Max T1/E1™

Installation Guide
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Summary

This document describes the MAX T1/E1 configuration commands used in interoperability test of the MAX T1/E1 with exchange equipments.

Overview of Digital Trunk Interface

The digital trunk interface is used for transferring a large volume of call traffic between exchange equipment (PBX or KTS) or between exchange equipment and peripherals.

The digital trunk interface has a signaling function, which exchanges the information needed for traffic path setup, release, and a monitoring/supervisory control function, which performs status management and error diagnosis for the trunk line.

The digital trunk interface, which is generally classified into E1 interface and T1 interface depending on the transmission speed, has various types of interfaces depending on the timing, frame mode, line encoding, signaling, etc.

Timing Clock Mode Setup

To maintain an error-free communication state between two exchange devices connected by a digital trunk, the timing clock signal must be synchronized for exact clock extraction and data transfer.

The clock source, or clock master, generates the timing clock signal and sends it to the remote side. The remote side receives the timing clock signal from the clock master and synchronizes itself with the clock master system using a phase locked loop circuit. This system is called a clock slave.

Because the Yap Max system has a chip that contains a phase locked loop circuit, this system can be used as clock master or clock slave.

Parameters

The commands for the timing clock mode setup of the MAX T1/E1 are executed in the directory MAXT1E1:/CONFIG/COMMON.

Example:

MAXT1E1:/CONFIG/COMMON>change clkp <value>
MAXT1E1:/CONFIG/COMMON>change clks <value>

clkp is the parameter that sets the primary system clock source and has 2 possible options: freerun and dvu. The freerun option represents the clock master and the dvu option represents the clock slave.

clks is the parameter that sets the secondary system clock source. This parameter is used only when several DVU boards are inserted into a system. The clks parameter can be set with the same value as clkp.
The MAX T1/E1 as the Clock Master

In this case, the timing clock signal that the MAX T1/E1 generates is used for telecommunication over the digital trunk interface between the MAX T1/E1 and exchange equipment (the PBX in the Figure 1).

![Figure 1 – Clock Master Diagram](image)

The command settings for the clock master are:

```
MAXT1E1:/CONFIG/COMMON>change clkp freerun
MAXT1E1:/CONFIG/COMMON>change clks freerun
```

The MAX T1/E1 as the Clock Slave

In this case, the MAX T1/E1 receives the timing clock signal from the exchange equipment (the PBX in the Figure 2) and synchronizes its own system clock to this timing clock signal.

![Figure 2 – Clock Slave Diagram](image)

The command settings for the clock slave are:

```
MAXT1E1:/CONFIG/COMMON>change clkp dvu
MAXT1E1:/CONFIG/COMMON>change clks dvu
```
## Digital Trunk Setup

The digital trunk is classified into E1 (2.048Mhz) and T1 (1.544Mhz), depending on the transmission speed.

The command for the digital trunk setup is executed in the directory `MAXT1E1:/CONFIG/DTRUNK>`.

**Example:**

```
MAXT1E1:/CONFIG/DTRUNK>change cfg type <value>
```

The `<value>` can be defined as **T1** or **E1**.

## Line Coding

Line coding means transforming an original digital bit stream into an optimized bit pattern for easy clock extraction and error detection.

The T1 trunk uses AMI (Alternate Mark Inversion) and B8ZS (Binary 8-Zero Substitution) line codings. The E1 trunk uses HDB3 (High-Density Bipolar-3 zeros) and AMI line codings.

The line coding of the MAX T1/E1 must be identical to that of the counterpart exchange equipment, or PBX.

The command to set the line coding is executed in the directory `MAXT1E1:/CONFIG/DTRUNK>`.

**Example:**

```
MAXT1E1:/CONFIG/DTRUNK>change cfg lcode <value>
```

The `<value>` can be defined as **AMI**, **HDB3**, or **B8ZS**.

## Frame Type

Data transmitted and received through the digital trunk forms a bundle of bits, which is called a frame.

The T1 trunk uses frame types like SF (Super Frame), ESF (Extended Super Frame) and D3/D4. The E1 trunk uses CRC4 and non-CRC4 frames.

