



# CV-MCU2+ Universal Converter Module

## Single-Channel Protocol Converter and Multiplexer Element

### Features

- Best-in-Class Drive Distances
  - 37 km over Multimode Fiber
  - 50 km over Single Mode Fiber
  - 3 km over Copper CDI
- Mode selection supporting all the following functions:
  - Serial over Fiber
  - Serial Multiplexing
  - Optical Multiplexing
  - Legacy Protocol Conversion
  - Legacy Fiber Optic Modem Equipment Emulation
  - Tactical Repeater
- Software-controlled power level boost over fiber
- Seamless operation over single mode and multimode fiber

Ultra-DNE's Universal Converter Module (UCM+) is at the heart of the CV-MCU2+'s flexibility. This all-in-one card is a fully functional standalone converter channel in a 2.5" x 8" footprint. Software selectable operation modes include:

- NRZ to Fiber conversion, CP mode for Canoga Perkins 2270 interoperability
- NRZ to Fiber conversion, FOM mode for JTC3A- 9109C equipment interoperability
- NRZ to Fiber conversion, CV mode for CV-8448 interoperability
- NRZ to CDI Copper conversion for Legacy CDI & EPLRS applications
- CDI Copper to Fiber for CDI repeater applications
- NRZ, CDI or Fiber port for multiplexing applications
- NRZ or Fiber aggregate for multiplexing applications

The UCM+ offers industry leading drive distances with unprecedented features such as fiber power control and fiber independent

interfaces. Users have the ability to set the power level of the laser, which provides a boost when driving through worn fiber connections or unplanned patches and junctions. The fiber independent interface allows the UCM+ to operate over a mix of single mode and multimode fibers without hardware adjustments or repeaters, giving the user the ability to use whatever fiber is on hand.

Minimizing operator intervention during mission changes was a key goal of the UCM+ design. Remote loopback and autobaud modes simplify configuration and testing of both local and far-end equipment. System timing options are extremely flexible and can be created from a GPS or recovered off any active interface. System timing can also fall back to an internal clock when an interface unexpectedly goes down.

The UCM+ preserves interoperability with

JTC3A-9109C compliant Fiber Optic Modems such as the GSC-54 and the MD-1272. In addition, compatibility is extended to DRS's CTM family of products and Canoga Perkins 2270 modems. As always, DNE has preserved interoperability with DNE's complete protocol converter line at rates supported by both units.

The UCM+ is the second generation of the popular UCM module. It provides all the conversion and connectivity of the original UCM while adding functionality. Feature improvements in the UCM+ include support of remote loopbacks in the Canoga Perkins mode, as well as extension of Canoga Perkins data rates to 14.336Mbps.

| SPECIFICATIONS                      |  |   |
|-------------------------------------|--|---|
| <b>Available Modes of Operation</b> | NRZ to CDI Converter<br>NRZ to Fiber Converter<br>CDI to Fiber Port Relay (repeater mode)  | CDI to NRZ Port Relay<br>Mux Port<br>Mux Aggregate                                  |
| <b>Interfaces</b>                   |  |   |
| CDI                                 | One micro DB-9 Female supports Balanced and Unbalanced CDI   |   |
| Optical                             | Two ST connectors per module (Tx and Rx), wavelength 1310 nm +/- 10 nm<br>Supports 9µm/125µm single mode, 50µm/125µm multimode, and 62.5/125µm multimode fiber   |   |
| NRZ                                 | One micro DB-25F connector, EIA 530 pinout, RS-422 (balanced) signaling  |   |
| <b>Maximum Drive Distances</b>      |  |   |
| NRZ                                 | 5m (16.4 ft) at 20,000 kbps  |   |
| CDI, balanced                       | 6.4km (4 mi) at 64kbps<br>3.2km (2 mi) at 224kbps<br>1.6km (1 mi) at 768kbps   | 0.64km (.4 mi) at 1544kbps<br>0.32km(.2 mi) at 2048kbps                             |
| CDI, unbalanced                     | 3.2km (2 mi) at 576kbps<br>2.4km (1.5 mi) at 768kbps<br>2km (1.25 mi) at 1152kbps  | 1.6km (1 mi) at 1544kbps<br>1.2km (.75 mi) at 3072kbps<br>0.8km (.5 mi) at 4608kbps |
| Optical                             | 50 km (31 mi) using 9µm singlemode fiber<br>37km (23 mi) using 62.5/50 µm multimode fiber*<br>14.2km (8.8 mi) using 62.5/50µm fiber in Canoga Perkins mode*<br>* Based on TFOCA cable with 0.75dB/km attenuation   |   |
| <b>Rates (kbps)</b>                 |  |   |
| Unbalanced CDI                      | 72, 96, 112, 128, 144, 192, 224, 256, 288, 320, 384, 448, 512, 576, 640, 768, 960, 1024, 1152, 1344, 1536, 1544, 1920, 1952, 2048, 2304, 2560, 2816, 3072, 3088, 3200, 3584, 3968, 4096, 4608 kbps   |   |
| Balanced CDI                        | 16, 32, 56, 64, 72, 96, 112, 128, 144, 192, 224, 256, 288, 320, 384, 448, 512, 576, 640, 768, 960, 1024, 1152, 1344, 1536, 1920, 1952, 2048 kbps   |   |
| Balanced (EPLRS mode)               | 32, 56, 64, 128, 256, 512 kbps   |   |
| NRZ (Converter or Mux port)         | N x 8 kbps increments from 16 to 20,000 kbps in 8 kbps increments  |   |
| NRZ (Mux Aggregate)                 | 2048, 3776, 4096, 7808, 8192, 9824, 10240, 11840, 12288, 15616, 16384 kbps   |   |
| Optical (CV mode)                   | 72, 96, 112, 128, 144, 192, 224, 256, 288, 320, 384, 448, 512, 576, 640, 768, 960, 1024, 1152, 1344, 1536, 1544, 1920, 1952, 2048, 2304, 2560, 2816, 3072, 3088, 3904, 3200, 3584, 3968, 4096, 4608, 4800, 4824, 5120, 5632, 5856, 6144, 6312, 6656, 7168, 7680, 7808, 8064, 8192, 8448 kbps |   |
| Optical (FOM JTC3A-9109 mode)       | N x 8 kbps from 16 to 18,840 kbps, in 8 kbps increments  |   |
| Optical (Canoga Perkins mode)       | N x 8 kbps from 96 to 14,366 kbps, in 8 kbps increments  |   |
| Optical (Mux Aggregate)             | 2.048, 4.096, 8.192, 10.240, 12.288, 16.384, 18.816, 23.552 Mbps   |   |
| <b>Compatibility</b>                | AN/TSQ-158 EPLRS, Canoga Perkins 2270, ITT AN/GSC-54, Moog (Northrop Grumman) MD-1272/G FOM, Codem CTM-100, DNE CV-2048, CV-8448, CV-FOM, CV-MCU, CV-HTU-16M, VersaMux 4000  |   |
| <b>Additional modes</b>             | High-margin tracking (+/- 2000 ppm) for EPLRS<br>KG Resync signaling<br>Software selectable filter to remove Analog CDI Orderwire signaling  |   |
| <b>Data Mark Sense</b>              | Data Mark Sense is user-selectable to be either positive or negative upon configuration.   |   |
| <b>Power</b>                        | 9 Watts per UCM module   |   |
| <b>Environmental</b>                |  |   |
| Temperature                         | -20° C to 60° C - Operating up to 3 UCM modules<br>-20° C to 50° C - Operating up to 5 UCM modules   | -30° C to 70° C - Storage   |

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