EtherSeries

EtherSeries

CR-2

&

CR-2-Opto

User's Guide

Revised October 7, 2013
Firmware Version 1.X

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Firmware Version: 1.0

1. DESCRIPTION

The CR-2 regenerates asynchronous data. The CR-2 uses UARTs in addition to RS232 and RS485 2-wire or 4-wire drivers and receivers (The CR-2 is RS422 compatible using the RS485 4-wire setting). The CR-2 regenerates both the electrical signals and the characters. While the CR-2 is most often used to re-format asynchronous data, it is also used as an interface converter between RS-422/485-2wire and RS-485-4wire, or between RS-232 and RS485/422.

Regenerating characters is useful when back to back links that user over-sampling are tied together. For example, over sampling 19200 bps asynchronous data over a 56 kbps synchronous circuit will shorten or lengthen each 1 or 0 by up to 34%. Receiving devices will typically correctly recover the data with 34% bit length distortion. However, back to back over sampled links can add another 34% bit distortion, for a total of 68%. A bit distortion of 68% results in bit errors.

The CR-2 removes async bit distortion by regenerating the characters. Each of the bits of a character coming out of an asynchronous UART have the same time duration.

The CR-2 is shipped set to RS232. The user can option the CR-2 for RS422/485 4-wire operation or for RS485 2-wire operation.

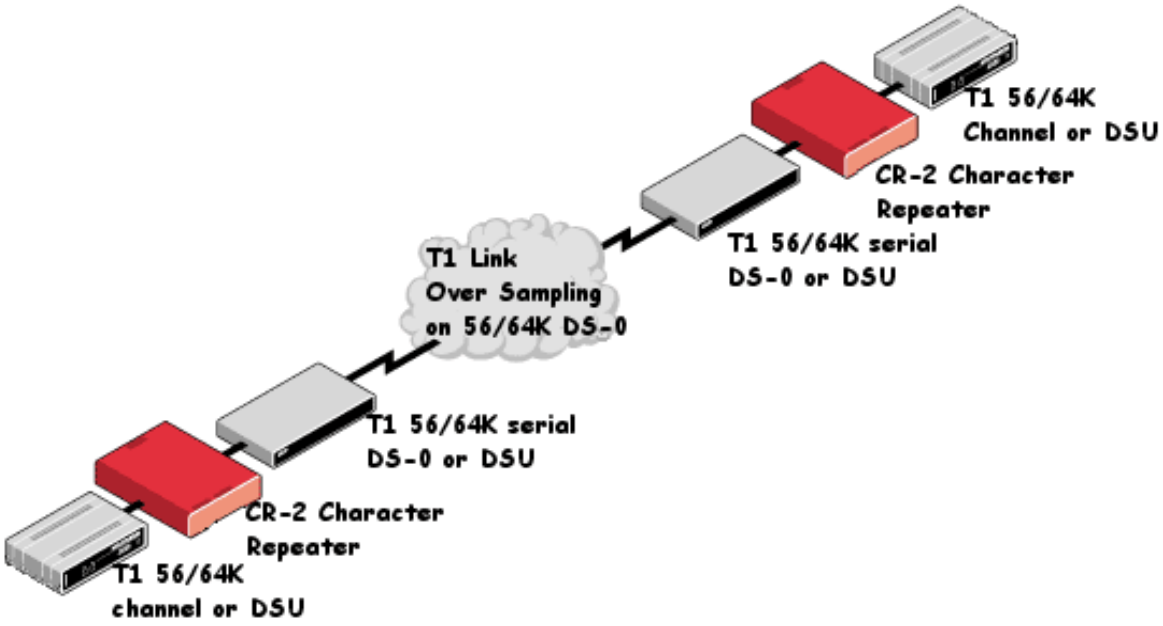
FEATURES:
STANDARD VERSION:

- Repeats RS232, RS422, RS485 data
- Regenerates asynchronous characters
- Industrial rated temperature from -40 to +75 C
- Two asynchronous serial port
- RS232, RS422, or RS485 2-wire or 4-wire
- Ports speeds to 57.6 Kbps
- Works in Point-to-point and multipoint applications
- Easy to setup and maintain
- Configuration via serial or ethernet port
- Use to regenerate over-sampled data
- Compact size; stand-alone or rack mounting
- AC and/or DC power supply
- User name and password option for configuration authority
- ROHS, CE

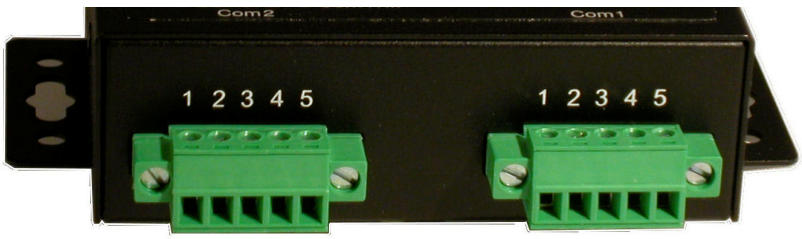
OPTICAL ISOLATED VERSION:

The Opto-isolated version includes optical isolation rated at 1.5 KV and 15 KV ESD. It does not prove RS-232 interfaces, instead it converts or isolates RS-485 and RS-422 interfaces. Interfaces on this version use screw-terminals.