The frame type of the MAX T1/E1 must be identical to that of the counterpart exchange equipment, or PBX.

The command to set the frame type is executed in the directory `MAXT1E1:/CONFIG/DTRUNK>`.

**Example:**

```
MAXT1E1:/CONFIG/DTRUNK>change cfg frame <value>
```

The `<value>` can be defined as **D4**, **ESF**, **SLS96**, **CRC4**, or **NOCRC4**.
Signaling Setup

Signaling is a protocol used to exchange the information needed for line monitoring and call setup or release between exchange equipment, between the extension line and the exchange equipment, or between network equipment.

The digital trunk has two types of signaling:

- Common Channel Signaling (CCS)
- Channel Associated Signaling (CAS)

The command for the signaling setup is executed in the directory `MAXT1E1:/CONFIG/DTRUNK>`.

Example:

```
MAXT1E1:/CONFIG/DTRUNK>change cfg sig <value>
```

The `<value>` can be defined as **R2**, **DTMF**, or **ISDN**.

**R2** and **DTMF** are CAS signaling types and **ISDN** is a CCS signaling type.

**CCS**

CCS is a signaling type used to send signaling information as an out-band signal.

The most notable and widely used form of this signaling type is ISDN. One disadvantage to using an ISDN primary rate interface (PRI) is the removal of one DS0, or voice channel in this case, for signaling use. Therefore, one T1 may have 23 DS0s, or B channels for user data, and one DS0, or D channel for signaling.

It is possible to control multiple PRIs with a single D channel. If each PRI uses Non Facility Associated Signaling (NFAS), you can configure the other PRIs in the NFAS group to use all 24 DS0s as B channels.

The MAX T1/E1 supports T1 ISDN PRI and E1 ISDN PRI. T1 ISDN PRI or E1 ISDN PRI depends upon the digital trunk type.

**ISDN PRI**

The commands and parameters used for the ISDN PRI setup are:

- **promode**
  
  This parameter is used to set the ISDN protocol mode to either ETSI or National ISDN-2.
  
  This setting must be identical to that of the counterpart PBX and support.

  Example:

  ```
  MAXT1E1:/CONFIG/ISDN>change promode <value>
  ```
The <value> can be defined as **etsi**, which stands for ETSI, or **ni2**, which stands for National ISDN-2.

**opmode**
This parameter is used to choose user-side protocol or network-side protocol.
If the counterpart exchange equipment is user-side, the MAX T1/E1 must be set to use the network-side protocol.
If the counterpart exchange equipment is network-side, the MAX T1/E1 must be set to use the user-side protocol.

*Example:*
MAXT1E1:/CONFIG/ISDN>change opmode <value>
The <value> can be defined as **user**, which is the ISDN PRI user-side protocol, or **net**, which is the ISDN network-side protocol.

**dmode**
This parameter is used to set the mode to send the destination number.

*Example:*
MAXT1E1:/CONFIG/ISDN>change dmode <value>
The <value> can be defined as **overlap** or **enbloc**.
When **enbloc** is set, the numbers are collected and sent in groups (instead of one at a time) within the SETUP message.
When **overlap** is set, the numbers are sent one at a time (instead of in groups) within the INFO message.

**dsend**
This parameter is used to choose sending a dial tone to the current channel in receiving overlap.

*Example:*
MAXT1E1:/CONFIG/ISDN>change dsend <value>
If the <value> is set to **on** and the SETUP message doesn’t have a destination number, a dial tone will be sent to the current channel.

**dtype**
This parameter is used to send continuous dial tone or discontinuous dial tone.

*Example:*
MAXT1E1:/CONFIG/ISDN>change dtype <value>
The <value> can be defined as **cont**, for a continuous dial tone, or **dcont**, for a discontinuous dial tone.
t1
This parameter is used to set the time delay that should be allowed before
the first number is dialed. Once this time is exceeded, the call is
disconnected.

Example:
MAXT1E1:/CONFIG/ISDN> change t1 <value>
The <value> can be defined from 1 second to 30 seconds.

t2
This parameter is used to set the maximum interval time between INFO
messages in receiving overlap. If one INFO message is not followed by the
next message within the t2 time, the latest digit information received is
regarded as the destination address.

