



Control Design, Inc.

Telemetry and Control Products

Toll Free: 888-422-1442

Product Information Guide

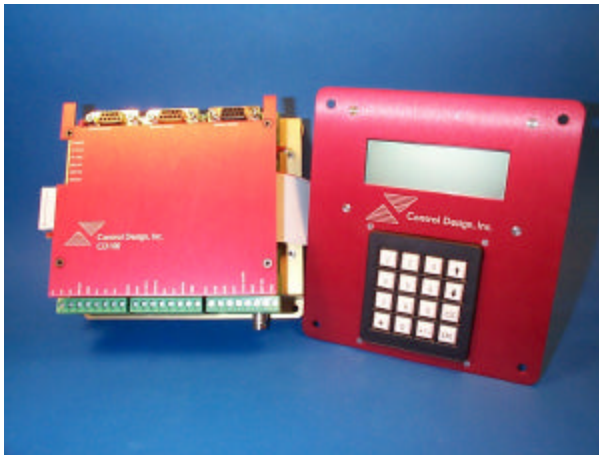
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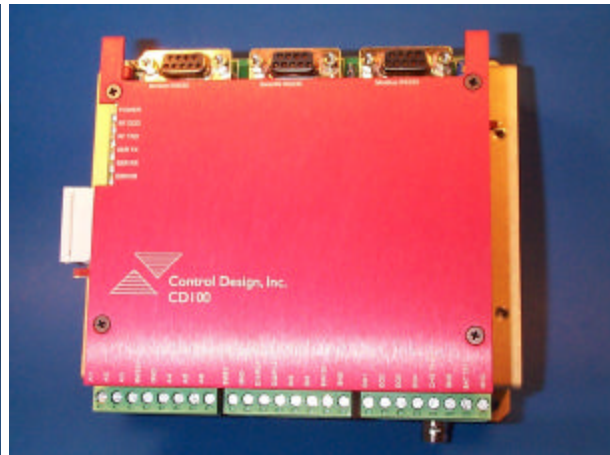
CD100 w/Built-In LCD and Keypad
CD100-B-KDI



CD100 with 4x20 Backlit LCD
CD100-B-DI



CD100 with External 4x20 LCD & 4x4 Keypad
CD100-B-KDEC



Basic CD100, No LCD/Keypad Options
CD100-B

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CD100 Wireless Controller Product Information

Control Design's CD100 Product line, first introduced in 1996 as the C18 and C44, is a highly integrated, programmable, wireless automation controller. It supports many customer-requested and field tested features for use in the Remote Control and Automation markets.

The primary features are as follow:

- Fully Programmable, using a built-in Basic 52 operating system, allow almost unlimited possibilities for use in Data Logging, Gate Controls, Water or Gas Flow Measurement and Calculation, etc. for on-site system management. A simple and relatively easy to use, built-in, Intel designed, Basic Interpreter coupled, uniquely by CDI, with industry standard Modbus give many end-users the ability to self-maintain their own programs and systems.
- Industrial grade, Modbus compatible, TVSS Protected Analog Inputs, Optically Isolated Digital Inputs/Pulse Counters and Solid State Digital Outputs provide for remote control and monitoring of many sensor types at sites as part of the unit on all products.
- Internal and External/Remote Display/Keypad options allow on-site readings and adjustments without requiring a laptop or other interface.
- Modbus RTU Protocol used throughout the product line for Industry standard acceptance into many off-the-shelf Software HMI packages. Integration into existing systems that use Modbus is also made easier.
- An optional built-in, long-range, reliable wireless Radio-Modem that allows use in remote (1 to over 120 air mile distances in use) applications using a unique radio-modem technology which allows data recovery down to -113dbm receive sensitivity. Typical "over-the-air" data recovery @ -112 dbm is better than 90%, @ -115dbm, better than 50%.
- The Radio-Modem Store and Forward feature ("SnF"), standard in every unit, permits even greater distances by allowing routing over and around terrain obstacles. Intelligent routing, using the Modbus Protocol, allows a unique path for each slave. Standard Routing allows any protocol to be forwarded. No Routing allows direct communication as with any other radio-modem. Setup and use of this feature has been designed for the easiest possible user interface via the CDI Toolbox (free software).
- Easily interfaced to external Data Loggers, PLCs, Sensors, Etc. with intelligent capability to enable use with CDI Radio-Modem and Modbus compatibility.

