

TS0 Compression Card Operating Information

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STATUTORY NOTICES

APPROVAL

The approval number for the DT310 Dual LIU is NS/3660/12/H/452538.

The DT310 Dual LIU is approved for direct connection to G.703 2048kbit/s private circuits, subject to the following conditions:

- 1) The Dual LIU is used in a 3000 series multiplexer chassis.
- 2) WARNING. Interconnection directly, or by way of other apparatus, of ports marked:-

"WARNING. CONNECT ONLY APPARATUS COMPLYING WITH BS6301 TO THIS PORT".

or

"WARNING. CONNECT ONLY APPARATUS COMPLYING WITH BS6301 TO THESE PORTS".

with ports marked or not so marked may produce hazardous conditions on the network. Advice should be obtained from a competent engineer before such a connection is made.
- 3) All ports, other than those connected to Public Telecommunication Networks, may only have equipment complying with BS6301 connected to them.

The safety status of all ports is SELV.



Case Technology Ltd declare that this product conforms with the protection requirements of Council Directive 89/336/EEC on the approximation of the laws of the member states relating to electromagnetic protection.

This equipment has been tested using shielded cables supplied by Case Technology Ltd. These cables, or equivalents, must be used to ensure compliance with this declaration.

All PCB assemblies contain Electrostatic Sensitive Devices (ESDs) which may be permanently damaged if incorrectly handled. This equipment must be handled in accordance with BS5783 code of practice for the handling of electrostatic sensitive devices.

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Published by Case Technology Technical Publications Department

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1.1 General Description

This manual is intended to be read in conjunction with the 3000 series multiplexer manual and the Dual Line Interface card manual.

The card will only operate in ports 3 and 4 of Cray Communications 3000 series multiplexers fitted with DT981/2 or later firmware.

The TS0 Data Compression Card (DCC) DTE243 consists of:

DT310 Dual LIU fitted with:-

- DT742 Dual LIU DCC module - daughter board
- DT995 Management firmware patchfield
- DT988 DCC firmware.

The DCC is a 'Smart' interface card configured via menu options which are accessed from the top menu of the system control card software through the 'Smart' option

1.2 Glossary Of Terms

Line 0 - Refers to signals on the multiplexer Backplane
Line 1 - Refers to the PCM stream connected to circuit 1
Line 2 - Refers to the PCM stream connected to circuit 2

in 0 - Refers to incoming data from the multiplexer switch port
in 1 - Refers to incoming data from Line 1
in 2 - Refers to incoming data from Line 2

Out 0 - Refers to outgoing data to the multiplexer switch port
Out 1 - Refers to outgoing data to Line 1
Out 2 - Refers to outgoing data to Line 2

2. Operation

The card provides two standard 2048kbit/s PCM line interfaces with special adaptation to interface to the multiplexer management system. The card is based on the Dual LIU card with the following differences:-

- a) The DCC operates only in ports 3 and 4 of the 3000 series chassis as a Smart card.
- b) The card only operates with two independent PCM streams.
- c) Normal management facilities provided by 3000 series multiplexers in TS0 for incoming and outgoing PCM streams is not supported.
- d) CRC4 error checking is not supported.
- e) The card cannot be used as a Dual LIU to route data from the PCM streams to the multiplexer.

Two modes of operation are available on the card by switch selection, 'Repeated non frame word' and 'Alternating non frame word'.

The 'Repeated non frame mode' is for use where the cross connected TS0 spare bits are repeated every frame and the 'Alternating non frame mode' is for use where the data is only cross connected into every alternate frame.

The PCM input to the DCC will, in normal operation, consist of the 8 TS0 spare bits from up to 31 remote PCM equipments, connected via a Digital Access Cross-Connect System (DACCS), carried in timeslots 1 to 31. On a line by line basis the DCC grooms the incoming timeslots into a single byte for interfacing to the 3000 multiplexer management system via management 'M' lines (M1-M4) or a timeslot, and broadcasts out a single management byte of information to all timeslots 1 to 31 in the PCM stream. If a timeslot is selected for the output, then the first timeslot assigned to circuit 1 carries line 1 result, and first circuit assigned to line 2 carries line 2 result. A fully fitted 3200 chassis, for example, can support 31x2x13 (806) remote managed equipments.

