COMTECH EF DATA™

CIC-50

T1/E1 G.703 Interface Converter
Installation and Operation Manual

(Accessory Product for use only with Comtech EFData CDM-550/550T Modems)

Errata A
Comtech EF Data Documentation Update

Subject: Revised Paragraph 3.1.4 Pin Assignments

Date: October 14, 2002
Document: CIC-50 T1/E1 G.703 Interface Converter, Installation and
                       Operation Manual, Rev. 1, dated October 20, 1999
Part Number: MN/CIC50.EA1
Collating Instructions: Attach this page to page 4

Comments:

The following changes provide updated information for Para. 3.1.4. This information will be incorporated into the next revision.

Change Specifics:

3.1.4   T1/E1 BALANCED 15 PIN D-SUB PINOUT

Pin	Connection
1	SD-A
9	SD-B
3	RD-A
11	RD-B
2	Ground
4	
6, 7, 8, 14, & 15	Reserved for redundancy system.

CIC-50 T1/E1 G.703
Interface Converter

Installation and Operation Manual

Customer Support

Contact the Comtech EFData Customer Support Department for:

- Product support or training
- Information on upgrading or returning a product
- Reporting comments or suggestions concerning manuals

A Customer Support representative may be reached at:

Comtech EFData
Attention: Customer Support Department
2114 West 7th Street
Tempe, Arizona 85281 USA

(480) 333-2200 (Main Comtech EFData Number)
(480) 333-4357 (Customer Support Desk)
(480) 333-2161 FAX

or, E-Mail can be sent to the Customer Support Department at:

service@comtechefdata.com

Contact us via the web at www.comtechefdata.com.

1. To return a Comtech EFData product (in-warranty and out-of-warranty) for repair or replacement:

2. Request a Return Material Authorization (RMA) number from the Comtech EFData Customer Support Department.

3. Be prepared to supply the Customer Support representative with the model number, serial number, and a description of the problem.

4. To ensure that the product is not damaged during shipping, pack the product in its original shipping carton/packaging.

5. Ship the product back to Comtech EFData. (Shipping charges should be prepaid.)

For more information regarding the warranty policies, see Warranty Policy, p. vii.

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About this Manual

This manual provides installation and operation information for the Comtech EFData CIC-50 T1/E1 G.703 Interface Converter. This is a technical document intended for earth station engineers, technicians, and operators responsible for the operation and maintenance of the CIC-50 T1/E1 G.703 Interface Converter.

Conventions and References

Cautions and Warnings

CAUTION indicates a hazardous situation that, if not avoided, may result in minor or moderate injury. CAUTION may also be used to indicate other unsafe practices or risks of property damage.

WARNING indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.

Metric Conversion

Metric conversion information is located on the inside back cover of this manual. This information is provided to assist the operator in cross-referencing English to Metric conversions.

Trademarks

Other product names mentioned in this manual may be trademarks or registered trademarks of their respective companies and are hereby acknowledged.

Reporting Comments or Suggestions Concerning this Manual

Comments and suggestions regarding the content and design of this manual will be appreciated. To submit comments, please contact the Comtech EFData Customer Support Department.

SAFETY NOTICES

ELECTRICAL SAFETY

The CIC-50 1:1 Redundancy Switch has been shown to comply with the following safety standard:

EN 60950:   Safety of Information Technology Equipment, including electrical business machines

The equipment is rated for operation at +12 volts DC and -12 volts DC. It has a maximum power consumption of 2.0 watts. The power supply current is, in all circumstances, supplied by a single Comtech CDM-550/550T Modem.

The User should observe the following instructions:

Equipment Connection

The CIC-50 is designed for operation ONLY with Comtech CDM-550 or CDM-550T Modems. These Modems supply DC operating current (electronically fused and protected) and control signals for the correct functioning of this unit. Connection to other manufacturer's equipment could result in damage to the unit.

Environmental

The CIC-50 must not be operated in an environment where the unit is exposed to extremes of temperature outside the ambient range 0 to 500C, precipitation, condensation, or humid atmospheres above 95% RH, altitudes (un-pressurised) greater than 2000 meters, excessive dust or vibration, flammable gases, corrosive or explosive atmospheres.

Operation in vehicles or other transportable installations which are equipped to provide a stable environment is permitted. If such vehicles do not provide a stable environment, safety of the equipment to EN60950 may not be guaranteed.

Telecommunications Terminal Equipment Directive

In accordance with the Telecommunications Terminal Equipment Directive 91/263/EEC, this equipment should not be directly connected to the Public Telecommunications Network.

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│           TELECOMMUNICATIONS TERMINAL    │
│    ⊗      EQUIPMENT DIRECTIVE 91/263/EEC  │
│                                           │
│           NOT INTENDED FOR DIRECT         │
│           CONNECTION TO THE PUBLIC        │
│           TELECOMMUNICATIONS NETWORK      │
│                                           │
│           COMTECH COMMUNICATIONS 1999     │
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EMC (ELECTROMAGNETIC COMPATIBILITY)

The CIC-50 T1/E1 G.703 Interface Converter has been demonstrated, by independent testing, to comply with the following standards:

Emissions: EN 55022 Class B - Limits and methods of measurement of radio interference characteristics of Information Technology Equipment.