APPLICATION



Standard Connectors



Optical Isolated Connectors

2. SPECIFICATIONS

2.1 General

- Two asynchronous RS232, RS422, or RS485 2 or 4-wire serial ports (Opto version contains no RS-232 interface)
- DE-9P (PC-9 pin) connectors, DTE interface (Opto version uses screw-terminal)
- Speeds to 57.6 Kbps, full or half duplex
- Can be configured via RS232 serial port
- Ethernet port for telnet or web browser management
- Use for regenerating over-sampled asynchronous characters

2.2 Environmental

- Operational Temperature: -40 to +75 C
- Storage Temperature: -50 to +75 C
- Humidity: <95% Non-condensing

2.3 Physical / Electrical

- Power requirements: 9 to 30 VDC (2 watts)
- 48, 125 VDC and 240 VAC options are available
- Supplied with 120 VAC power supply
- 4 ¼" wide x 3" long x 1" high
- Weight: 7.5 ounces
- Din clip mounting available
- ROHS, CE

2.4 Setup Commands

Set LAN Configuration,
Serial Port Configuration
Configuration Access
Display Configuration Settings
Reset Configuration to Default
Save and Exit
Exit without Saving

3. INSTALLATION

3.1 Unpacking

The following is included with each unit:

- Unit and external AC power supply
- Serial cable for connection to a PC for initial configuration.
- Manual CD
- Information regarding warranty, maintenance contracts and repair

3.2 Setup

The CR-2 must be properly configured before use. See Section 5 for connection and configuration information.

3.3 Connections

The RS-232 serial ports on the CR-2 are configured as Data Terminal Equipment (DTE). This is the same configuration used on PC COM ports. To connect the CR-2 to peripheral equipment, use the same cable that would be used to connect that equipment to a PC COM port. See Section 6 for more information.

3.4 Default Configuration

The factory default settings for the CR-2 are as follows:

IP Address: 192.168.0.100
Serial Ports: RS-232, 57,600 8,N,1
Baud Offset: +1.2%

To reset the unit to factory defaults perform the following steps:

1. Depress and hold the SETUP switch.
2. Apply power to the CR-2.
3. Continue holding the SETUP switch until the RUN indicator begins flashing.
4. Release the SETUP switch and wait for the unit to reset.
5. When the RUN indicator comes on solid, the unit is set to factory default.

4. CONTROLS AND INDICATORS

4.1 Controls

A pushbutton switch to invoke serial port setup is accessible through a small hole on the rear of the unit. Use a paper clip to press the switch.

4.2 Indicators

Indicator	Condition	Meaning
LAN	Yellow	10 MB LAN connection
	Green	100 MB LAN connection
Run	ON	Unit has power and is working properly
	Flash	Serial Setup Mode active
Com1 Tx	ON	Serial data out COM 1
Com2 Tx	ON	Serial data out COM 2
Com1 Rx	ON	Serial Data into COM 1
Com2 Rx	ON	Serial Data into COM 2

5. CONFIGURATION & MANAGEMENT

5.1 Introduction

Initial setup of the CR-2 is accomplished using serial port Com1. After initial configuration, a web browser or Telnet connection may be used if the unit was configured for LAN operation.

5.2 Connections and Setup

The CR-2 can be set up through serial port Com1. Connect a PC to serial port 1 using the cable provided. If an asynchronous terminal is used, a null modem cable is required

Use an asynchronous terminal or a PC using a communications program such as Hyper Terminal. Set the terminal to 9600 bps, 8 data bits, no parity, 1 stop bit, and no flow control.

Press the Setup switch through the hole in the rear of the case. Pressing the switch will bring up the following screen:

5.3 Serial Mode and Telnet Setup Screens

```
Character Repeater V1.0
----------------------------------------

 Configuration setup.

[Press any key to continue]
```

After pressing any key:

```
 Main Menu
-----------------------------------------
 1  Set LAN Configuration,
 2  Serial Port Configuration
 3  Configuration Access
 4  Display Configuration Settings
 5  Reset Configuration to Default
 6  Save and Exit
 0  Exit without Saving

Choose a Number =>
```

To make configuration changes in the following screens, enter the number of the item to change followed by a space and the number of the new setting. When finished, select item 8, Save and Exit, from the main menu.