Example:
MAXT1E1:/CONFIG/ISDN> change t2 <value>
The <value> can be defined from 1 second to 30 seconds.

t3xx
This parameter is used to set the value of the timer related to the ISDN
hierarchy defined in ITU-T Q.931. For further details, refer to the ITU-T
Q.931 Recommendation.

Example:
MAXT1E1:/CONFIG/ISDN> change t303 <value>
MAXT1E1:/CONFIG/ISDN> change t304 <value>
.......... 
MAXT1E1:/CONFIG/ISDN> change t310 <value>
The <value> can be defined as follows for each parameter:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>t301</td>
<td>From 180 seconds to 250 seconds</td>
</tr>
<tr>
<td>t303 - t308</td>
<td>From 1 second to 30 seconds</td>
</tr>
<tr>
<td>t313</td>
<td>From 1 second to 30 seconds</td>
</tr>
<tr>
<td>t318</td>
<td>From 1 second to 30 seconds</td>
</tr>
<tr>
<td>t319</td>
<td>From 1 second to 30 seconds</td>
</tr>
</tbody>
</table>
**cnpn, cdpn**

This parameter is used to set the numbering plan needed to use for the called party or the calling party on ISDN signaling. For further details, refer to ITU-T Q.931 Recommendation.

**Example:**

```
MAXT1E1:/CONFIG/ISDN>change cnpn <value>
MAXT1E1:/CONFIG/ISDN>change cdpn <value>
```

The `<value>` can be defined as:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>International number in ISDN numbering plan</td>
</tr>
<tr>
<td>2</td>
<td>National number in ISDN numbering plan</td>
</tr>
<tr>
<td>3</td>
<td>Local (directory) number in ISDN numbering plan</td>
</tr>
<tr>
<td>4</td>
<td>Subscriber number in private numbering plan</td>
</tr>
<tr>
<td>5</td>
<td>Unknown number in unknown numbering plan</td>
</tr>
</tbody>
</table>

**CAS**

CAS (Channel Associated Signaling) is a signaling type used to send signaling information into information band.

CAS signaling is divided into line signaling and address signaling.

- **Line signaling** indicates that on-hook/off-hook status changes occurred in the network and performs call setup and call connection monitoring and release operation.
- **Address signaling** performs processing related to the caller-dialed number, or the destination number.

**T1 Line Signaling**

CAS signaling means that instead of having a specific time slot (such as an ISDN D channel in PRI) designated to provide signaling only, signaling bits are within the sixth, twelfth, eighteenth and twenty-fourth frames of each time slot. CAS signaling is often called robbed-bit signaling because it takes bits from bearer channels and uses them for signaling.

Various types of CAS signaling are available in the T1 world. The most common forms of CAS signaling are **loopstart**, **groundstart**, and **EMsignaling**.

**E1 Line Signaling**

The Conference of European Postal and Telecommunications administrations (CEPT) defines how bits of a PCM carrier system in E1 areas will be used and...
in what sequence. E1 circuits use the Channel Associated Signaling (CAS) protocol. Frames using CAS share time slot 16, which carries signaling information for two time slots or voice channels at a time.

**ADDRESS SIGNALING**

In CAS signaling, the address signal is transmitted as an audio tone through the voice channel.

The International standard for audio tone transmission is R2MFC signaling but most countries have adopted their own settings for the number of tones used and the frequency range.

DTMF can be used as an audio tone in the PBX.

**T1 CAS**

The line signaling used in the MAX T1/E1 is E&M signaling that includes **E&M wink-start**, **E&M immediate-start**, and **E&M delay-start**.

The command to set line signaling is executed in the directory `N2P:/CONFIG/R2>.

**Example:**

```
MAXT1E1:/CONFIG/R2> change stype <value>
```

The `<value>` can be defined as `emi`, `emd`, or `emw`.

- `emi` is for E&M immediate-start,
- `emd` is for E&M delay-start,
- `emw` is for E&M wink-start.

The address signaling used in the MAX T1/E1 is R2MFC signaling and DTMF signaling.

The command to set address signaling is executed in the directory `N2P:/CONFIG/DTRUNK>.