FCC Part 15 Class B

Immunity: EN 50082 Part 1 - Generic immunity standard, Part 1: Domestic, commercial and light industrial environment.

In order that the CIC-50 continues to comply with these standards, observe the following instructions:

- All 'D' type connectors attached to the unit must have back-shells which provide continuous metallic shielding. Cable with a continuous outer shield (either foil or braid, or both) must be used, and the shield must be bonded to the back-shell.

- The equipment must be operated with its cover on at all times. If it becomes necessary to remove the cover, the User should ensure that the cover is correctly re-fitted before normal operation commences.

Warranty Policy

This Comtech EFData product is warranted against defects in material and workmanship for a period of two years from the date of shipment. During the warranty period, Comtech EFData will, at its option, repair or replace products that prove to be defective.

For equipment under warranty, the customer is responsible for freight to Comtech EFData and all related custom, taxes, tariffs, insurance, etc. Comtech EFData is responsible for the freight charges **only** for return of the equipment from the factory to the customer. Comtech EFData will return the equipment by the same method (i.e., Air, Express, Surface) as the equipment was sent to Comtech EFData.

Limitations of Warranty

The foregoing warranty shall not apply to defects resulting from improper installation or maintenance, abuse, unauthorized modification, or operation outside of environmental specifications for the product, or, for damages that occur due to improper repackaging of equipment for return to Comtech EFData.

No other warranty is expressed or implied. Comtech EFData specifically disclaims the implied warranties of merchantability and fitness for particular purpose.

Exclusive Remedies

The remedies provided herein are the buyer's sole and exclusive remedies. Comtech EFData shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory.

Disclaimer

Comtech EFData has reviewed this manual thoroughly in order that it will be an easy-to-use guide to your equipment. All statements, technical information, and recommendations in this manual and in any guides or related documents are believed reliable, but the accuracy and completeness thereof are not guaranteed or warranted, and they are not intended to be, nor should they be understood to be, representations or warranties concerning the products described. Further, Comtech EFData reserves the right to make changes in the specifications of the products described in this manual at any time without notice and without obligation to notify any person of such changes.

If you have any questions regarding your equipment or the information in this manual, please contact the Comtech EFData Customer Support Department.

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Chapter 1. INTRODUCTION

While the CDM-550/550T modem is capable of data rates up to 2048 kbps, its standard interface is limited to EIA-422, V.35 and EIA-232 formats only.

In order to accommodate the G.703 data formats commonly used at 1544 kbps (T1) and 2048 kbps (E1), the CIC-50 converter attaches to the rear of the modem at the 25-pin data connector. No external power is required and all settings are made on the CIC-50 using three switches. Two LED indicators are also present for monitoring the condition of the G.703 terrestrial link.

2 Chapter 2. INSTALLATION

1. Power down the modem before installing the converter.

2. Remove the six flathead screws (four on the sides, two on top) and lift off the cover of the CIC-50.

3. The 25-pin male D-sub connector includes two captive screws which can be reached by sliding a screwdriver through the holes located at the opposite end of the CIC-50. The only reason for removing the cover is to clearly guide the screwdriver to these captive screws.

4. Attach the CIC-50 to the CDM-550 modem by mating the two 25-pin D-subs together, then tighten the two captive screws.

5. Re-attach the cover and replace the six flathead screws. The metal surfaces of the modem and CIC-50 should be flush and the three format indicator LEDs should safely recess into the modem chassis.

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Chapter 3. OPERATION

After applying power to the modem, the following configuration changes must be made to the modem in order for it to operate with the CIC-50.

- Program the transmit and receive data rates to either 1544 or 2048 kbps. Both directions must be at the same rate.

- Set the data interface type to EIA-422. The modem itself operates in this electrical format while the converter translates between EIA-422 and G.703.

- Set the transmit clocking to INT. This is required so that the modem's internal transmit data rate clock is driven to the converter on the ST lines to provide a high stability reference for the G.703 clock recovery circuitry. The recovered clock and data drive into the modem on the TT and SD lines, respectively.

Three switches must be set properly on the CIC-50, depending upon the specific G.703 format in use. They can be accessed with a small screwdriver.

3.1.1   MODE SELECT

0	E1, always used with a 2048 kbps data rate.
1-2	Unused.
3	T1(1), used at 1544 kbps and short cable lengths of 0-133 feet.
4	T1(2), used with 133-266 ft. cable.
5	T1(3), used with 266-399 ft. cable.
6	T1(4), used with 399-533 ft. cable.
7	T1(5), used with 533-655 ft. cable.

