWARD-SHORT-MESSAGE

The following diagram shows the network entities involved in the MAP-FORWARD-SHORT-MESSAGE service :

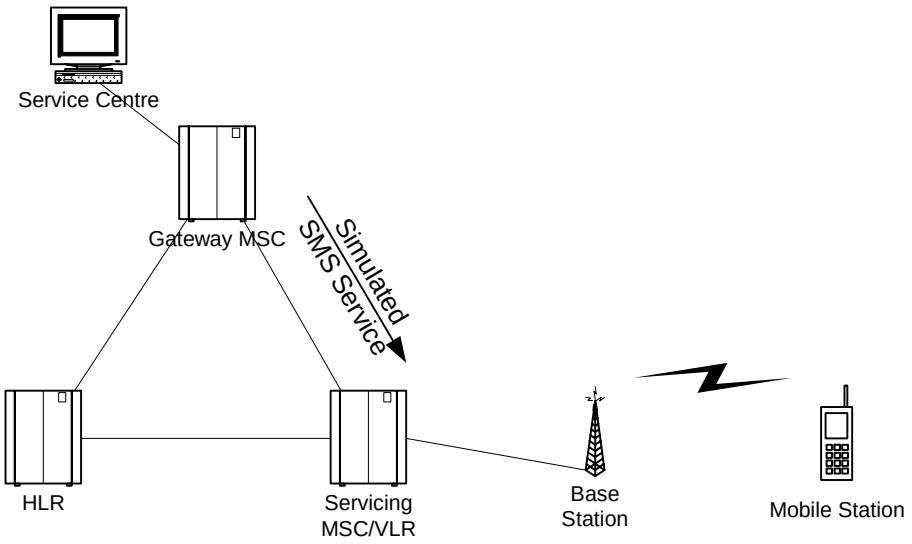


Figure 1. GSM Network Architecture

The SS7 layers involved and the two applications are shown below in Figure 2.

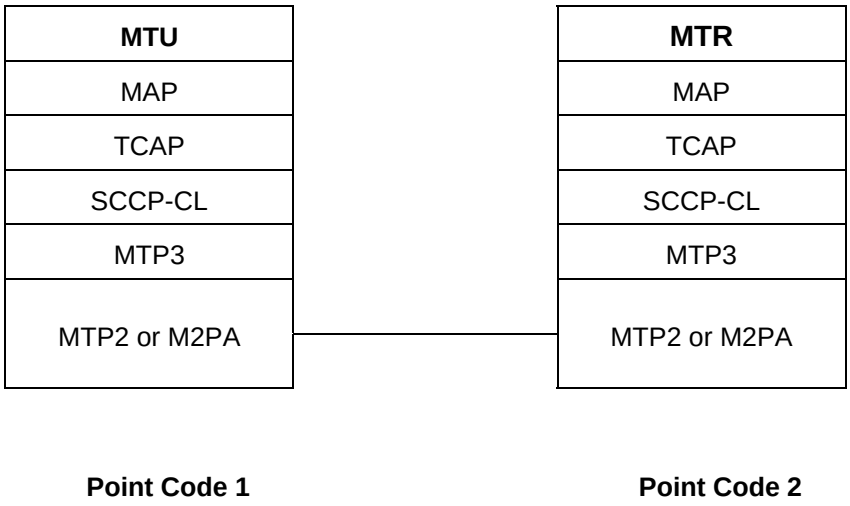


Figure 2. Typical configuration

2.1 MTU

MTU is the Dialogic® MAP Test Utility, which generates the dialogues to which MTR responds. It first opens a dialogue to the remote node then sends the service request and finally waits for the result. Using command line options, you may set the dialogue addresses, data fields and dialogue ids to be used. Further options allow the utility to generate a single dialogue or multiple dialogues. Full tracing of sent and received messages is also included.

2.2 MTR

The MTR utility responds to the MTU generated requests and displays the message data. It also allows the tracing of sent and received messages. As it replies to dialogues from the remote node it need not allocate dialogue ids itself as the Dialogic® MAP module will take that responsibility.

2.3 Message Sequence Chart

The following pages contain message sequence charts showing a typical message flow for a single dialogue between MTU and MTR. Each chart shows the message flow between the application and the MAP[7], TCAP[6] and SCCP[5] modules.

