

# CX-U Series

## Reducing MNOs transmission costs



Memotec's CX-U Series is a cellular backhaul platform delivering Radio Access Network (RAN) Bandwidth Optimization and A/E Voice Trunk Compression. The CX-U expands cellular transmission network capacity, enabling new services and additional subscribers now, without costly upgrades. The CX-U series support GSM 2G/2.5G (Abis, Ater, A/E, Gb/Gn), 3G (UMTS/W-CDMA), TDM, Pseudowire, Ethernet, IP/MLPPP and PSTN voice trunk interfaces. It is suitable for GSM, CDMA, TDMA and AMPS networks, including Satellite backhaul. The result is more revenue and significant expenses reduction.

### OPERATOR BENEFITS:

#### Reduced OPEX / Minimal CAPEX

Increases backhaul capacity without added transmission resources

Reduces transmission capacity requirement in proportion to the effective traffic usage

Rapid ROI—often in only a few months

#### Significant Bandwidth Savings

GSM Base Station Abis/Ater traffic:  
Minimum 50% bandwidth savings

Cell site aggregation:  
Up to 3:1 backhaul capacity reduction

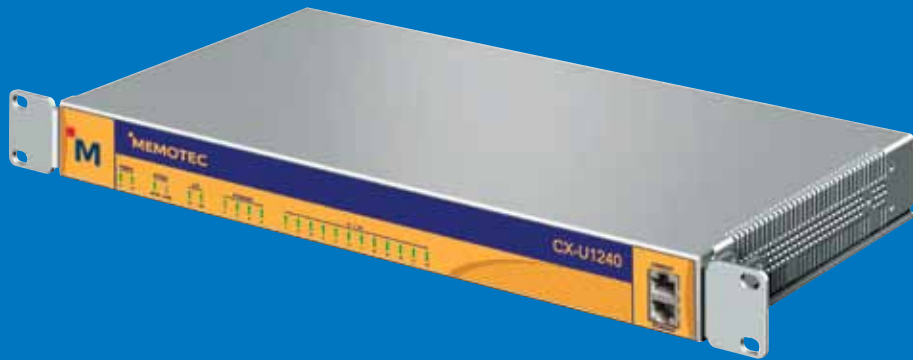
Voice Trunk Compression: 16:1 to 20:1  
bandwidth reduction

#### Sustained Service Quality

Preserves voice quality  
and service integrity

Abis transparent

Simple and reliable fail-safe operation



## Overview

The CX-U Series is a core component of Memotec's comprehensive cellular backhaul optimization solution. A powerful, robust T1/E1 access concentration and bandwidth compression platform intended for cellular applications, the CX-U combines RAN optimization and DCME voice compression together with data traffic aggregation into a compact, cost effective and versatile unit.

The CX-U is conveniently packaged in a standard 1U rack and supports a combination of any GSM 2G/2.5G (Abis, Ater, A/E, Gb/Gn), 3G (UMTS/W-CDMA) and PSTN voice trunk interfaces. It operates with CDMA, TDMA and AMPS networks. Its unique embedded bandwidth management features enable superior bandwidth efficiency without sacrificing voice quality.

The CX-U supports digital fractional T1/E1, High-Speed Serial and Ethernet network interfaces with a choice of protocols (Frame-Relay, IP/MLPPP) and multiple network backup options. Designed with the utmost reliability in mind, it can support an extended temperature range. Line Bypass and optional 50ms 1+1 hot standby redundancy without service interruption are also available for ultimate availability in challenging remote locations.

## RAN Optimization

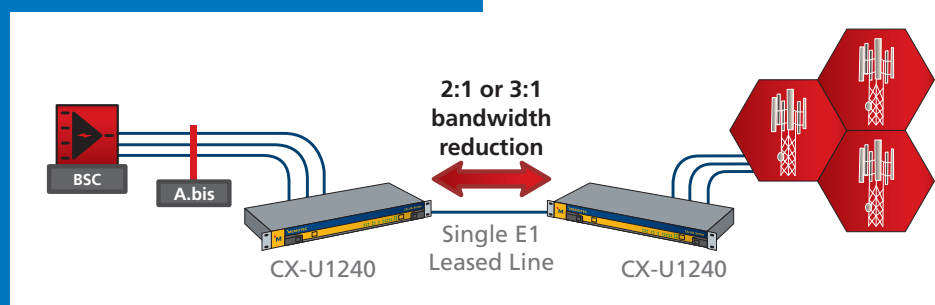
A simple yet compelling alternative to basic TDM multiplexers, it reduces RAN transmission costs and limits the need for increases in RAN backhaul capacity to introduce high-speed data services (EDGE) or increase voice penetration in GSM and CDMA networks.