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CD100 Technical Features Overview

- **9 Analog Inputs**, 6 available to the user via Terminals, 3 internally dedicated for Charge, Battery and RSSI (Radio Signal Strength Indicator) monitor.
 - **Analog Temperature Monitor**.
- **4 Digital Inputs**, Optically Isolated, Positive (8-27vdc) Voltage Active.
- **2 Pulse Counters**, Digital Inputs 1 and 2 also double as **Pulse** (to 3Khz) counters.
- **4 Digital Outputs**, Solid State, 30 VDC, 1 Amp (Pull to Ground when On).
 - Digital Output 4 can also be used as the LCD Backlight switch.
- **LCD and Keypad (optional)** with Backlight, 4 row by 20 character, internal or external. External LCD/Keypad can be extended up to 50 feet from CD100.
- **Basic52 Programmability** for programming features such as:
 - Complicated 32 bit math functions to process data from I/O ports,
 - Master polling for local data gathering and transfer,
 - PID loop controllers for Gate and Valve controls,
 - Data logging and Totalizer for water or other materials flow measurement.
 - Runs multiple programs to allow operation as Data Logger, Sensor Management, Gate Controller, Etc. simultaneously.
- **Modbus RTU Protocol** includes 500 standard integer (16bit) registers and 16000+ floating-point (32bit) registers. All Registers are non-volatile.
- **64K, Non-Volatile FRAM*** for Data Logging and other data storage, contains all Integer and Floating Point Modbus Registers.
- **64K of Non-Volatile Flash Memory**. 32K used by Basic52 system. 32K available for Basic52 programs.
- **High Accuracy Real Time Clock** with Battery backup. Maintains +/- 2 minutes per YEAR (+/- 10 seconds/month) accuracy. 5-Year minimum battery backup.
- **Charge Controller** built-in for Solar or other DC power sources up to 30 VDC input and programmable for 13.6v standby or 14.4v intermittent (Solar) battery charging. Allows up to 30 watts of Solar Panel or ~1.2 Amp of current.
- **Low Power Operation** ~60ma maximum operating current, ~40ma normal operating current with a low power mode for ~10ma operation to extend battery life.
- **Radio-Modem (VHF 150-174Mhz or UHF 450-470Mhz)** built-in, full 1 to 5 watt transmit power with exclusive Control Design long-range Modem and Store & Forward technology for remote monitoring and control over long distances in rugged terrain and noisy environments.
- **Multiple (3) Communication Ports:**
 - **Modem RS232** port for direct communications with external PLCs, Data Loggers, Etc.
 - **Basic52 RS232** port for Basic52 programming and ASCII communications to external devices such as Displays, PLCs, Data Loggers, Etc..
 - **Modbus RS232** port for communications with External PLCs, Radio Modem, Etc, using Modbus protocol. Also used for internal communications to built-in IO unit.

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- **Switched Battery** voltage (12V), and Switched Precision 5 volt power with Ground next to each Switched V+, available on the Terminals for use in providing power to external sensors or other devices requiring intermittent or constant battery power.
- **LED Indicators** for Power and Modem functions to aid in instant troubleshooting or assessment of critical system functions. Can be turned off for additional power saving.
- **Industrial Grade** components for more reliable field operation and –30 Deg C (-22 Deg F) to +50 Deg C (122 Deg F) operation for Radio, -40 Deg C (-40 Deg F) to +85 Deg C (185 Deg F) for all other components.

*NOTE: The FRAM used in the CD100 is a new technology that replaces SRAM and EEPROM.
The FRAM:

- does not require battery backup like Static RAM
- does not wear out like EEPROM
- reads and writes at Static RAM speeds

Build Information:

The standard CD100 is built on an aluminum, U shaped bracket for installation in a user-supplied enclosure.

CDI can also build the CD100 into an enclosure appropriate for your application. Options such as the CD103 Bubbler and CD104 Gate Relay controller can be included in the enclosure and pre-wired along with and to the CD100.

See the Enclosure options below in the Price Guide section of this document.



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Price Guide

Logger/Controllers -

CD100-B

- includes 14 I/O Programmable Controller with Faceplate on Metal Bracket

CD100-B-DI

- includes 14 I/O Programmable Controller with Faceplate, Metal Bracket and Built-In 4 Line x 20 Character, Backlit Display.