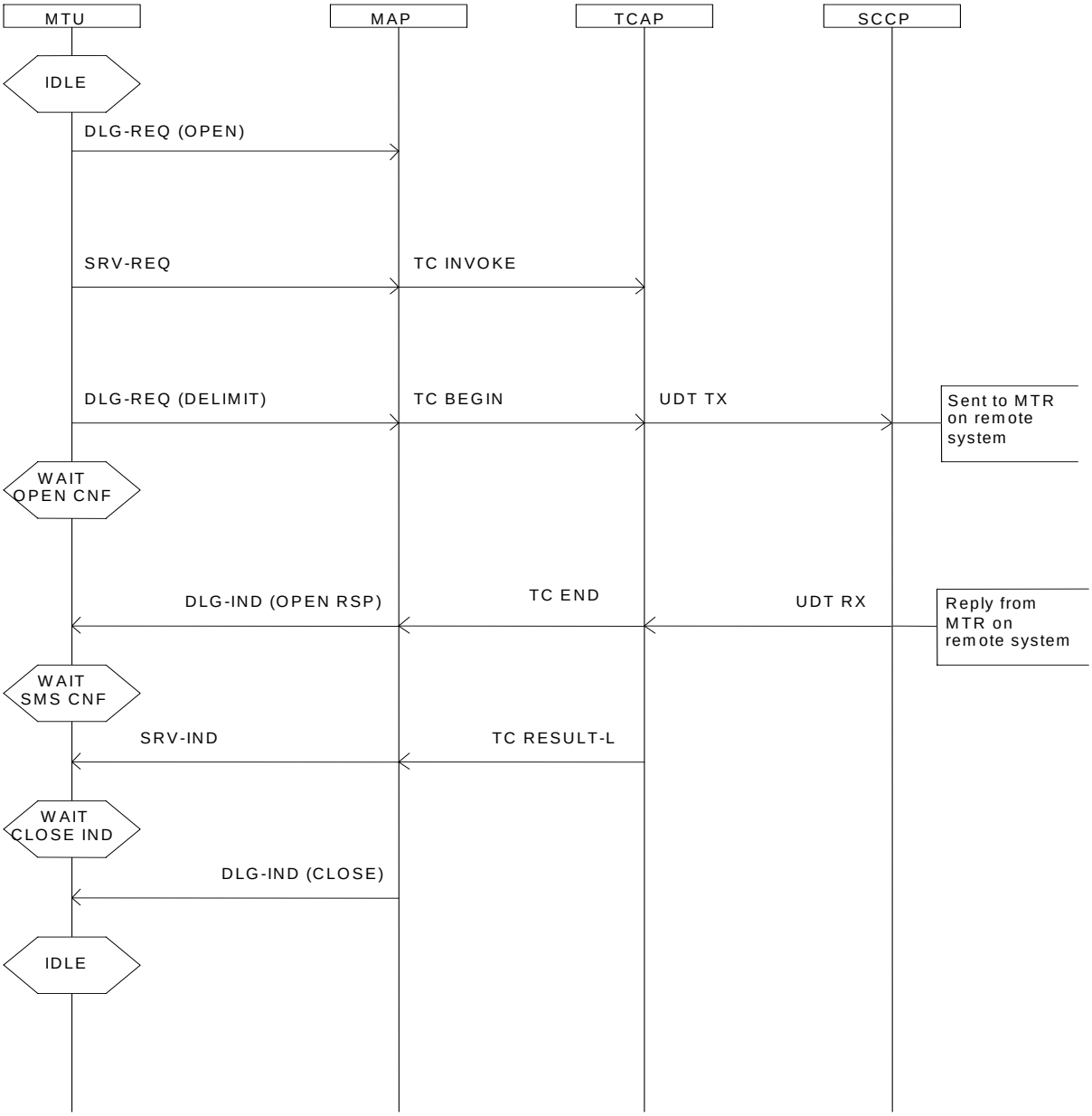


Figure 3. Single dialogue at MTU node

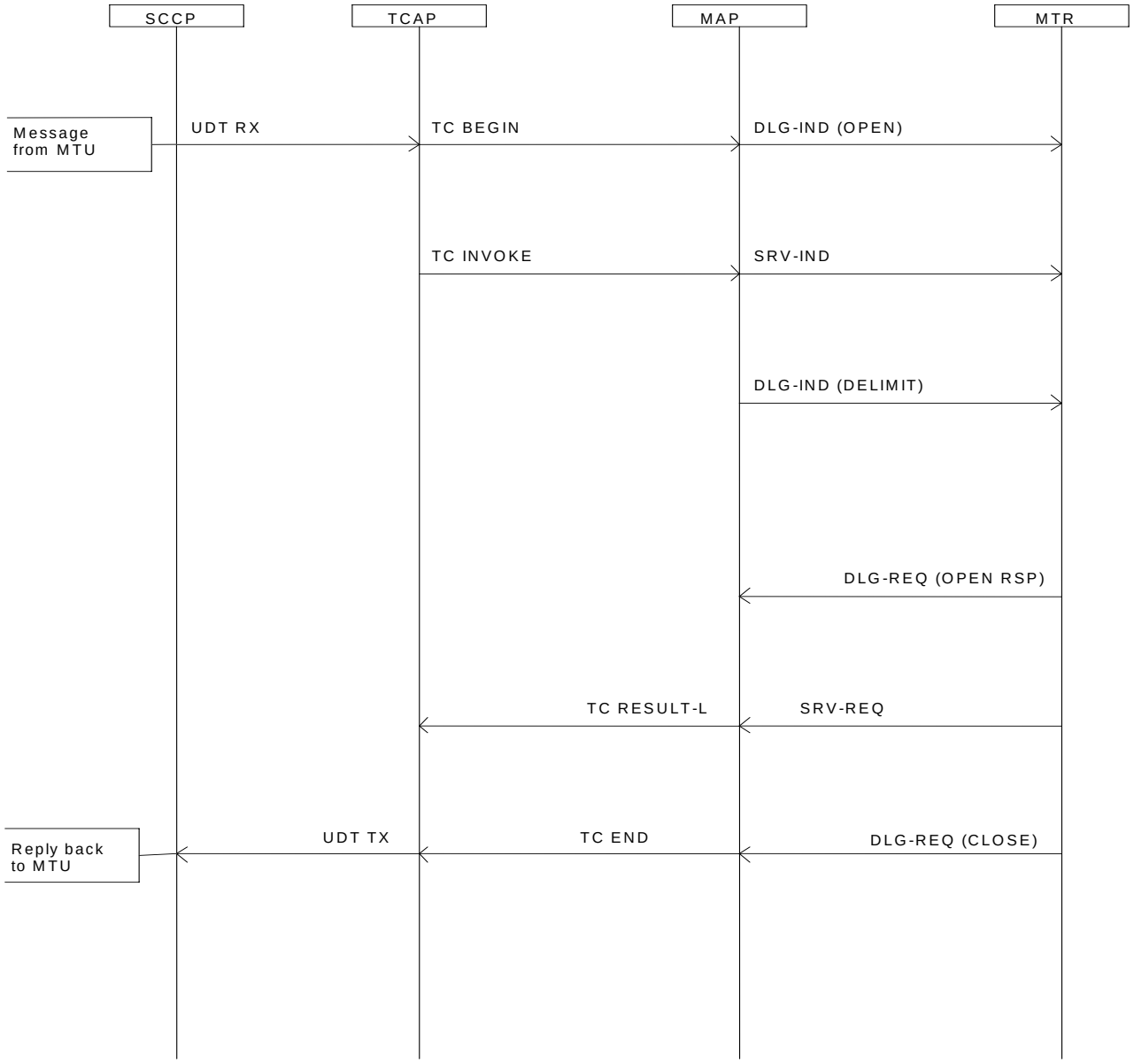


Figure 4. Single dialogue at MTR node

2.4 Customizing the MTU and MTR applications

MTU/MTR are example programs for development using the MAP module and as such, a number of simplifications and limitations have been imposed for this purpose.

MTU does not try to prevent congestion on the link, so it is possible to generate more traffic than the links can handle. The lower levels of the stack provide some protection from the effect of link congestion by simply discarding messages. Without changes, MTU should be run at lower traffic loading levels.

MTU does not provide support for segmentation of messages that are too long for the 'short' message service.

MTR assumes the use of MTU as the dialogue generating application and supports only the functionality required to reply to dialogues generated by MTU.

The developer should be aware of the limited nature of the example applications when making use of the source code for building their own.