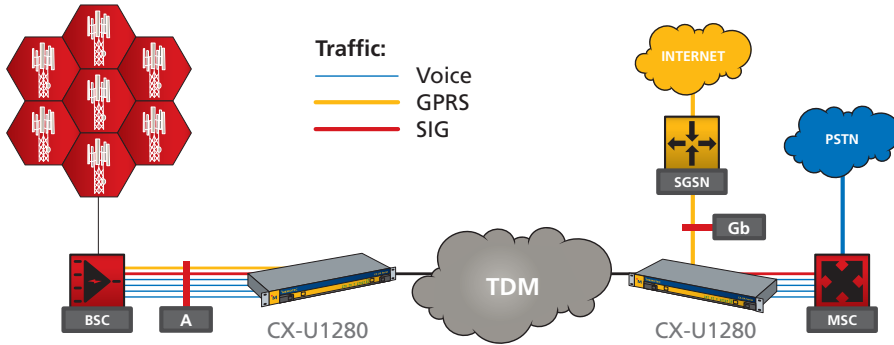
Based on GSM Abis traffic optimization and using statistical multiplexing, Memotec's RAN Optimizer delivers up to 3:1 bandwidth reduction. It transparently connects between the BTS/BSC and the transmission network facility.

Whether adding capacity, migrating from legacy wireless to GSM, aggregating cell sites or different base station technologies, Memotec's RAN Optimizer offers a cost-effective alternative to adding bandwidth, for solving transmission bottlenecks.

### Ran Optimizer Features

- Supports GSM FR, EFR, HR and AMR codecs optimization without voice compression
- Supports any data services (GPRS, EDGE, V110 Fax/Modem)
- IDLE and silence suppression
- HDLC signaling frame extraction and forwarding
- EDGE traffic compression
- Signaling/Voice/Data traffic prioritization
- Transparent support of CDMA-IS95 traffic
- 3G and CDMA-1X traffic optimization (ATM IDLE cells removal, Cell packing, ATM header and payload compression)
- Pseudowire
- SS7 traffic forwarding and optimization (Ater links)
- End-to-end Abis link continuity check
- Dynamic Abis map interface auto-configuration
- Traffic prioritization and 3 level QoS
- TRX channels usage real-time monitoring
- Flexible 3GPP compliant synchronization





## DCME Voice Compression

A reliable, cost-effective and efficient means of increasing the capacity of operator's transmission links without sacrificing service quality.

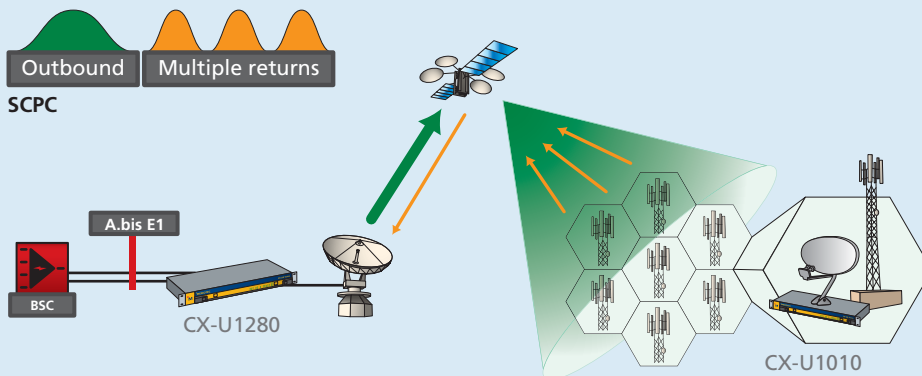
With its advanced GSM AMR voice codec, Memotec's DCME solution is ideal to relieve network congestion, leased or microwave while preserving voice quality. Particularly efficient for telephony, it is a must have on any satellite link and offers a cost effective solution for disaster recovery. Memotec DCME solution also enhances the compression efficiency of media gateway trunks. Improved service reliability is designed to offer 100% service availability.