Note: In this application 'grooming' means logically 'ANDing' together all bit 1s in timeslots 1 to 31, all bit 2s, all bit 3s, etc. to form an 8 bit result.

Fault Monitoring

Fault monitoring is undertaken locally and the operator has the ability to list and clear faults in the same manner as the system control card software. All fault information from Smart channel cards is passed back to the system control card which, if it is in logging mode, will be displayed to the operator.

Receive attention of active faults can be carried out locally using the 'Rx att' command or by using the Receive attention command sent from the system control card. This command will log these faults as 'RxAt' and prevent them from generating alarm relay responses. The LEDs will still report the fault. These faults will only become active again if they clear and then re-occur; the relays will then act normally.

Restart

There are two types of restart which can occur on the card. 1) When power is applied to the card for the first time. The card will enter the self test routine which will take ten seconds to complete. On successfully completing the self test the card will run either the configuration passed by the system controller, if valid, or the default configuration.

2) When either the power fails for a fraction of a second or a watchdog occurs. In this case the card will restart without carrying out the self test and raise the 'System restart' fault.

Watchdog

The card has a watchdog facility provided to prevent the microprocessor from running invalid software. If this condition was to occur a restart would be initiated as detailed above.

3. Specifications

The card complies with CCITT Recommendations G.704 and G.706 (blue book), and with G.703, G.732, G.736 and G.823 (red book).

Line Signal:

Line Rate	2048 kbit/s \pm 25ppm
Line Code	HDB3
Output Signal Level	\pm 2.37V \pm 10% (75 ohms) \pm 3.0V \pm 10% (120 ohms)
Input Signal Level	0 to > 6dB line loss
Line Interface	75 ohms unbalanced: BNC 120 ohms balanced: 9 way 'D' type connector

Power Consumption

Power consumption (typical) from each rail is as follows:-

+12V:	1.2W	
+ 5V :	5.2W	
- 5V :	0.25W	Total: 6.65W

(includes both DT310 mother board and DT742 module)

4. Configuration of a Smart Channel Card

There are four configuration fields available plus a default field. All modifications are undertaken in an edit field which can be loaded from any valid configuration or the default configuration. The default configuration is ROM based and therefore cannot be altered. The procedure using the 'Edit' 'Load' 'Save' 'Modify' and 'Display' commands is exactly the same as for the main multiplexer.

Smart channel cards have no battery backed memory, a copy of all configurations saved must be held in the battery backed memory on the system control card. Smart channel cards save their configurations when requested, by using the 'Backup' command, to the local volatile memory and also to the battery backed memory on the system control card.

From a power up condition, the system controller will initialise the channel cards and download any configurations previously saved to the card. When the operator loads a configuration, this is from the local volatile memory only and not from the battery backed memory on the system control card.

The configurations for the card are modified on the card in the normal smart fashion and then uploaded to the system controller for saving. They will be passed back to the channel card from the system controller using the smart protocol every time the unit is powered up.

Configuration Commands

The format of the configuration menu commands is the same as the 3000 multiplexer commands, using 'Edit', 'Load', 'Save', 'Modify' and 'Display'. If a configuration is saved locally, it will also require backing up to the multiplexer system control card, which has battery backed RAM, via the smart interface. There are 4 configurations available for modification.

(SC) Current | Edit >

Current

This command will display the current configuration running on the card i.e. Default,1,2,3 or 4

Edit

This will allow the operator to 'Load', 'Save', 'Modify', 'Display' or 'Back-up' configurations for the card.

Load

This command allows the operator to load any local configuration (Default,1,2,3 or 4) into the edit buffer for modification or re-saving into another configuration. If the operator selects the currently running configuration, the following will be displayed :-

WARNING CONFIG IS CURRENT

Loading the current configuration will not cause any disruption to service.

Save

This command allows the operator to save the configuration in the edit buffer into any local configuration (1,2,3 or 4). If the chosen configuration is current the following message will be displayed:-

WARNING CONFIG IS CURRENT - CONT Y/N >

If N (no) is selected the command will be aborted.