CD100-B-KDI

- includes 14 IO Programmable Controller with Faceplate, Metal Bracket and Built-In 4 Line x 20 Character, Backlit Display and 6 Button, Tactile Keypad.

CD100-B-KDES

- includes 14 IO Programmable Controller with Faceplate, Metal Bracket and External, Serial, 4 Line x 20 Character, Backlit Display and 16 Button, Standard (0-9, *,#,A,B,C,D), Non-Sealed Keypad. [Includes CD110 Upgrade.](#)

CD100-B-KDEC

- includes 14 IO Programmable Controller with Faceplate, Metal Bracket and External, Serial, 4 Line x 20 Character, Backlit Display and 16 Button, Custom Character (0-9,.,Enter,Esc,Up,Down), Sealed Keypad. [Includes CD110 Upgrade.](#)

CD100-DRU

- includes Programmable Controller with Radio-Modem in a handheld Plastic Box with 6 Button Tactile Keypad, 4x20 Display and Cigarette Lighter Power Cable. Antenna sold Separate (see [G8BI-KIT](#) on Page 8).

CD110-UPGRADE

- **Changes:** from 32K to 96K Flash Memory, from 2K to 8K RAM, from 11Mhz to 22Mhz Crystal and add Com0 5V for Serial LCD to any of above CD100 units.
- NOTE: Required option for use with KDES and KDEC external serial displays.

CX-10 Expansion Unit

Adds 8 optically isolated Digital Inputs and 8 3 amp relay Digital Outputs to CD100

CX-10 w/SS Radio

- Adds 1 Watt Spread Spectrum radio to CX-10 for remote operation with CD100
NOTE: requires -SSR option below to add a SS radio to remote CD100.

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CDI Radio-Modem options -

add one of the following, to the above Logger/Controller part numbers, to have the radio-modem installed:

- 1S for VHF 148-174Mhz, Licensed Public channels, 5 watt Radio
- 2S for VHF 151-154Mhz, [License Free channels](#), 2 watt Radio
- 2U for VHF 218-222Mhz Licensed channels, 2 to 5 watt Radio
- 3S for UHF 402-430Mhz, Licensed Govt. channels, 5 watt Radio
- 4S for UHF 450-470Mhz, Licensed Public channels, 5 watt Radio

NOTE: when ordering the VHF or UHF radios above, you may specify radio frequencies to be programmed in radio (up to 8- No Extra Charge).

Spread Spectrum Radio option- add to the base part number to add SS radio only OR add as a separate line item on the order in addition to ordering the unit with the above radio-modem:

- SSR for 1 Watt Spread Spectrum (902-928Mhz) radio

ORDER EXAMPLE:

Example to order a CD100 with built-in LCD/Keypad and UHF 450-470Mhz radio-modem:

Part Number = [CD100-B-KDI-4S](#)



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Replacement Parts for CDI Products

Order these part numbers separate from RTU orders:

SSC cable kit for Spread Spectrum radio connection to CD100

DTC cable kit for standard radio modules to CDI modem

LCD420B 4x20 Backlit LCD with pins installed (for CD100, CD110)

LCD216 2x16 Non-Backlit LCD with pins installed (for CD20, CD50)

LCD216B 2x16 Backlit LCD with pins installed (for CD20, CD50)

LCDS 4x20 LCD with serial adaptor board, no cable, no enclosure

LCDSC 4x20 LCD with serial adaptor board & cable, no enclosure

LCDSCE 4x20 LCD with serial adaptor board, cable, NEMA enclosure

KP6 6 Button, Tactile plug-in keypad for CD100, CD110

The following radio modules are for the Control Design CD100, CD110 products:

DTX-442-C-CD 450-470Mhz 5W Radio module

DTX-142-C-CD 148-174Mhz 5W Radio module

The following radio modules are for the C44, C44P, C14, CD20:

DTX-442-S-CD 450-470Mhz 5W Radio w/10 pin adaptor

DTX-142-S-CD 148-172Mhz 5W Radio w/10 pin adaptor

The following radio modules are the Hi-Spec radio for the CD100, CD110 products:

DTX-454-CD 450-470Mhz 8W Radio module

DTX-154-CD 148-174Mhz 6W Radio module

Program Kit A Software and cables to program standard CDI radios

Program Kit B Software and cables to program Hi-Spec (2U/4U) radios

CD100-IO-PCB Replacement IO circuit board

CD100-MDM-PCB Replacement Modem circuit board

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Control Design Manufactured Options:

Order as a separate line item.