CX-U Series Benefits:

- Increased compression ratio up to 16:1 on cellular voice trunks (including Media Gateway); 20:1 for telephony
- Superior carrier-grade voice quality
- Lower cost and reduced footprint
- Data services handling and interfaces to the NGN/3G soft switch network model
- Fail-safe continuous operation, including hot swappable sub-systems, complete system 1+1 redundancy, housed in a NEBS compliant chassis.

## Satellite Backhaul

The satellite transponder is dimensioned for real traffic carried by the RAN instead of the individual BTS radio capacity.



**Jointly developed with parent company Comtech EF Data (CEFD), Memotec's satellite backhaul solution is un-rivaled for backhauling cellular base station traffic over satellite links. Compared favorably against traditional microwave or leased lines terrestrial technologies, Memotec's solution ties transponder capacity to the effective traffic usage instead of the deployed base station radio capacity (TRXs).**

Whether your application is an individual remote cell site or cell cluster, a low density rural area, or a challenging remote region, the CX-U offers embedded features for supporting satellite 2G/3G GSM

backhaul, making it the system-of-choice for your satellite based solutions. As well, the CX-U enables you to deploy 2.5G EDGE data services over existing transmission links with minimal or no increase to OPEX and generating a quick ROI.

Memotec and CEFD are the undisputed leaders in cellular (GSM and CDMA) satellite backhaul.

### Satellite Backhaul Features

- Point-to-Point and Point-to-Multipoint backhaul
- Single Carrier / Multiple Carriers operation
- Support IP, Frame-Relay or TDM VSAT networks
- SCPC and TDMA/DAMA IP modem technology

### DCME Features

- Support G.729 ab, G.723.1 and AMR codecs with variable coding rate
- Silence suppression and DSI
- T.30 FAX relay (V29/V27ter/V17)
- Modem relay (V32/V32bis/V22/V22bis)
- SS7 signaling transport with optimization (FISU spoofing)
- CCS signaling transport
- Transcoder free operation (end-to-end one hop compression)
- Multi-clique, multi-bearer operation
- End-to-end continuity tone check, detection and regeneration
- Voice channels usage real-time monitoring