If Y (yes) is selected the configuration will be saved and immediately run effecting the changes.

Modify Command.

This command allows the operator to Modify the following parameters.

- (i) Signal failure options
- (ii) Line fault logging mode
- (iii) Low error rate detector threshold
- (iv) Routing of compressed TS0 data

Display

This command allows the operator to display the information that has been loaded into the Edit buffer.

Back-up

This command allows the operator to save configurations from the card to the battery backed RAM on the system control card. A check is made for identical configurations and these are only sent once e.g. sending 1, 3, 4.

Default Configuration

The Default configuration is :-

- a) Line signal clock option = PCM loss
- b) Fixed Data F code = FFH
- c) Low Error rate = 10^{-5}

Running a Configuration

In a 3000 series multiplexer, the configuration to be run by the smart card is determined by the configuration menu on the system control card. The operator will be given a choice of four configurations to be run.

If the system controller instructs the card to run a configuration which is corrupt, the card will automatically run the default configuration.

Clock Recovery and Selection

A recovered 2048kHz clock is available from each of the received PCM lines and also the 2048kHz external clock input signal. Any of these may be selected by the system controller on 3000 units as the system clock. These clocks are monitored by the system controller if they are allocated in the clock priority list.

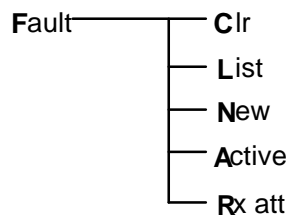
Jitter Attenuation

Jitter attenuators are used on the PCM and clock inputs to reduce jitter on the recovered signals. This improves jitter transfer of the system if the clock is selected as the system timing source in the 3000 series multiplexers.

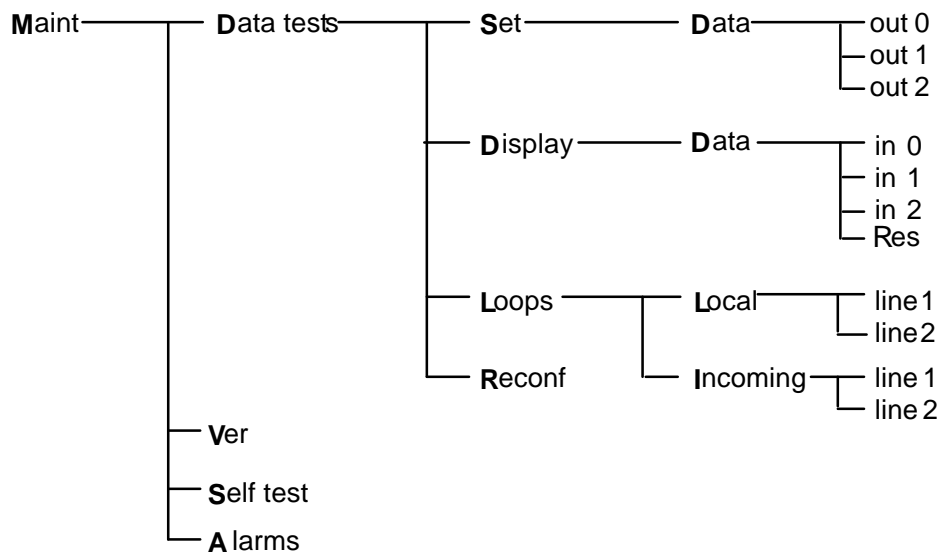
5. Menu Options

The DCC supports a subset of the Dual LIU standard menu options as follows. Reference should be made to the Dual LIU manual for information on menu options not described.