**Example:**

```
N2P:/CONFIG/DTRUNK>change cfg sig <value>
```

The `<value>` can be defined as `r2`, which is for R2MFC signaling or `dtmf`, which is for DTMF signaling.

The commands and parameters used in T1 CAS are:

**DIALING (ADDRESS SENDING) MODE**

This parameter is used to select `overlap` or `enbloc`. In Net2Phone protocol, only `enbloc` is supported.

**Example:**

```
MAXT1E1:/CONFIG/R2> change dmode <value>
```
ROBBED BIT REVERSE

In E&M Protocol, the signaling bit means line status (i.e., on-hook or off-hook status).

When the signaling bit is 0, the line status is on-hook. If the signaling bit is 1, the line status is off-hook.

However, in other systems, the value may be switched.

When the robbed bit reverse parameter is set to off in the MAX T1/E1, the on-hook state has 0 value and the off-hook state has 1 value.

If the robbed bit reverse parameter is set to on, the values are switched: the on-hook state has 1 value and the off-hook state has 0 value.

Example:
MAXT1E1:/CONFIG/R2>change rbr <value>

The <value> can be defined as on or off.

RINGBACK TONE SEND IN ALERT

This parameter is used to generate a ringback tone to the current voice channel if an alert message is received from the Internet (or Net2Phone network).

Example:
MAXT1E1:/CONFIG/R2>change rsend <value>

The <value> can be defined as on or off.

ALERT MSG SEND TO NETWORK

This parameter is used to send an alert message to the Internet when dialing information is sent through the digital trunk in the overlap dialing mode.

Example:
MAXT1E1:/CONFIG/R2>change asend <value>

The <value> can be defined as on or off.

O/G II-GROUP SIGNAL

This parameter is used to set the class of calling extension in R2 MFC signaling. For further details, refer to the ITU-T Q.441 recommendation.

Example:
MAXT1E1:/CONFIG/R2>change categ <value>

The <value> can be defined as any number from 1 to 15.

REQUEST CHARGE

This parameter is used to set billing if a call is received in R2 MFC signaling. For further details, refer to the ITU-T Q.441 recommendation.

Example:
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MAXT1E1:/CONFIG/R2>change charge <value>
The <value> can be defined as **on** or **off**.

I/C A-GROUP SIGNAL (ACOMP)

This parameter is used to set the group-changing mode after receiving the address information when a call is received in R2 MFC signaling. For further details, refer to ITU-T Q.441 recommendation.

**Example:**
MAXT1E1:/CONFIG/R2>change acomp <value>
The <value> can be defined as **on** or **off**.

I/C CALLING PARTY ADDR REQUEST (SAREQ)

This parameter is used to request source address information when a call is received in R2 MFC signaling.

**Example:**
MAXT1E1:/CONFIG/R2>change sareq <value>
The <value> can be defined as **on** or **off**.

MAX NUMBER OF DIGITS TO RECEIVE (MRXD)

This parameter is used to set the maximum length of the digits of an incoming call when a call is received in R2 MF signaling.

**Example:**
MAXT1E1:/CONFIG/R2>change mrxd <value>
The <value> can be defined as any number from 0 to 20 (0:unlimited).

R2-MFC TONE OUTPUT GAIN (GAIN)

This parameter is used to set the output gain of the R2 MFC tone.

**Example:**
MAXT1E1:/CONFIG/R2>change gain <value>
The <value> can be defined as any number from -31 dB to 0 dB.

DIAL TONE SEND IN SEIZURE (DSEND)

This command is used to send a dial tone to the voice channel after receiving a seizure signal in DTMF signaling.

**Example:**
MAXT1E1:/CONFIG/R2>change dsend <value>
The <value> can be defined as **on** or **off**.
**WAIT FIRST DTMF TIMER (FDWT)**

This parameter is used to set the time to wait for the first DTMF message after receiving the seizure signal in DTMF signaling. If the first DTMF message is not received until after it times out, the call is released.

*Example:*

```
MAXT1E1:/CONFIG/R2>change fdwt <value>
```

The `<value>` can be defined from 1 second to 30 seconds.