## Product Specifications

|                        |  |           |           |           |           |
|------------------------|--|-----------|-----------|-----------|-----------|
| <b>Interfaces</b>      | <ul style="list-style-type: none"> <li>- Digital T1/E1: unframed, fractional, channelized, voice, data, TDM</li> <li>- T1 line type: ANSI T1.403 (PRI), AT&amp;T TR62411 (D4), and TR 54016 (ESF), Telcordia GR-499-CORE</li> <li>- T1 encoding: JBZS (AT&amp;T), AMI, B8ZS</li> <li>- E1 line type : CEPT (PRI), G.703/G.704 with or without CRC4 &amp; MF</li> <li>- E1 encoding: HDB3, AMI</li> <li>- T1/E1 interface choice of: <ul style="list-style-type: none"> <li>- Balanced 120 Ohms: RJ21 "Centronics" and RJ-48 individual connectors</li> <li>- Unbalanced 75 Ohm: BT43 or 1.0/2.3 Mini Siemens connector</li> </ul> </li> <li>- NFAS, AIS and RDI bits/alarm relay</li> <li>- Serial interface: EIA-530/V35 (DB25) up to 8 Mb/s</li> <li>- Ethernet: 10/100 Mb/s, RJ 45</li> <li>- RS232 Serial craft interface</li> </ul> |           |           |           |           |
| <b>Standards</b>       | <ul style="list-style-type: none"> <li>- T1/E1 Interface: ITU-T G.703, G.704, G.706, G.732, G.733, G.823, G.824</li> <li>- Echo: ITU-T G.168</li> <li>- Voice: ITU-T G.711, G.723.1, G.729 a+b</li> <li>- Ethernet Interface: IEEE 802.1, 802.3, 802.3u</li> </ul>   |           |           |           |           |
| <b>Capacity</b>        |  | CX-U1010  | CX-U1220  | CX-U1240  | CX-U1280  |
|                        | T1/E1  | 4         | 12        | 12        | 12        |
|                        | Bearer   | 1 up to 4 | 4 up to 8 | 4 up to 8 | 8         |
|                        | Abis TRXs  | up to 60  | up to 120 | up to 120 | up to 120 |
|                        | Voice Channels   | up to 120 | up to 240 | up to 240 | 240       |
|                        | Serial   | 1         | 1         | 1         | 1         |
|                        | Ethernet   | 4+1       | 4+1       | 4+1       | 4+1       |
|                        | On-board DSP   | 1         | 2         | 4         | 8         |
|                        | <ul style="list-style-type: none"> <li>- Each model has 2 expansion slots that can be fitted with DLP or DDLP modules. Each module can support up to 4 E1 depending on application</li> </ul>  |           |           |           |           |
| <b>Management</b>      | <ul style="list-style-type: none"> <li>- Centralized EMS with GUI, interactive help and CLI ASCII script file generation</li> <li>- Open standard SNMP, MIB based NMS platform</li> <li>- CLI interface (local or Telnet remote access)</li> <li>- SNMP based Open EMS (Configuration &amp; Software management), alarm and performance monitoring</li> <li>- Abis and Voice interface detailed alarm and performance monitoring with KPI (CXMON)</li> <li>- Secured in-band node management (IP based)</li> <li>- T1/E1 alarms: red, yellow, near/far end LOS, AIS, LOF, LOMF, test, loop</li> </ul>  |           |           |           |           |
| <b>Synchronization</b> | <ul style="list-style-type: none"> <li>- ETSI PDH ITU-T G.823/G.824/G.825 and ETSI SDH SEC / ITU-T G.813 clock synchronization compliant</li> <li>- 10MHz, 2.048 MHz, 1.544 Mbps (BITS), and 2.048 Mbps G.703 external clock reference input (BNC 75 Ohm connector)</li> <li>- 2.048 MHz, 1.544 Mbps (BITS), and 2.048 Mbps G.703 clock reference output (BNC 75 Ohm connector)</li> <li>- Better than Stratum 3 TCXO local clock reference (250ppb 24 hours holdover over temperature range)</li> <li>- Optional embedded GPS clock reference</li> </ul>  |           |           |           |           |
| <b>Physical</b>        | <ul style="list-style-type: none"> <li>- Dimensions: Standard 19" rack 1U high chassis<br/>W=16.5" x D= 9.25" x H=1.75"</li> <li>- Weight: chassis: 2.2 kg (5.5 lb)</li> <li>- Input power: DC -36 to -60V; 24VDC and 85-264 VAC power available on option</li> <li>- Consumption: &lt;20W Depending on model</li> <li>- MTBF &gt; 17 Years</li> </ul>   |           |           |           |           |
| <b>Environmental</b>   | <ul style="list-style-type: none"> <li>- Operating temp: -10° to 65° Celcius (14° to 149° Fahrenheit)</li> <li>- Storage temp: -50° to +80° Celcius (-58° to 176° Fahrenheit)</li> <li>- Operating humidity: 0 to 95% non-condensing</li> <li>- Altitude: 6000m</li> </ul>   |           |           |           |           |
| <b>Approvals</b>       | <ul style="list-style-type: none"> <li>- Safety: CSA/UL 60950-1, IEC/EN 60950-1</li> <li>- Telecom: TIA IS-968, IC-03 Part II</li> <li>- EMC: FCC Part 15, ICES-003 Class A, EN 55022 Class A, EN 55024</li> </ul>   |           |           |           |           |

## About Memotec

**Memotec is an innovative supplier of optimization solutions for cellular backhaul and GSM/CDMA networks. Its flagship product, the CX Series, enables operators to dramatically reduce network operating expenses by cutting transmission costs and expanding existing infrastructure capacity from the RAN (BTS/Abis links) to the public switched network interface (PSTN-MSC-BSC, A/E links).**

Memotec's CX-U Series leverages the satellite modem expertise of parent company Comtech EF Data, offering GSM operators a cost-effective, yet proven solution for deploying profitable voice & data services in rural, low density or geographically challenging areas.

With hundreds of deployed and operational cellular sites across both satellite and terrestrial transport networks in Latin America, the Middle East, Africa and Asia, Memotec's solutions are proven globally.

### Legal Note

Memotec is a trademark of Memotec Inc. All information is proprietary to Memotec Inc. and is subject to change without notice. For current information about Memotec's CX-U Series and its product specifications, contact us at COE@memotec.com. Memotec Inc. is a wholly owned subsidiary of Comtech EF Data Corp. and its parent company Comtech Telecommunications Corp. (NASDAQ: CMTL).

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