3.1.2　AMI or HDB3/B8ZS

For both T1 and E1 formats, this sets the G.703 output to either the uncoded Alternate Mark Invert (AMI) format, or to the appropriate zero substitution line code used for T1 (B8ZS) or E1 (HDB3).

3.1.3　E1 BAL or UNBAL

For E1 only, this adjusts the impedance on the G.703 input between 120 ohms for balanced and 75 ohms for unbalanced. The 15-pin D-sub connector should be used for balanced and the two BNC connectors for unbalanced. For T1 this selection is a 'don't care' since unbalanced is not an option, and the D-sub connector must always be used.

3.1.4　T1/E1 BALANCED 15 PIN D-SUB PINOUT

Pin	Balanced G.703 Tx (Inputs)
3, 11	Balanced G.703 Rx (Outputs)
2, 4	Ground
6, 7, 8, 14, 15	Don't Connect (reserved for redundancy system)

Chapter 4.
INDICATORS AND
TROUBLESHOOTING

After configuring both the CDM-550 and the CIC-50, two indicators are available on the CIC-50 to monitor the condition of the incoming G.703 data. If no marks are received over 175 bit times at T1 or 32 bit times at E1, the Loss Of Signal LED will illuminate. This will not activate an alarm on the CDM-550, but the CIC-50 will generate AIS (all ones) data into the modem timed directly off the internal clock reference provided to it. Therefore, activating the TX-AIS alarm will allow the modem to indirectly monitor this condition.

The other indicator is the Bipolar Violation LED. AMI coding dictates that each mark received at the G.703 input be of alternating polarity. Enabling the HDB3/B8ZS line coding presumes the use of zero substitution patterns that include intentional Bipolar Violations (BPV). Since this LED will be pulsed with each BPV found, it will not only illuminate when format errors are present, but also if the incoming data is using HDB3/B8ZS while the CIC-50 is set for AMI. This mismatch will cause errors in the data path and should be corrected. It is recommended that HDB3/B8ZS always be selected on the CIC-50's switch unless the user is certain that line coding will never be present.

Note:
> CDM-550 only - if using software releases before Version 1.10, the I/O LOOP test mode will not operate properly with the CIC-50. Please call the factory for a free software upgrade. The CDM-550T is not affected.

Chapter 5. SUMMARY OF SPECIFICATIONS

Equipment Type	T1/E1 G.703 Interface Converter
Modems Supported	Comtech EFData CDM-550 and CDM-550T Digital Satellite Modems
Operating Modes	E1 (2048 kbps) balanced (120 ohms) and unbalanced (75 ohms) T1 (1544 kbps) unbalanced (100 ohms) Per ITU Recommendation G.703
Jitter and Wander	Per ITU Recommendations G.823 and G.824
Power requirements	2.0 Watts maximum +12 volts DC -12 volts DC (Power is supplied by the Modem. These power supplies are electronically fused and protected.)
Approvals	'CE' as follows: EN 55022 Class B (Emissions) EN 50082-1 (Immunity) EN 60950 (Safety) FCC Part 15 Class B

METRIC CONVERSIONS

Units of Length

Unit	Centimeter	Inch	Foot	Yard	Mile	Meter	Kilometer	Millimeter
1 centimeter	—	0.3937	0.03281	0.01094	6.214×10^{-6}	0.01	—	—
1 inch	2.540	—	0.08333	0.2778	1.578×10^{-5}	0.254	—	25.4
1 foot	30.480	12.0	—	0.3333	1.893×10^{-4}	0.3048	—	—
1 yard	91.44	36.0	3.0	—	5.679×10^{-4}	0.9144	—	—
1 meter	100.0	39.37	3.281	1.094	6.214×10^{-4}	—	—	—
1 mile	1.609×10^{5}	6.336×10^{4}	5.280×10^{3}	1.760×10^{3}	—	1.609×10^{3}	1.609	—
1 mm	—	0.03937	—	—	—	—	—	—
1 kilometer	—	—	—	—	0.621	—	—	—

Temperature Conversions

Unit	° Fahrenheit	° Centigrade
32° Fahrenheit	—	0 (water freezes)
212° Fahrenheit	—	100 (water boils)
-459.6° Fahrenheit	—	273.1 (absolute 0)

Formulas
C = (F - 32) * 0.555
F = (C * 1.8) + 32

Units of Weight

Unit	Gram	Ounce Avoirdupois	Ounce Troy	Pound Avoir.	Pound Troy	Kilogram
1 gram	—	0.03527	0.03215	0.002205	0.002679	0.001
1 oz. avoir.	28.35	—	0.9115	0.0625	0.07595	0.02835
1 oz. troy	31.10	1.097	—	0.06857	0.08333	0.03110
1 lb. avoir.	453.6	16.0	14.58	—	1.215	0.4536
1 lb. Troy	373.2	13.17	12.0	0.8229	—	0.3732
1 kilogram	1.0×10^{3}	35.27	32.15	2.205	2.679	—