5.1 Fault Menu



5.2 Maintenance Menu

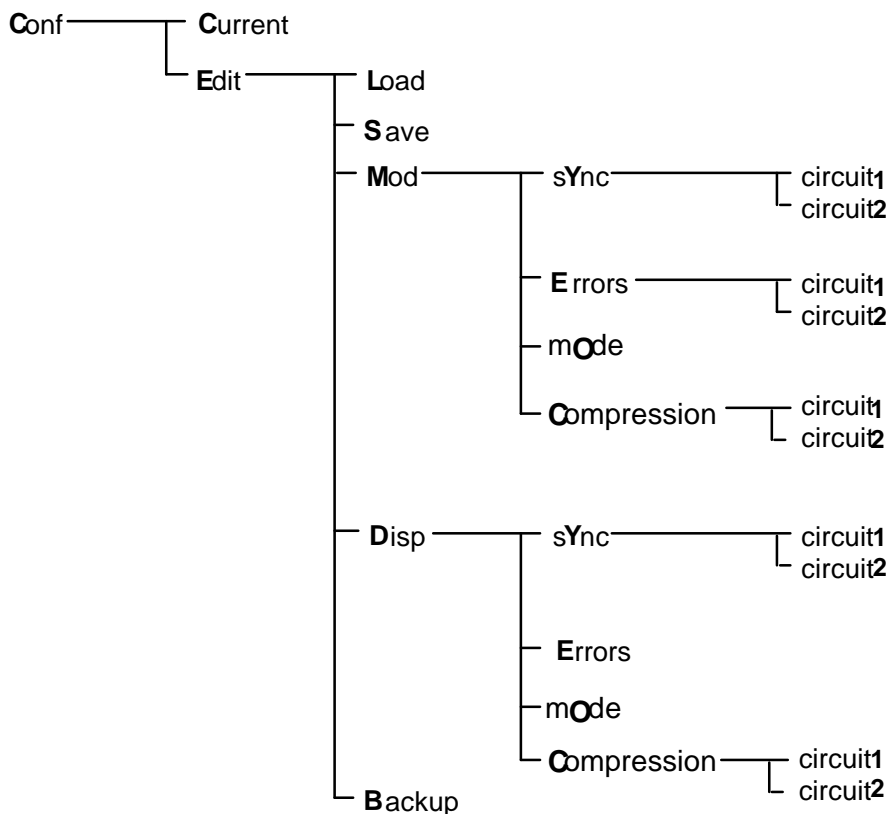


5.2.1 Res Display Menu Option

This command enables the user to view the resultant combined byte from the daughter board in Hexadecimal.

All other maintenance menu options operate as described in the Dual LIU operators manual.

5.3 Configuration Menu



5.3.1 Mode menu option

The card only operates with two separate PCM lines with the following options:-

- Fault logging line 1 Enable/Disable. This allows the operator to disable line 1. The card will then no longer generate fault information for that specific line. All other operations for that line will remain functioning.
- Fault logging line 2 Enable/Disable. As above but for line 2.

Modify Format

(SCEM) sYnc | mOde | Errors | Compression >0

mode is DCC

Fault logging line 1 1=Enabled (0= Disable, 1=Enable) >1

Fault logging line 2 1=Enabled (0=Disable, 1=Enable) >1

(SCEM) sYnc | mOde | Errors | Compression *>

Display Format

(SCED) sYnc | mOde | Errors | Compression >O
mode is DCC

Fault logging line 1 1=Enabled

Fault logging line 2 1=Enabled

(SCED) sYnc | Errors | Mode | Compression *>

5.3.2 Compression Menu Option

General

Three bi-directional routing options for each circuit of the resultant byte are selectable.

- a) Circuit 1 and/or Circuit 2 to Management Patchfield, reported as cct-man.
- b) Circuit 1 and/or Circuit 2 to Timeslot, reported as cct-ts.
- c) Timeslot to Management Patchfield, reported as ts-man.

The timeslot used will be the first timeslot assigned to the circuit and the default setting is cct-man.

Modify Format

(SCEM) sYnc | mOde | Errors | Compression >C

(SCEMC) circuit 1 | circuit 2 >1

1 cct-man

2 cct-ts

3 ts-man

option=1 >2

Line Disabled (0=disabled, 1=enabled) 0>

(SCEMO) circuit 1 | circuit 2 *>

Display Format

(SCED) sYnc | mOde | Errors | Compression >C

(SCEDC) circuit 1 | circuit 2 >1

1 (cct-man)

(SCEDO) circuit 1 | circuit 2 *>

Sync

This command allows the operator to select, for each circuit, the condition under which the recovered line clock is deemed to have failed before the 2048kHz clock for that specific circuit is disabled to the multiplexer.