2.5 MTU source code

The MTU program can be found in the *Dialogic® User Part Development Package*. The following table describes the files that make up the MTU application:

File	Notes
mtu_main.c	This file contains the **main()** function. This reads the command line arguments and passes them to **mtu_ent()**.
mtu.c	**mtu_ent()** calls the function **MTU_open_dlg()** to open a dialogue, send a service request message and send a delimiter to indicate that currently no further requests will be made. It waits for indications to be received, and these are handled by the main state machine **MTU_smac()**. Depending on the trace options the message is displayed by **MTU_display_recvd_msg()**.
mtu_fmt.c	Contains functions to format dialogue and service requests destined for MAP and also to convert indications from MAP into a structured format.
mtu.h	Contains macro and structure definitions used in MTU.

2.6 MTR source code

The MTR program can be found in the *Dialogic® User Part Development Package*. The following table describes the files required by the MTR application:

File	Notes
mtr_main.c	This file contains the **main()** function. This reads the command line arguments and passes them to **mtr_ent()**.
mtr.c	This file contains **mtr_ent()** which sends an open response using **MTR_send_OpenResponse()** when an open dialogue indication is received and then waits for a service indication and a delimiter. When both have been received, a service response is sent, followed by a close dialogue request using **MTR_send_MapClose()**.
mtr.h	Contains macro and structure definitions used in MTR.

3 Building the MTU and MTR applications

Example make-files for the following operating systems are provided and identified by a unique suffix:

Operating system	Suffix
Generic UNIX (Solaris, Linux)	.mak
Windows®	.mnt

A single definitions file (one for each operating system) which contains the definitions relating to the user's own development environment is supplied in the *Dialogic® User Part Development Package.* The definitions files are as follows and the appropriate file should be used depending on the operating system:

makdefs.mak (Linux)

makdefs_sol.mak (Solaris)

makdefs.mnt (Windows®)

For Windows®, a dynamically linked GCT library that allows the application to link to the GCT functions is supplied in the *Dialogic® SS7 Development Package* as follows:

gctlib.dll (Visual C++® compiler)

For 'UNIX', a GCT shared object is supplied in the *Dialogic® SS7 Development Package*

e.g. libgctlib.so.1.0.0 (Linux & Solaris)

The source code for the example program should be compiled and linked with the appropriate library for the operating system in use.

3.1 Host software directory structure

To build the MTU application, the user should first ensure that the required files are copied into the correct directories as follows:

1. Copy either the zip or tar file from the *Dialogic® User Part Development Package* to the *Dialogic® SS7 Development Package* directory and decompress using the appropriate tool. The choice of the zip or tar file is up to the user; both will create the UPD directory structure shown in the table below. The table below shows files required by the MTU and MTR programs only.
2. The C header files in the INC directory shown in the table below lists the header files required by the MTU and MTR programs.

   The following table lists the directory structure and files required to build the MTU and MTR programs supplied on the *Dialogic® User Part Development Package*.

<table>
<tr><td colspan="5">Root directory</td></tr>
<tr><td colspan="5">Septel</td></tr>
<tr><td>INC</td><td colspan="4">UPD</td></tr>
<tr><td rowspan="2">asciibin.h
bit2byte.h
map_inc.h
msg.h
pack.h
ss7_inc.h
strtonum.h
sysgct.h
system.h</td><td>BIN</td><td colspan="3">SRC</td></tr>
<tr><td>BACKUP_BINWIN
BACKUP_BINLNX
BACKUP_BINSOL</td><td>MTU
mtu.mnt
mtu.mak
mtu_sol.mak
mtu.c
mtu_fmt.c
mtu_main.c
mtu.h
mtu_iss.txt</td><td>MTR
mtr.mnt
mtr.mak
mtr_sol.mak
mtr.c
mtr_main.c
mtr.h
mtr_iss.txt</td><td>makdefs.mnt
makdefs.mak
makdefs.mak
makeall.bat
makeall
makeall_sol</td></tr>
</table>

3.2 Building MTU and MTR

It is assumed that the UPD is extracted in the *Dialogic® SS7 Development Package* directory i.e. for Windows® C:\Septel as shown above. Similarly, for Linux, a symbolic link should be created it is assumed that the UPD is unpacked and stored within in the DPK directory.

A script is provided in the BIN\SRC directory to build and copy all of the example programs into the UPD/BIN directory. To run this script, change to the BIN\SRC directory and type one of the following commands depending on the operating system:

makeall	(Linux)
makeall_sol	(Solaris)
makeall.bat	(Windows®)

A pre-built copy of the MTU and MTR applications, for each operating system, can be located within the backup subdirectories in the BIN directory.

To build the MTU program, change to the SRC\MTU directory and type one of the following commands depending on the operating system:

```
make –f mtu.mak
make –f mtu_sol.mak
nmake /f mtu.mnt
```

To build the MTR program, change to the SRC\MTR directory and type one of the following commands depending on the operating system:

```
make –f mtr.mak
make –f mtr_sol.mak
nmake /f mtr.mnt
```

4 Configuration

The local and remote ends of the system need to be configured before the Dialogic® MTU and MTR applications may be run. Example configuration files are provided in the *Dialogic® User Part Development Package* and after installation will be stored in the directories as shown in the following table:

Root	
MTU	**MTR**
“CONFIG”	**“CONFIG”**
config.txt	config.txt
system.txt	system.txt

Example configurations for TDM and SIGTRAN are provided. The configuration files in the MTU and MTR directories should be copied to the appropriate node. Refer to Appendix A - Example configuration files for further information.

4.1 System Configuration

The GCT environment is configured using the Dialogic® gctload program and the system.txt file. The basic board configuration along with the Dialogic® MTP, SCCP, TCAP and MAP modules is achieved using the config.txt file.

4.1.1 SPCI2S, SPCI4 and SS7HD

For TDM based configurations, example board based configuration files are provided in Appendix A for MTU and MTR.

When running MTU and MTR on a Windows® host system using SPCI4 with MTP2 running on the board and Dialogic® MTP3, SCCP, TCAP, and MAP running on the host, the provided configuration files may be used without any modification.

Configuration details for other board types are also provided for reference.

4.1.2 SIGTRAN M2PA

It is also possible to run a similar configuration as described in Section 4.1.1 but with SIGTRAN M2PA links. Configuration files for such systems are contained in Appendix B. When running MTU and MTR on a Windows® host system using Dialogic® M2PA, MTP3, SCCP, TCAP and MAP running on the host, the provided configuration files may be used without any modification.

4.1.3 SS7G2x

System and protocol information is configured using the management module and commands in the config.txt and system.txt files for the SS7G2x. Further information on this can be obtained from the user manual [2].

Note: These files are not contained in the User Part Development Package.