---

**WAIT SECOND DTMF TIMER (SDWT)**

This parameter is used to set the time to wait for DTMF message for each digit number after receiving seizure signal and the first DTMF message in DTMF signaling. The next DTMF message is not received until this timer gets to time out, the number of the incoming call will be regarded as collected.

*Example:*

```
MAXT1E1:/CONFIG/R2>change sdwt <value>
```

The option value can be selected from 1 second to 30 seconds.

---

**DIAL GUARD TIME (GUARD)**

This parameter is used to set the time from the point of sending seizure signal or receiving seizure ack signal preceded by sending seizure signal to the point of the DTMF tone being sent, when there is an outgoing call in DTMF signaling.

*Example:*

```
MAXT1E1:/CONFIG/R2>change guard <value>
```

The `<value>` can be defined from 10 ms to 1000 ms.

---

**DIAL DURATION (DUR)**

This parameter is used to set the time to maintain the DTMF tone in sending DTMF tone in DTMF signaling.

*Example:*

```
MAXT1E1:/CONFIG/R2>change dur <value>
```

The `<value>` can be defined from 10 ms to 1000 ms.

---

**DIAL INTERVAL (INTV)**

This parameter is used to set the inter-digit time between DTMF tones in DTMF signaling.

*Example:*

```
MAXT1E1:/CONFIG/R2>change intv <value>
```

The `<value>` can be defined from 10 ms to 1000 ms.
**DIAL TONE TYPE ( Dtype)**

This parameter is used to set the dial tone type to send through the voice channel after receiving a seizure signal in DTMF signaling.

**Example:**

```
MAXT1E1:/CONFIG/R2> change_dtype <value>
```

The `<value>` can be defined as `cont`, which indicates a continuous dial tone, or `dcont`, which indicates a discontinuous dial tone.

**SEIZURE GUARD TIME (t1)**

This parameter is used to set the time needed to recognize a seizure signal. To be recognized as a seizure signal, the value of the signaling bit must be maintained and unchanged for a certain time (seizure guard time) after receiving the seizure signaling bit in CAS line signaling.

**Example:**

```
MAXT1E1:/CONFIG/R2> change t1 <value>
```

The `<value>` can be defined from 0 ms to 1000 ms.

**CLEAR FORWARD GUARD TIME (t2)**

This parameter is used to set the time needed to recognize a clear forward guard signal. To be recognized as a clear forward signal, the value of the signaling bit must be maintained and unchanged for a certain time (clear forward guard time) after receiving the clear forward signaling bit in CAS line signaling.

**Example:**

```
MAXT1E1:/CONFIG/R2> change t2 <value>
```

The `<value>` can be defined from 0 ms to 1000 ms.

**CLEAR FORWARD WAIT GUARD TIME (t3)**

This parameter is used to set the wait time for a clear forward guard signal after sending a clear backward signal in CAS line signaling. If the clear forward signal is not received within this time, the voice channel will be blocked.

**Example:**

```
MAXT1E1:/CONFIG/R2> change t3 <value>
```

The `<value>` can be defined from 1000 ms to 60000 ms.

**SEIZURE ACK GUARD TIME (t4)**

This parameter is used to set the time needed to recognize a seizure ack signal.
To be recognized as a seizure ack signal, the value of the signaling bit must be maintained and unchanged for a certain time (seizure ack guard time) after receiving the seizure ack signaling bit in CAS line signaling.

Example:

MAXT1E1:/CONFIG/R2>change t4 <value>

The <value> can be defined from 0 ms to 1000 ms.

GLARE GUARD TIME (T5)

This parameter is used to set the seizure ack duration in CAS line signaling.

Example:

MAXT1E1:/CONFIG/R2>change t5 <value>

The <value> can be defined from 0 ms to 1000 ms.

ANSWER GUARD TIME (T6)

This parameter is used to set the time needed to recognize an answer signal. To be recognized as an answer signal, the value of the signaling bit must be maintained and unchanged for a certain time (answer guard time) after receiving the answer signaling bit in CAS line signaling.

Example:

MAXT1E1:/CONFIG/R2>change t6 <value>

The <value> can be defined from 0 ms to 1000 ms.