Pneumatic Bubbler Sensor

Single Sensor

Dual Sensor

CD103-1-p Single Output Pneumatic Sensor

CD103-2-p Dual Output Pneumatic Sensor

CD103-3-p Triple Output Pneumatic Sensor

- **-p** = specify 1 PSIG (2.31ft H₂O), 5 PSIG (11.55ft H₂O) or 15 PSIG (34.65ft H₂O) by adding -1, -5 or -15 to above part number.
- To specify a second sensor on the unit, add a second -p with the pressure desired.

Example: [CD103-2-1-5](#) to order a 2 output with a 1 PSIG and a 5 PSIG sensor.

CD103 Description:

The CD103 Bubbler unit is designed to take measurements in low flow water, situations where more than one measurement is needed from the same sensor for greater accuracy and where no contact with the water is desirable. Example programs and application support for the sensor is available from CDI.

Gate Relay Controller

CD104-0 Gate Relay Unit, No Relays

CD104-2 Gate Relay Unit, 2 Relays (1 Gate)

CD104-4 Gate Relay Unit, 4 Relays (2 Gates)

NOTE: above relay boards come with terminals for external, user-supplied switches.

CD104 Description:

The CD104 Relay Controller is designed to operate 2 DC motors, requiring up to 15 amps and can be operated manually or automatically using a controller. The user, via terminals on the board, adds auto-Manual and Up/Down switches.

The CD104-0 has 4 sockets for 4 each KUP-14D15-12 (10 amp) or KUMP-14D18-12 (15 amp) relays. The board is designed to switch polarity of the DC being fed to the motors. The board is also wired so that both relays to one motor cannot be switched on simultaneously.



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Serial LCD/Keypads

KDES Standard, Non-Sealed Keypad with Serial LCD for CD110
KDEC Custom, Sealed Keypad with Serial LCD for CD110

Enclosure Options:

Call CDI to discuss your specific needs for an enclosure. CDI will quote and custom-manufacture the enclosure to suit your application. Some pricing examples:

E864F 8" Tall x 6" Wide x 4" Deep Fiberglass NEMA 4X Enclosure
E1086F 10" Tall x 8" Wide x 6" Deep Fiberglass NEMA 4X Enclosure
E16126S 16" Tall x 12" Wide x 6" Deep Steel NEMA 4 Enclosure

^ includes display window, locking handle, mounting feet, battery, external radio connector.

NOTE: All above enclosures **include** internally mounted battery appropriate for internal equipment and custom metal to mount and/or enclose all RTU and Battery equipment in enclosure.

*Any optional equipment included as part of order, such as CD104 Relay controller or CD103 Bubbler sensor, will be mounted and pre-wired as part of enclosure price (for enclosures in which options will fit inside).

Please call to discuss these and any other options with which we can assist



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Antenna Kits:

- AKA/NN/15 3 Element 7.1db gain Yagi Kit
- AKB/NN/15 5 element 9.2db gain Yagi Kit
- AKC/NN/15 6 element 10db gain Yagi Kit
- AKD/NN/15 3db gain Omni-Directional Antenna Kit
- /G added to any above antenna kits will add the Gold, Anodized, Welded option
- /U or /V to specify UHF or VHF for any kit above
- NOTE: Above Antenna Kits include Coax w/connectors installed, Pole Mount hardware.

- G8BI Magnetic Mount Roof top antenna mount w/BNC, 12ft Coax
- LP450NMOW Low profile 3"x 1" tall on-unit antenna for MAB8BI2 cable
- TRA4503 Phantom Antenna for above mount, 3" Tall
- G8BI-KIT G8BI and TRA4503 both required for complete antenna kit
- JP18 18" BNC Male to N Female Bulkhead cable
- ^ >NOTE: Change 18 to 06 thru 36 for any length needed from 6" to 36"

Lightning Protection:

- AKL Polyphaser Lightning arrestor
- JM18 18" BNC Male to N Male jumper

ANTENNA MOUNTS, COAX, CONNECTORS

- MABTO NMO mount for RG58, 3/8" Hole size, No Coax
- MAB8U NMO mount with 17ft RG58, 3/8" Hole size
- MAB8BI2 NMO mount with 2 ft RG58, 3/8" hole, BNC Conn

- LMR240 RG8X Type Coax Cable per foot
- LMR200 RG58 Type Coax Cable per foot

- CBNC8X BNC Male Connector for RG8X/LMR240 Coax
- CN8X N-Male Connector for RG8X/LMR240 Coax
- CBNC58 BNC Male Connector for RG58U Coax
- CN58 N-Male Connector for RG58U Coax

NOTE: for BNC Male connector, substitute "B" for "N" above on either end.