4.2 Protocol Configuration

All protocol modules are configured using commands in the config.txt file. The example configuration files given in the appendices will perform the appropriate protocol configuration shown below. If the user wishes to better understand or alter the configuration given, the following sections will be of interest.

Before configuring the protocol modules, it is useful to determine the following information relative to each network entity:

- Local point code
- Local sub-system number
- Remote point code and
- Remote sub-system number

4.2.1 SCCP

The local point code is contained in the main SCCP configuration command and this should be set to the appropriate value. In addition, configuration commands are required for the local subsystem, remote point code and remote sub-system.

4.2.2 TCAP

TCAP should be configured for ITU operation in the flags parameter of the TCAP configuration command (refer to the programmer's manual [6] for details). The dialogue id ranges should be set to allow the appropriate number of ids split between incoming and outgoing dialogues. Some applications may require initiation of dialogues in one direction only.

4.2.3 MAP

The TCAP dialogue base id and number values should be set to match those given in the TCAP configuration module. The user dialogue values are a separate independent range from the TCAP dialogue ids but will need to be similarly dimensioned, e.g. if 16 incoming dialogue ids are configured in MAP then TCAP must also support at least 16 incoming dialogue ids.

5 Running the MTU and MTR applications

Copy the host binaries to the Dialogic® SS7 Development Package directory.

Before running the Dialogic® MTU and MTR applications, the GCT environment must first be initialized and the signaling links brought into service. This is achieved by running the Dialogic® gctload program, and activating the links using the Dialogic® mtpsl utility. Refer to manuals [1], [3] or [4] for details as appropriate.

5.1 MTU Command Line Arguments

The module takes a number of command line arguments, which are summarized below:

Option	Default	Notes
-a	-	destination address (encoded in accordance with Q.713 definition of called party address). This parameter is mandatory.
-b	0x0000	base MAP dialogue ID
-d	0	Mode of operation (see section 5.1.1 for details)
-g	-	originating address (encoded in accordance with Q.713 definition of called party address) This parameter is mandatory.
-h, -H -v	-	Displays help message
-m	0x2d	MTU module ID
-n	0x400	number of dialogues to use
-o	0x000f	Output display options (add together required values for tracing options (section 5.1.2)
-u	0x15	MAP module ID
-x	0	number of active dialogues to maintain

Example:

```
mtu –d0 -a43020008 -g43010008 -s"good morning" –i987654321
```

The above example will open a single dialogue and send a short message from point code 1, SSN 0x8, to point code 2, SSN 0x8. The short message sent will be ‘good morning’, and the international mobile subscriber ID will be 987654321. If option –x were added, MTU would open multiple dialogues up to the value specified by option –x or up to the maximum that could be supported. If this maximum is exceeded and error tracing is activated (section 5.1.1) a message indicating failure will be displayed.

5.1.1 MTU Modes of Operation

MTU is able to accept parameters other than those shown in section 5.1 . Whether the extra parameters can be used is dependent on the value provided for option –d (mode of operation). There are four acceptable values for option –d ranging from 0 to 3. The meaning of these values and other parameters which MTU can accept are detailed in the tables below.

If –d parameter has value 0 (default) – Forward short message

Option	Notes
-p	MAP phase (can also take value 1)
-i	international mobile subscriber ID (see programmer's manual for format [7]). This parameter is mandatory.
-c	Service centre address (see programmer's manual for format [7])
-s	short message (free text). This parameter is mandatory.

If –d parameter has value 1 – Send IMSI

Option	Notes
-e	MSISDN (see programmer's manual for format [7])

If –d parameter has value 2 – Send routing info for GPRS

Option	Notes
-f	GGSN number (see definition of ISDN-AddressString [9])
-i	international mobile subscriber ID (see programmer's manual for format [7]). This parameter is mandatory.

If –d parameter has value 3 – Send IMSI & Send routing info for GPRS

Option	Notes
-e	MSISDN (see programmer's manual for format [7])
-f	GGSN number (see definition of ISDN-AddressString [9])

5.1.2 MTU Display Options

Tracing option	Value	Notes
MTU_TRACE_TX	0x0001	Trace transmitted dialogue messages
MTU_TRACE_RX	0x0002	Trace received dialogue requests
MTU_TRACE_ERROR	0x0004	Trace error messages
MTU_TRACE_STATS	0x0008	Trace the number of opened dialogues

5.2 MTR Command Line Arguments

The module takes a number of command line arguments, which are summarized below:

Option	Default	Notes
-m	0x2d	MTR module id
-u	0x15	MAP module id
-t	Enabled	Disable tracing. If –t parameter is provided, tracing is disabled.
-h, -H, -?, -v	-	Displays help information

Example:

```
mtr –m0xd
```

The above example will run MTR with a module id of 0x0d and MTR will assume the MAP module below has a module id of 0x15. MTR will also trace any messages received or transmitted.

6 References

[1] U10SSS, Dialogic® Software Environment Programmer's Manual

[2] 05-2302, Dialogic® SS7G2x SIU Mode User Manual

[3] U03HSP, Dialogic® Programmer's Manual for SPCI2S, SPCI4 and CPM8

[4] 05-2063, Dialogic® SS7HD Programmer's Manual

[5] U05SSS, Dialogic® SCCP Programmer's Manual

[6] U06SSS, Dialogic® TCAP Programmer's Manual

[7] U14SSS, Dialogic® MAP Programmer's Manual

[8] U04STN, Dialogic® Programmer's Manual for Sigtran Host Software

[9] ETSI TS 100 974v7.5.1, Digital Cellular Telecommunications System (Phase 2+)

Updates to the documentation are available on the Dialogic web site at
http://www.dialogic.com/support/helpweb/signaling/default.htm

7 Abbreviations

The following lists acronyms alphabetically used in this user guide.

GGSN	Gateway GPRS Support Node
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HLR	Home Location Register
IMSI	International Mobile Subscriber Identity
MAP	Mobile Application Part
MSC	Mobile Switching Centre
MTP	Message transfer part
MTR	MAP Test Responder
MTU	MAP Test Utility
SCCP	Signaling Connection Control Part
SIU	Signaling Interface Unit
SMS	Short Message Service
TCAP	Transaction Capabilities Application Part
VLR	Visitor Location Register

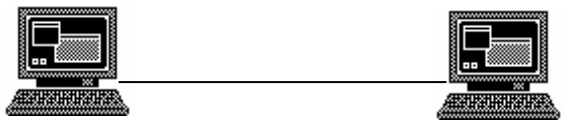
Appendix A - Example configuration files using SPCI4 boards

This section provides example configuration files for use with Dialogic® MTU and MTR applications on a Windows® host system for SPCI4 boards. The Dialogic® MAP, TCAP, SCCP and MTP3 modules are running on the host and both MTU and MTR are running as module ID 0x2d.