These options are :-

- | | | |
|---|---------------------|--|
| 1 | (Line loss) | If there is no Line signal input to the specific circuit. |
| 2 | (1 or Service loss) | If there is no line signal or an error rate of 1 in 10^{-3} or frame sync loss or AIS on the line. |
| 3 | (2 or Remote alarm) | As in 2 or a distant (remote) alarm is received on the line. |
| 4 | (1 or Remote alarm) | If there is no line signal or a distant (remote) alarm is received on the line. |

Modify Format

(SCEM) sYnc | mOde | Errors | Compression >Y

(SCEMY) circuit 1 | circuit 2 >1

1 (PCM loss)

2 (1 or Service loss)

3 (2 or Remote alarm)

4 (1 or Remote alarm)

option = 2 >3

(SCEMY) circuit 1 | circuit 2 *>

Display Format

(SCED) sYnc | mOde | Errors | Compression >Y

(SCEDY) circuit 1 | circuit 2 >1

1 (PCM loss)

(SCEDY) circuit 1 | circuit 2 *>

6. Alarm Indicators

LED indicators are provided to indicate the following:-

Top	Yellow	Circuit 2 MF Remote alarm
	Yellow	Circuit 2 TS0 Remote Alarm
	Red	Circuit 2 PCM Fault
	Yellow	Circuit 1 MF Remote alarm
	Yellow	Circuit 1 Remote Alarm
Bottom	Red	Circuit 1 PCM Fault

7. Link Settings

TL1 and TL2 These must be set to position 1-2.

TL3 This must be fitted.

LK1-LK11 These links must be set to position 1-2

LK12 This must be set to position 2-3. (Middle).

All links are for factory use only.

8. Switch settings

DIL Switch S1 on the main board is used to select the required network management patchfield. Patchfield number 8 is for factory test purposes only and must *not* be selected.

S1 Main board:

1	2	3	Line 1 Patchfield
Closed	Closed	Closed	1
Open	Closed	Closed	2
Closed	Open	Closed	3
Open	Open	Closed	4
Closed	Closed	Open	5
Open	Closed	Open	6
Closed	Open	Open	7
Open	Open	Open	8
4	5	6	Line 2 Patchfield
Closed	Closed	Closed	1
Open	Closed	Closed	2
Closed	Open	Closed	3
Open	Open	Closed	4
Closed	Closed	Open	5
Open	Closed	Open	6
Closed	Open	Open	7
Open	Open	Open	8

Switches 7 and 8 must be left in the Closed position.

Switches S1, S2 and S3 on the Daughter board are used to select the operating mode of the card. All three switches must be in the same positions.

Position A (Dots hidden) Repeated Non Frame Word mode. 

Position B (Dots showing) Alternating Non Frame Word mode 

9. Dual LIU I/O Adaptors

I/O adaptors must be used in conjunction with the DCC Dual LIU card. These include the isolation transformers and bypass links and relays . The I/O adaptors provide the means of connection to the PCM lines and G.703 clock.

To ensure adequate earthing of the I/O adaptor it must be fitted to the chassis using the knurled screw provided.

DT315 75 Ohm I/O Adaptor

The DT315 uses standard 75 ohm BNC sockets for connection to the two PCM lines and the G.703 clock. As standard, the screens of the output connectors are connected to earth and the screens of the input connectors are isolated from earth by means of insulating washers fitted between the connectors and the mounting bracket. If it is required to earth the screen of the input connector instead of the output, then it is necessary to re-assemble the I/O adaptor with the insulating washer fitted to the input connector.

DT316 120 Ohm I/O Adaptor

The DT316 provides PCM connections via two 9 way 'D' type connectors. The transmitted signal is present on pins 5 and 9, and the received signal on pins 1 and 6. The cable screen should be connected to the body of the connector.

The clock signals are provided on a separate 9 way 'D' type connector with the transmit clock O/P on pins 4 and 8, and the receive clock I/P on pins 2 and 7. The cable screen should be connected to the body of the connector.

Bypass facility

The I/O adaptors contain relays to connect line 1 to line 2 in the event of failure of the DCC or power failure. This facility should be disabled in this application by fitting the four links in positions 2-3.