Antenna Kit NOTES:

1. /NN above indicates connector choice for each end of coax: N=N Male, B=BNC Male.
2. /15 above indicates coax length choices: to change coax length, replace 15 with a value from 1 to 25. If longer than 25 feet is required, call for details and pricing.
3. Coax cable used is RG8X low loss (0.242" OD.). Similar in size to RG58/U (0.195" OD.)
4. UHF or VHF antenna and pricing is assumed based on radio specified with RTU order.

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Power Options:

BC	120VAC to 15VDC, 1amp wall mount charger
SPA	20 Watt Solar Panel with Side of pole bracket Kit
SPB	10 Watt Solar Panel with Side of pole bracket Kit
PS-1228	12 volt, 2.8 amp hour battery (CD20/50)
PS-1270	12 volt, 7 amp hour battery (CD100/110)
PS-12120	12 volt, 12 amp hour battery

ORDER EXAMPLE:

To order a CD100 on a bracket ([CD100-B](#)) with an Internal 4x20 Display ([-DI](#)) and then add a VHF License Free Radio-Modem ([-2S](#))

Add a Gate Relay Controller unit with 2 Relays installed ([CD104-2](#))

To order a 3 element Yagi Antenna Kit ([AKA](#)), with N-Male to BNC-Male ([/NB](#)) connectors and 10 feet of RG8X low loss coax ([/10](#)), then add Gold Welded version ([/G](#)),

And last, add a 10 Watt Solar Panel with bracket kit ([SPB](#)) to the order.

Line Item 1> 1 each [CD100-B-DI-2S](#)
Line Item 2> 1 each [CD104-2](#)
Line Item 3> 1 each [AKA/NB/10/G/U](#)
Line Item 4> 1 each [SPB](#)

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Control Design, Inc. (CDI) Warranty Statement

All components manufactured by CDI are warranted for 24 months to be free from manufactured defects, firmware bugs and from failure due to design.

This warranty includes all parts and labor for 6 months from the date of delivery to customer. All parts continue to be covered for 18 months beyond the first 6 months. Labor to repair or service the unit will be billed to the customer during the last 18 months of warranty.

First 30 Days Immediate Exchange Program:

For the first 30 days of the warranty period, CDI will exchange the complete unit, at no charge to the customer, if it is found to be defective.

The defective unit should be delivered to CDI for replacement. CDI will ship a replacement unit immediately, by overnight express if appropriate, to the customer and will allow the customer up to 30 days to return the defective unit. If the defective unit is not returned within 30 days, to CDI, CDI will bill the customer for the replacement unit.

If the defective unit is found to be non-defective or is defective but not due to CDI's fault, the customer will be charged for any repairs or replacement of the unit not covered by warranty.

After 30 Day Exchange Program:

All components suspected of being defective must be returned to CDI either by the customer, the customer's representative, distributors for CDI or CDI's employees for repair or replacement. Customer will be charged for any repairs or replacement not covered by the warranty.

CDI reserves the right to determine whether the product is defective due to CDI's fault or causes beyond CDI's control. Lightning, Floods and other damaging acts of nature, Vandalism, Improper installation, Improper technical repairs are some items NOT covered by this warranty.

Third party manufactured devices are covered as follows :

- **RADIOS** supplied by CDI as part of a complete product will be covered according to the manufacturers warranty and will be handled by CDI as a representative of the radio manufacturer.
- **BATTERIES** supplied by CDI will be warranted fully and replaced, if defective, for the first 6 months. Beyond 6 months up to 24 months CDI will prorate the battery for replacement. Battery prorating will be based on the list price of the battery divided by 18 months times the number of months beyond the first 6.
- **ANTENNAS** and **CABLE KITS** supplied by CDI will be warranted for 30 days.
- **ALL OTHER** components, supplied by CDI with it's products, will be warranted according to the manufacturers warranty. Handling and Labor charges may be applied depending on the manufacturers warranty and support to CDI.

Defective products, made by CDI, will be repaired or replaced and returned to customer within 15 working days of receipt of the defective product(s) if parts delays are not incurred.

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