Before configuring the protocol modules it is useful to determine information such as the local point code and remote point code relative to each network entity. For this example configuration, the MTU point code is 1 and the MTR point code is 2 (Figure 5).

Example configuration

Operating system:	Windows®
Board type:	SPCI4
Local point code:	1 (MTU)
Remote point code:	2 (MTR)
MTU module ID (Local point code):	0x2d
MTR module ID (Remote point code):	0x2d
Modules running on the host:	MAP/TCAP/SCCP/MTP3



MTU
Point code 1
subsystem 0x8

MTR
Point code 2
subsystem 0x8

Figure 5. Example configuration

A.1 system.txt

This section provides one example system.txt file for an SPCI4 board running under Windows® using the example configuration described earlier in this appendix.

The following example system.txt file is valid for point code 1 and point code 2. All comments are denoted by '*'.

A.1.1 system.txt for point code 1(MTU) and point code 2(MTR)

```
************************************************************************
* Example system.txt.
* Edit this file to reflect your configuration.
************************************************************************
*
*
* Essential modules running on the host:
*
LOCAL           0x20            * ssd - Board Interface task
LOCAL           0x00            * Timer Task
*
* Optional modules running on the host:
*
LOCAL           0xcf            * s7_mgt - Management/config task
LOCAL           0xef            * s7_log - Display and logging utility
*
* Modules that optionally run on the host
*
LOCAL           0x2d            * MTR or MTU module
LOCAL                   0x15            * MAP module
LOCAL                   0x14            * TCAP module
LOCAL           0x33            * SCCP module
LOCAL           0x22            * MTP3 module
*
* Modules running on the board (all redirected via ssd):
*
REDIRECT        0x71    0x20    * MTP2 module
REDIRECT        0x10    0x20    * CTbus/Clocking control module
REDIRECT        0x8e    0x20    * On-board management module
*
* Redirection of status indications:
*
REDIRECT        0xdf    0xef    * LIU/MTP2 status messages to s7_log
REDIRECT        0x9e    0xef
*
* Now start-up all local tasks:
*
FORK_PROCESS    ..\..\..\..\ssds.exe -d
FORK_PROCESS    ..\..\..\..\tim_nt.exe
FORK_PROCESS    ..\..\..\..\tick_nt.exe
FORK_PROCESS    ..\..\..\..\s7_mgt.exe -d
FORK_PROCESS    ..\..\..\..\s7_log.exe
FORK_PROCESS    ..\..\..\..\map_nt.exe -t
FORK_PROCESS    ..\..\..\..\tcap_nt.exe -t
FORK_PROCESS    ..\..\..\..\sccp_nt.exe –t
FORK_PROCESS    ..\..\..\..\mtp_nt.exe -t
```

A.2 Using different operating systems and board configurations

The following subsections provide information regarding the system.txt file if using different operating systems or board based configurations.

A.2.1 Running MTU/MTR with SS7HD

If using SSHD, the following lines:

```
REDIRECT        0x71    0x20    * MTP2 module

FORK_PROCESS    SSDS.EXE -d
```

should be replaced by:

```
REDIRECT        0x81    0x20    * MTP2 module_id for SP0
REDIRECT        0x91    0x20    * MTP2 module_id for SP1
REDIRECT        0xe1    0x20    * MTP2 module_id for SP2
REDIRECT        0xf1    0x20    * MTP2 module_id for SP3

FORK_PROCESS    SSDH.EXE -d
```

Refer [4] for further information.

A.2.2 Running MTU/MTR with SS7G2x

If using the SIU, additional commands required by the SIU will need to be included. Therefore, the example system.txt provided in this appendix should not be used. Refer to [2] for further information.

A.2.3 Running MAP/TCAP/SCCP on the board

If using a board license button so that the MAP, TCAP, SCCP and MTP3 modules are run on the board instead of the host, remove the `FORK_PROCESS` command for the MAP host binary, the `LOCAL` declaration should be removed for the MAP module and a `REDIRECT` command (which redirects messages for that module to the board) should be added. Similar changes should also be made for the MTP3, SCCP and TCAP modules.

Refer to [2], [3] and [4] as appropriate.

A.2.4 Running MTU/MTR with other operating systems

If using operating systems other than Windows®, the names of some of the executable files used in the FORK_PROCESS commands need to be changed.

Refer to [3] and [4] as appropriate.

A.3 config.txt

This section provides two example config.txt files for a SPCI4 board running under Windows® using the example configuration described earlier in this appendix showing the protocol modules can be configured for use..

The following example config.txt files are for point code 1 and point code 2. All comments are denoted by '*'.

Using the two example config.txt files (one at each end of the link) will allow dialogues using MAP with 14-bit point codes to be demonstrated. If connecting to other equipment, all the various parameters in the file need to be examined to determine if they are compatible with the configuration at the other end of the link, for example:

- point codes (OPC, DPC)
- signaling timeslot
- sub-system numbers (SSN)