CLEAR BACKWARD GUARD TIME (T7)

This parameter is used to set the time needed to recognize a clear backward signal. To be recognized as a clear backward signal, the value of the signaling bit must be maintained and unchanged for a certain time (clear backward guard time) after receiving the clear backward signaling bit in CAS line signaling.

Example:

MAXT1E1:/CONFIG/R2>change t7 <value>

The <value> can be defined from 0 ms 1000 ms.

RELEASE GUARD TIME (T8)

This parameter is used to set the time needed to recognize a release guard signal. The voice channel must be maintained in an idle state for a certain time (release guard time) between the release state and the seizure state.

Example:

MAXT1E1:/CONFIG/R2>change t8 <value>
The <value> can be defined from 0 ms~ 1000 ms.

**Reanswear Guard Time (T9)**

This parameter is used to set the time needed to maintain for a certain time (reanswear guard time) after receiving the answer signaling bit preceded by the clear backward signal in CAS line signaling.

**Example:**

MAXT1E1:/CONFIG/R2>change t9 <value>

The <value> can be defined from 0 ms to 1000 ms.

**Release Wait Guard Time (T10)**

This parameter is used to set the time to wait until the channel is released after sending the clear forward in CAS line signaling.

If the channel is not released within this time, it will be blocked.

**Example:**

MAXT1E1:/CONFIG/R2>change t10 <value>

The <value> can be defined from 0 ms to 1000 ms.

**Block Detect Guard Time (T11)**

This parameter is used to set the time needed to recognize a block signal.

To be recognized as a block signal, the value of the signaling bit must be maintained and unchanged for a certain time (block detect guard time) after receiving the block detect signaling bit in CAS line signaling.

**Example:**

MAXT1E1:/CONFIG/R2>change t11 <value>

The <value> can be defined from 0 ms to 1000 ms.

**Glare Detect Guard Time (T12)**

This parameter is used to set the time needed to recognize the glare occurring when both communication sides in CAS line signaling seize a voice channel simultaneously.

**Example:**

MAXT1E1:/CONFIG/R2>change t12 <value>

The <value> can be defined from 100 ms to 10000 ms.

**Glare Detect Seizure Maintain Time (T13)**

This parameter is used to set the time needed to maintain the seizure state after the recognizing glare in CAS line signaling.

**Example:**

MAXT1E1:/CONFIG/R2>change t13 <value>
The <value> can be defined from 100 ms to 10000 ms.

**E1 CAS**
Wink-start signaling is used in the E1 digital trunk of the MAX T1/E1.

*Example:*

```
MAXT1E1:/CONFIG/R2>change stype wink
```

E1 line signaling must be set to *wink*.

R2 MFC and DTMF can be set for address signaling in E1 CAS of the Max T1/E1.

The command to set address signaling is executed in the directory `MAXT1E1:/CONFIG/DTRUNK>`.

*Example:*

```
MAXT1E1:/CONFIG/DTRUNK>change cfg sig <value>
```

The <value> can be defined as *R2*, which indicates the R2 MF type, or *DTMF*, which indicates the DTMF type.

Other commands and parameters related to E1 CAS are used in the same way as T1 CAS.

### Configuration Settings

In interoperability testing of the MAX T1/E1 with PBX using the digital trunk, the configuration must be set as defined below.

1. **PCM Coding Law Setting**
   Set PCM coding law identical with interoperating PBX.

2. **Clock Source Setting**
   Refer to the *Timing Clock Mode Setup* section on page 1 and set the clock mode.

3. **Trunk Type Setting**
   Set a trunk type fit with which the digital trunk can interoperate.

4. **Signaling Type Setting**
   Set the signaling type needed for an interoperability test.

5. **Line Coding and Frame Mode Setting**
   Set the line coding and frame mode, respectively fit for the trunk type and signaling type as set in steps 3 and 4 above.

6. **Channel Type Setting**
   Set each voice channel type. Each voice channel may be set to *incoming*, *outgoing*, or *bothway*.
   - *Incoming*: Can only receive calls.
   - *Outgoing*: Can only send calls.
   - *Bothway*: Can receive and send calls.