A.3.1 config.txt for point code 1 (MTU)

```
*************************************************************************
* Example config.txt.
* Edit this file to reflect your configuration.
*************************************************************************
*
*
* Configure individual boards:
* For SPCI4 / SPCI2S boards:
* SEPTELPCI_BOARD <board_id> <flags> <code_file> <run_mode>
SEPTELPCI_BOARD  0  0x0003  ss7.dc3 MTP2
*
* For SS7HD PCI boards:
* SS7_BOARD <board_id> <board_type> <flags> <code_file> <run_mode>
*SS7_BOARD  0 SS7HDP 0x0003  ss7.dc4  MTP2
*
* For SS7HD cP boards:
* SS7_BOARD <board_id> <board_type> <flags> <code_file> <run_mode>
*SS7_BOARD  0 SS7HDC 0x0003  ss7.dc4  MTP2
*
*
* Configure individual E1/T1 interfaces:
* LIU_CONFIG <board_id> <liu_id> <liu_type> <line_code> <frame_format>
*            <crc_mode>
LIU_CONFIG  0  0  5  1  1  1
*
*
* MTP Parameters:
* MTP_CONFIG <reserved> <reserved> <options>
MTP_CONFIG  0  0  0x00000000
*
* Define linksets:
* MTP_LINKSET <linkset_id> <adjacent_spc> <num_links> <flags> <local_spc>
*             <ssf>
MTP_LINKSET  0  2  1  0x0000 1 0x08
*
* Define signaling links:
* MTP_LINK <link_id> <linkset_id> <link_ref> <slc> <board_id> <blink>
*          <stream> <timeslot> <flags>
* Note: The SS7HD board requires a compound parameter for blink of the
form
* sp_id-sp_channel.
* For SPCI4 / SPCI2S / CPM8 boards:
MTP_LINK  0  0  0  0  0  0    0   1  0x0006
* For SS7HD boards:
*MTP_LINK  0  0  0  0  0  0-0  0   1  0x0006
*
* Define a route for each remote signaling point:
* MTP_ROUTE <dpc> <linkset_id> <user_part_mask>
MTP_ROUTE  2  0  0x0008
*
*
* SCCP Parameters:
* SCCP_CONFIG <local_spc> <ssf> <options>
SCCP_CONFIG 1 0x8 0x0102
*
* Enable SCCP traces:
* SCCP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
```

```
SCCP_TRACE 0x3 0x7 0x3
*
* Define Remote Signaling Points:
* SCCP_SSR <ssr_id> RSP <remote_spc> <flags> <pc_mask>
SCCP_SSR 1 RSP 2 0 0x0000
*
* Define Local Sub-Systems:
* SCCP_SSR <ssr_id> LSS <local_ssn> <module_id> <flags> <protocol>
SCCP_SSR 2 LSS 0x08 0x2d 0 MAP
*
* Define Remote Sub-Systems:
* SCCP_SSR <ssr_id> RSS <remote_spc> <remote_ssn> <flags>
SCCP_SSR 3 RSS 2 0x08 0
*
*
* TCAP Parameters:
* TCAP_CONFIG <base_ogdlg_id> <nog_dialogues> <base_icdlg_id>
*             <nic_dialogues> <options> <dlg_hunt> [<addr_format>]
TCAP_CONFIG 0x0 8192 0x8000 8192 0x0000 0 0
*
* Enable TCAP traces:
* TCAP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
TCAP_TRACE 0x7 0xf 0x0
*
*
* MAP Parametes:
* MAP_CONFIG <options>
MAP_CONFIG 0x0
*
* Enable MAP traces:
* MAP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
MAP_TRACE 0xf 0xf 0x15
```

A.3.2 config.txt for point code 2 (MTR)

```
*************************************************************************
* Example config.txt.
* Edit this file to reflect your configuration.
*************************************************************************
*
* Configure individual boards:
* For SPCI4 / SPCI2S boards:
* SEPTELPCI_BOARD <board_id> <flags> <code_file> <run_mode>
SEPTELPCI_BOARD  0  0x0002  ss7.dc3 MTP2
*

* For SS7HD PCI boards:
* SS7_BOARD <board_id> <board_type> <flags> <code_file> <run_mode>
*SS7_BOARD  0 SS7HDP 0x0002  ss7.dc4  MTP2
*
* For SS7HD cP boards:
* SS7_BOARD <board_id> <board_type> <flags> <code_file> <run_mode>
*SS7_BOARD  0 SS7HDC 0x0002  ss7.dc4  MTP2
*
*
* Configure individual E1/T1 interfaces:
* LIU_CONFIG <board_id> <liu_id> <liu_type> <line_code> <frame_format>
*            <crc_mode>
LIU_CONFIG  0  0  5  1  1  1
*
*
* MTP Parameters:
* MTP_CONFIG <reserved> <reserved> <options>
MTP_CONFIG  0  0  0x00000000
*
* Define linksets:
* MTP_LINKSET <linkset_id> <adjacent_spc> <num_links> <flags> <local_spc>
<ssf>
MTP_LINKSET  0  1  1  0x0000 2 0x08
*
* Define signaling links:
* MTP_LINK <link_id> <linkset_id> <link_ref> <slc> <board_id> <blink>
*          <stream> <timeslot> <flags>
* Note: The SS7HD board requires a compound parameter for blink of the
form
* sp_id-sp_channel.
* For SPCI4 / SPCI2S / CPM8 boards:
MTP_LINK  0  0  0  0  0  0    0   1  0x0006
* For SS7HD boards:
*MTP_LINK  0  0  0  0  0  0-0  0   1  0x0006
*
* Define a route for each remote signaling point:
* MTP_ROUTE <dpc> <linkset_id> <user_part_mask>
MTP_ROUTE  1  0  0x0008
*
*
* SCCP Parameters:
* SCCP_CONFIG <local_spc> <ssf> <options>
SCCP_CONFIG 2 0x8 0x0102
*
* Enable SCCP traces:
* SCCP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
```

```
SCCP_TRACE 0x3 0x7 0x3
*
* Define Remote Signaling Points:
* SCCP_SSR <ssr_id> RSP <remote_spc> <flags> <pc_mask>
SCCP_SSR 1 RSP 1 0 0x0000
*
* Define Local Sub-Systems:
* SCCP_SSR <ssr_id> LSS <local_ssn> <module_id> <flags> <protocol>
SCCP_SSR 2 LSS 0x08 0x2d 0 MAP
*
* Define Remote Sub-Systems:
* SCCP_SSR <ssr_id> RSS <remote_spc> <remote_ssn> <flags>
SCCP_SSR 3 RSS 1 0x08 0
*
*
* TCAP Parameters:
* TCAP_CONFIG <base_ogdlg_id> <nog_dialogues> <base_icdlg_id>
*             <nic_dialogues> <options> <dlg_hunt> [<addr_format>]
TCAP_CONFIG 0x0 8192 0x8000 8192 0x0000 0 0
*
* Enable TCAP traces:
* TCAP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
TCAP_TRACE 0x7 0xf 0x0
*
*
* MAP Parametes:
* MAP_CONFIG <options>
MAP_CONFIG 0x0
*
* Enable MAP traces:
* MAP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
MAP_TRACE 0xf 0xf 0x15
```

A.4 Using different operating systems and board configurations

The following subsections provide information regarding the config.txt file if using different operating systems or board based configurations.

A.4.1.1 Running MTU/MTR with SS7HDP

If using SS7HDP boards, the SEPTELPCI_BOARD command should be replaced with the following:

```
SS7_BOARD  0 SS7HDP 0x0003  ss7.dc4  MTP2
```

Refer to [4] for further information.

A.4.1.2 Running MAP/TCAP/SCCP on the board

When using a license button so that the MAP, TCAP, SCCP and MTP modules run on the board instead of the host:

- For SPCI2S and SPCI4:

  the <run_mode> field in the SEPTELPCI_BOARD command should be set to MAP

- For SS7HDP:

  the <run_mode> field in the SS7_BOARD command should be set to MAP

Refer to [3] and as appropriate.

A.4.1.3 Running MTU/MTR with the SIU

If using the SIU, additional commands required by the SIU will need to be included. Therefore, the example config.txt provided in this appendix should not be used.

Refer to [2], [3] and [4] for further information.

A.4.1.4 Running MTU/MTR with other operating systems

There are no additional commands specific to various operating systems.

Refer to [3] and [4] as appropriate.

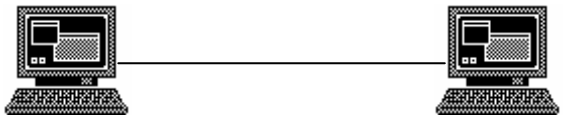
Appendix B - Example configuration files using SIGTRAN M2PA

This section provides example configuration files for use with Dialogic® MTU and MTR applications on a Windows® host system using SIGTRAN M2PA links. The Dialogic® MAP, TCAP, SCCP, MTP3 and M2PA modules are running on the host. Both MTU and MTR are running as module ID 0x2d.

Before configuring the protocol modules it is useful to determine information such as the local point code and remote point code relative to each network entity. For this example configuration, the MTU point code is 1 and the MTR point code is 2 (Figure 5).

Example configuration

Operating system:	Windows®
Link type:	SIGTRAN M2PA
Local point code:	1 (MTU)
Remote point code:	2 (MTR)
MTU module ID (Local point code):	0x2d
MTR module ID (Remote point code):	0x2d



MTU
Point code 1
subsystem 0x8
IP 192.168.0.1

MTR
Point code 2
subsystem 0x8
IP 192.168.0.2

Figure 6. Example configuration

B.1 system.txt

This section provides example system.txt files for SIGTRAN M2PA hosts running under Windows® using the example configuration described earlier in this appendix.

The following example system.txt file is valid for point code 1 and point code 2. All comments are denoted by '*'.

```
*************************************************************************
* Example system.txt.
* Edit this file to reflect your configuration.
*************************************************************************
*
* Modules running on the host:
*
LOCAL           0x00            * Timer Task
LOCAL           0xcf            * s7_mgt - Management/config task
LOCAL           0xef            * s7_log - Display and logging utility
LOCAL           0xc2            * mbm - Management task
LOCAL           0xd0            * SCTPD module
LOCAL           0xd1            * SCTP module
LOCAL           0xc1            * M2PA module
LOCAL           0x22            * MTP3 module
LOCAL           0x33            * SCCP module
LOCAL           0x14            * TCAP module
LOCAL           0x15            * MAP module
LOCAL           0x2d            * MTR or MTU module
*
* Now start-up all local tasks:
*
FORK_PROCESS    ..\..\..\..\tim_nt.exe
FORK_PROCESS    ..\..\..\..\tick_nt.exe
FORK_PROCESS    ..\..\..\..\sctpd.exe
FORK_PROCESS    ..\..\..\..\sctp.exe
FORK_PROCESS    ..\..\..\..\m2pa_nt.exe -t
FORK_PROCESS    ..\..\..\..\mtp_nt.exe -t
FORK_PROCESS    ..\..\..\..\mbm.exe -d
FORK_PROCESS    ..\..\..\..\sccp_nt.exe -t
FORK_PROCESS    ..\..\..\..\tcp_nt.exe -t
FORK_PROCESS    ..\..\..\..\map_nt.exe -t
FORK_PROCESS    ..\..\..\..\s7_mgt.exe -d
FORK_PROCESS    ..\..\..\..\s7_log.exe -fss7.log
```

If using operating systems other than Windows, the names of some of the executable files used in the FORK_PROCESS commands need to be changed.

Refer to the SIGTRAN Programmer's Manual [8] as appropriate.

B.2 config.txt

This section provides two example config.txt files for SIGTRAN M2PA hosts running under Windows using the example configuration described earlier in this appendix.

The following example config.txt files are for point code 1 and point code 2. All comments are denoted by '*'.

Using the two example config.txt files (one at each end of the link) will allow dialogues using MAP with 14-bit point codes to be demonstrated. If connecting to other equipment, the various parameters in the file need to be examined to determine if they are compatible with the configuration at the other end of the link, for example:

- point codes (OPC, DPC)
- signaling timeslot
- sub-system numbers
- host IP addresses

If using the example config.txt files please edit the ip address of the local and remote host to match your system.

Refer to [8] for SIGTRAN related parameter changes (such as port numbers, IP addresses, etc.)

B.2.1 config.txt for point code 1 (MTU)

```
*************************************************************************
* Example config.txt.
* Edit this file to reflect your configuration.
*************************************************************************
*
* NOTE: The ip addresses in the CNSYS and SNSLI command needs to match
* your configuration.   Change the ip address in the CNSYS command to
* match your local machine and in the SNSLI command to match your remote
* machine.
CNSYS:IPADDR=192.168.0.1,PER=0;
*
SNSLI:SNLINK=1,IPADDR=192.168.0.2,SNEND=C,SNTYPE=M2PA,M2PA=1,PPORT=3565;
*
* MTP Parameters:
* MTP_CONFIG <reserved> <reserved> <options>
MTP_CONFIG  0  0  0x00000000
*
* Define linksets:
* MTP_LINKSET <linkset_id> <adjacent_spc> <num_links> <flags> <local_spc>
*             <ssf>
MTP_LINKSET  0  2  1  0x0000 1 0x08
*
* Define signaling links:
* MTP_LINK <link_id> <linkset_id> <link_ref> <slc> <board_id> <blink>
*          <stream> <timeslot> <flags>
MTP_LINK  0  0  0  0  0  1  0  0  0x80000006
*
* Define a route for each remote signaling point:
* MTP_ROUTE <dpc> <linkset_id> <user_part_mask>
MTP_ROUTE  2  0  0x0008
*
*
* SCCP Parameters:
* SCCP_CONFIG <local_spc> <ssf> <options>
SCCP_CONFIG 1 0x8 0x0102
*
* Enable SCCP traces:
* SCCP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
SCCP_TRACE 0x3 0x7 0x3
*
* Define Remote Signaling Points:
* SCCP_SSR <ssr_id> RSP <remote_spc> <flags> <pc_mask>
SCCP_SSR 1 RSP 2 0 0x0000
*
* Define Local Sub-Systems:
* SCCP_SSR <ssr_id> LSS <local_ssn> <module_id> <flags> <protocol>
SCCP_SSR 2 LSS 0x08 0x2d 0 MAP
*
* Define Remote Sub-Systems:
* SCCP_SSR <ssr_id> RSS <remote_spc> <remote_ssn> <flags>
SCCP_SSR 3 RSS 2 0x08 0
*
*
* TCAP Parameters:
* TCAP_CONFIG <base_ogdlg_id> <nog_dialogues> <base_icdlg_id>
*             <nic_dialogues> <options> <dlg_hunt> [<addr_format>]
TCAP_CONFIG 0x0 8192 0x8000 8192 0x0000 0 0
```

```
*
* Enable TCAP traces:
* TCAP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
TCAP_TRACE 0x7 0xf 0x0
*
*
* MAP Parametes:
* MAP_CONFIG <options>
MAP_CONFIG 0x0
*
* Enable MAP traces:
* MAP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
MAP_TRACE 0xf 0xf 0x15
```