7. **Signaling-Related Parameter Setting**
   Adjust parameters of the directory corresponding to the signaling type set in step 4 above.
8. **Saving Setting Value**  
   Save setting values to apply changed values even after rebooting system. The command for saving can be executed in the directory **MAXT1E1:/CONFIG>**.

9. **Reset**  
   Reset the system to apply the above changes.

---

**Configuration Examples**

**Configuration Example 1**

Below is an example of T1 CAS setting.

```
MAXT1E1:/CONFIG/COMMON> change pcm ulaw  
Configuration is not saved. You must save the changed configurations  
Command successfully end.  
You Must RESET to apply modified value(s) to system.  
MAXT1E1:/CONFIG/COMMON> change clkp dvu  
Configuration is not saved. You must save the changed configurations  
Command successfully end.  
MAXT1E1:/CONFIG/COMMON> change clks dvu  
Configuration is not saved. You must save the changed configurations  
Command successfully end.  
MAXT1E1:/CONFIG/COMMON> show  
==========================================================================  
MAXT1E1 System Configurations  
==========================================================================  
pcm_coding_law (pcm)          : U-LAW  
nv-memory save mode (save)    : MANUAL  
yes/no prompt mode (prompt)   : ENABLE(ON)  
watchdog timer (wdt)          : ENABLE(ON)  
primary clock source (clkp)   : LOCAL TRUNK(DVU)  
secondary clock source (clks) : LOCAL TRUNK(DVU)  
==========================================================================  
MAXT1E1:/CONFIG/DTRUNK> change cfg type t1  
Configuration is not saved. You must save the changed configurations  
Command successfully end.  
You Must RESET to apply modified value(s) to system.  
MAXT1E1:/CONFIG/DTRUNK> change cfg sig dtmf  
Configuration is not saved. You must save the changed configurations  
Command successfully end.  
You Must RESET to apply modified value(s) to system.  
MAXT1E1:/CONFIG/DTRUNK> change cfg lcode ami  
Configuration is not saved. You must save the changed configurations
```
Command successfully end.
You Must RESET to apply modified value(s) to system.
MAXT1E1:/CONFIG/DTRUNK> **chang cfg frame d4**
Configuration is not saved. You must save the changed configurations
Command successfully end.
You Must RESET to apply modified value(s) to system.
MAXT1E1:/CONFIG/DTRUNK> **show cfg**
Digital Trunk Configurations

trunk type (type) : T1
line code (lcode) : AMI(T1, E1)
frame mode (frame) : D4(T1)
signaling type (sig) : DTMF(CAS)
Voice Output Gain (vgain) : -3 dbm
PCM Input Gain (igain) : -3 dbm

MAXT1E1:/CONFIG/DTRUNK> show line

Channel Type configurations

channel type        |  I=Incoming      O=Outgoing    B=Bothway
|  S=Signaling-CH  F=Frame-Sync  X=undefined

channel number      |            1         2         3
|  01234567890123456789012345678901

[slot/port] [3/0]   |  BBBBBBBBBBBBBBBBBBBBBBBBXXXXXXXX

MAXT1E1:/CONFIG/R2> ch stype emi
Configuration is not saved. You must save the changed configurations
Command successfully end.

MAXT1E1:/CONFIG/R2> show

R2 Configurations

Dialing Mode (dmode)                   : 1(ENBLOC)
R2 Line signaling type (stype)         : E&M IMM
robbed bit reversion (rbr)             : DISABLE(OFF)
Ringback tone send in alert (rsend)    : ENABLE(ON)
Alert Msg send to network (asend)      : ENABLE(ON)
Seizure Guard Time (t1)                : 30 ms
Clear Foward Guard Time (t2)           : 200 ms
Clear Foward Wait Guard Time (t3)      : 30000 ms
Seizure Ack Guard Time (t4)            : 1000 ms
Glare Guard Time (t5)                  : 360 ms
Answer Guard Time (t6)                 : 200 ms
Clear Backward Guard Time (t7)         : 200 ms
Release Guard Time (t8)                : 200 ms
Reanswer Guard Time (t9)               : 200 ms
Release Wait Guard Time (t10)          : 1000 ms
Block Detect Guard Time (t11)          : 640 ms
Glare Detect Guard Time (t12)          : 200 ms
If glare is detected, stay seizure(t13): 500 ms

MAXT1E1:/CONFIG> save
This command isn't recoverable. Are you sure(y/n)? y

Configurations in working memory is saved to NV-Memory.
Configuration Example 2
Below is an example of T1 PRI setting.

MAXT1E1:/CONFIG/COMMON> **change pcm ulaw**
Configuration is not saved. You must save the changed configurations
Command successfully end.
You Must RESET to apply modified value(s) to system.
MAXT1E1:/CONFIG/COMMON> **change clkp dvu**
Configuration is not saved. You must save the changed configurations
Command successfully end.
MAXT1E1:/CONFIG/COMMON> **change clks dvu**
Configuration is not saved. You must save the changed configurations
Command successfully end.
MAXT1E1:/CONFIG/COMMON>

MAXT1E1:/CONFIG/COMMON> **show**
==========================================================================
MAXT1E1 System Configurations
==========================================================================
pcm_coding_law (pcm)          : U-LAW
nv-memory save mode (save)    : MANUAL
yes/no prompt mode (prompt)   : ENABLE(ON)
watchdog timer (wdt)          : ENABLE(ON)
primary clock source (clkp)   : LOCAL TRUNK(DVU)
secondary clock source (clks) : LOCAL TRUNK(DVU)
==========================================================================
MAXT1E1:/CONFIG/COMMON> **show**
MAXT1E1:/CONFIG/DTRUNK> **change cfg type t1**
Configuration is not saved. You must save the changed configurations
Command successfully end.
You Must RESET to apply modified value(s) to system.
MAXT1E1:/CONFIG/DTRUNK> **change cfg sig isdn**
Configuration is not saved. You must save the changed configurations
Command successfully end.
You Must RESET to apply modified value(s) to system.
MAXT1E1:/CONFIG/DTRUNK> **change cfg locode b8zs**
Configuration is not saved. You must save the changed configurations
Command successfully end.
You Must RESET to apply modified value(s) to system.
MAXT1E1:/CONFIG/DTRUNK> **change cfg frame esf**
Configuration is not saved. You must save the changed configurations
Command successfully end.
You Must RESET to apply modified value(s) to system.
MAXT1E1:/CONFIG/DTRUNK> **show cfg**
Digital Trunk Configurations

trunk type (type) : T1  
line code (lcode) : B8ZS(T1)  
frame mode (frame) : ESF(T1)  
signaling type (sig) : ISDN(CCS)  
Voice Output Gain (vgain) : -3 dbm  
PCM Input Gain (igain) : -3 dbm

MAXT1E1:/CONFIG/DTRUNK> show line

Channel Type configurations

channel type    |  I=Incoming      O=Outgoing    B=Bothway     
                |  S=Signaling-CH F=Frame-Sync  X=undefined
-----------------------------------------------------
channel number  |            1         2         3
-------------    |  01234567890123456789012345678901
[slot/port] [3/0] |  BBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBBB

MAXT1E1:/CONFIG/DTRUNK> cd ..

ISDN Configurations

Protocol Mode (prmode) : (NI2)  
Operation Mode (opmode) : (NETWORK-MODE)  
Dialing Mode in O/G Call SETUP (dmode) : (ENBLOC-MODE DIAL)  
Dial tone send in seizure (dsend) : DISABLE(OFF)  
Dial Tone Type (dtype) : CONTINUOUS  
wait first INFO timer (t1) : 5 sec  
wait second INFO timer (t2) : 3 sec  
Q931 Timer - Call Delivered (t301) : 180 sec  
Q931 Timer - Call Initiated (t303) : 4 sec  
Q931 Timer - Overlap Sending (t304) : 4 sec  
Q931 Timer - Disconnect Request (t305) : 30 sec  
Q931 Timer - Release Request (t308) : 4 sec  
Q931 Timer - Outgoing Call Proceeding (t310) : 10 sec  
ISDN Calling Party Numbering Plan (cdpn) : (UNKNOWN)

MAXT1E1:/CONFIG> save
This command isn't recoverable. Are you sure(y/n)? y

Configurations in working memory is saved to NV-Memory.