B.2.2 config.txt for point code 2 (MTR)

```
*************************************************************************
* Example config.txt.
* Edit this file to reflect your configuration.
*************************************************************************
*
CNSYS:IPADDR=192.168.0.2,PER=0;
*
SNSLI:SNLINK=1,IPADDR=192.168.0.1,SNEND=S,SNTYPE=M2PA,M2PA=1,PPORT=3565;
*
* MTP Parameters:
* MTP_CONFIG <reserved> <reserved> <options>
MTP_CONFIG  0  0  0x00000000
*
* Define linksets:
* MTP_LINKSET <linkset_id> <adjacent_spc> <num_links> <flags> <local_spc>
<ssf>
MTP_LINKSET  0  1  1  0x0000 2 0x08
*
* Define signaling links:
* MTP_LINK <link_id> <linkset_id> <link_ref> <slc> <board_id> <blink>
*          <stream> <timeslot> <flags>
MTP_LINK  0  0  0  0  0  1  0  0  0x80000006
*
* Define a route for each remote signaling point:
* MTP_ROUTE <dpc> <linkset_id> <user_part_mask>
MTP_ROUTE  1  0  0x0008
*
*
* SCCP Parameters:
* SCCP_CONFIG <local_spc> <ssf> <options>
SCCP_CONFIG 2 0x8 0x0102
*
* Enable SCCP traces:
* SCCP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
SCCP_TRACE 0x3 0x7 0x3
*
* Define Remote Signaling Points:
* SCCP_SSR <ssr_id> RSP <remote_spc> <flags> <pc_mask>
SCCP_SSR 1 RSP 1 0 0x0000
*
* Define Local Sub-Systems:
* SCCP_SSR <ssr_id> LSS <local_ssn> <module_id> <flags> <protocol>
SCCP_SSR 2 LSS 0x08 0x2d 0 MAP
*
* Define Remote Sub-Systems:
* SCCP_SSR <ssr_id> RSS <remote_spc> <remote_ssn> <flags>
SCCP_SSR 3 RSS 1 0x08 0
*
*
* TCAP Parameters:
* TCAP_CONFIG <base_ogdlg_id> <nog_dialogues> <base_icdlg_id>
*             <nic_dialogues> <options> <dlg_hunt> [<addr_format>]
TCAP_CONFIG 0x0 8192 0x8000 8192 0x0000 0 0
*
* Enable TCAP traces:
* TCAP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
TCAP_TRACE 0x7 0xf 0x0
```

```
*
*
* MAP Parametes:
* MAP_CONFIG <options>
MAP_CONFIG 0x0
*
* Enable MAP traces:
* MAP_TRACE <op_evt_mask> <ip_evt_mask> <non_prim_mask>
MAP_TRACE 0xf 0xf 0x15
```

Appendix C - Sample Output

The following is a sample output from the Dialogic® MTU and MTR applications. Both MTU and MTR have module id of 0x2d.

MTU was started using :

```
mtu –d0 -g43010008 -a43020008 -i987654321 -s"Hello World"
```

MTU example output :

```
MTU MAP Test Utility  Copyright (C) Dialogic Corporation 1997-2006.  All Rights Reserved
================================================================

MTU mod ID 0x2d; MAP module Id 0x15
mode 0 - Forward Short Message

MTU Tx: sending Open Request
MTU Tx: I0000 M tc7e2 i0000 f2d d15 s00 p010b090607040000010019020104430200080304430100080
0
MTU Tx: sending Forward Short Message Request
MTU Tx: I0000 M tc7e0 i0000 f2d d15 s00
p030e0101170700058967452 3f118080406a121436587f9191c2f090421436587f904006010022123420 00bc832
9bfd065ddf7236192d023c0000
MTU Tx: sending Delimiter Request
MTU Tx: I0000 M tc7e2 i0000 f2d d15 s00 p0500
MTU Rx: received Open Confirmation
MTU Rx: I0000 M t87e3 i0000 f15 d2d s00
p820501000b090607040000010019020104430100080304430200080 0
MTU Rx: received Forward Short Message Confirmation
MTU Rx: I0000 M t87e1 i0000 f15 d2d s00 p840e010100
MTU Rx: received Close Indication
MTU Rx: I0000 M t87e3 i0000 f15 d2d s00 p0400
```

Corresponding MTR output :

```
MTR MAP Test Responder (C) Dialogic Corporation 1997-2006.  All Rights Reserved
=====================================================

MTR mod ID - 0x2d; MAP module Id 0x15
MTR Rx: I0000 M t87e3 i8003 f15 d2d s00 p020104430200080304430100080b090607040000010019020
0
MTR Rx: Received Open Indication
MTR Tx: Sending Open Response
MTR Tx: I0000 M tc7e2 i8003 f2d d15 s00 p810501000b090607040000010019020 0
MTR Rx: I0000 M t87e1 i8003 f15 d2d s00
p040e0101191c2f090421436587f904006010022123420 00bc8329bfd065ddf72361917070005896745 23f11808
0406a121436587f900
MTR Rx: Received Forward Short Message Indication
MTR Rx: Short Message User Information:
MTR Rx: Hello World
MTR Rx: I0000 M t87e3 i8003 f15 d2d s00 p0600
MTR Rx: Received delimiter Indication
MTR Tx: Sending Forward SM Response
MTR Tx: I0000 M tc7e0 i8003 f2d d15 s00 p830e010100
MTR Tx: Sending Close Request
MTR Tx: I0000 M tc7e2 i8003 f2d d15 s00 p0307010000
```