5.3.1 Set LAN Configuration

```
LOCAL UNIT CONFIGURATION:
 Local Address: 192.168.0.100        MAC Addr: 00:09:AA:12:34:5F
 Gateway Address: (NOT SET)          Subnet Mask: 255.255.255.0


SET LOCAL UNIT CONFIGURATION:
 1  Local IP Address
 2  Gateway IP Address
 3  Subnet Mask
 0  -- Return to previous menu

EXAMPLE: To set local IP address to 192.168.0.10
   => 1 192.168.0.10
Enter Command =>
```

5.3.2 Serial Port Configuration

```
SERIAL PORT CONFIGURATION:
 Baud Rate:        57600
 Baud Offset:      +1.2%
 Parity:           NONE
 Data:             8 Bits
 Stop:             1 Bit
 COM1 Interface:   rs232
 COM2 Interface:   rs232

SET SERIAL PORT CONFIGURATION:
 1  Baud Rate         [0=57600, 1=38400, 2=19200, 3=9600
                       4=4800,  5=2400,  6=1200,  7=600,  8=300]
 2  Baud Offset       [0=-2.4%, 1=-1.2%, 2=0, 3=+1.2%, 4=+2.4%]
 3  Parity bit        [0=None, 1=Odd, 2=Even, 3=Mark, 4=Space]
 4  Data bits         [0=7bits, 1=8bits]
 5  Stop bits         [0=1bit, 1=2bits]
 6  COM1 Interface    [0=rs232, 1=rs485/4-wire, 1=rs485/2-wire]
 7  COM2 Interface    [0=rs232, 1=rs485/4-wire, 1=rs485/2-wire]
 0  -- Return to previous menu.
EXAMPLE: To set the baud rate to 9600
   => 1 3
Enter Command =>
```

Baud offset is used to retard or advance the baud rate by a small percentage. With async serial, there are minor variances in the actual baud rate between connected devices. In order for the Character Repeater to function correctly, it's baud rate must be slightly faster than the connected devices baud rate. If you are experiencing framing errors, it may be necessary to retard the baud rate. If you are experiencing dropped characters, it may be necessary to advance the baud rate.

5.3.3 Configuration Access

```
CONFIGURATION ACCESS:
 Web Configuration:    ENABLED
 Telnet Configuration: ENABLED
 Firmware Upgrade:     ENABLED
 User ID:
 Password:

SET CONFIGURATION ACCESS:
 1  Web Configuration    [0=ENABLED, 1=DISABLED]
 2  Telnet Configuration [0=ENABLED, 1=DISABLED]
 3  Firmware Upgrade     [0=ENABLED, 1=DISABLED]
 4  Set User ID and Password [userid password]
 5  Clear User ID and Password
 0  -- Return to previous menu

EXAMPLE: To set User ID to root, password toor
   => 4 root toor

Enter Command =>
```

5.3.4 Display Configuration Settings

```
Character Repeater: V1.0

LOCAL UNIT CONFIGURATION:
 Local Address: 192.168.0.100        MAC Addr: 00:09:AA:12:34:5F
 Gateway Address: (NOT SET)          Subnet Mask: 255.255.255.0


SERIAL PORT CONFIGURATION:
 Baud Rate:         57600
 Baud Offset:       +1.2%
 Parity:            NONE
 Data:              8 Bits
 Stop:              1 Bit
 COM1 Interface:    rs232
 COM2 Interface:    rs232

[Press any key to continue]

CONFIGURATION ACCESS:
 Web Configuration:    ENABLED
 Telnet Configuration: ENABLED
 Firmware Upgrade:     ENABLED
 User ID:
 Password:

[Press any key to continue]

CURRENT STATISITCS:
 Network packets received:    763
 Network packets transmitted: 1
 Network packet errors:       0
 COM1 bytes received: 0
 COM2 bytes received: 0

CONFIG Mode

[Press any key to continue]

Main Menu
-----------------------------------------
 1  Set LAN Configuration,
 2  Serial Port Configuration
 3  Configuration Access
 4  Display Configuration Settings
 5  Reset Configuration to Default
 6  Save and Exit
 0  Exit without Saving

Choose a Number =>
```

5.4 Ethernet Management

For a connection directly to a PC, use an Ethernet crossover cable. DCB part number 9500097. If connecting to an Ethernet hub or switch, use a straight through Ethernet cable. (Patch Cord)

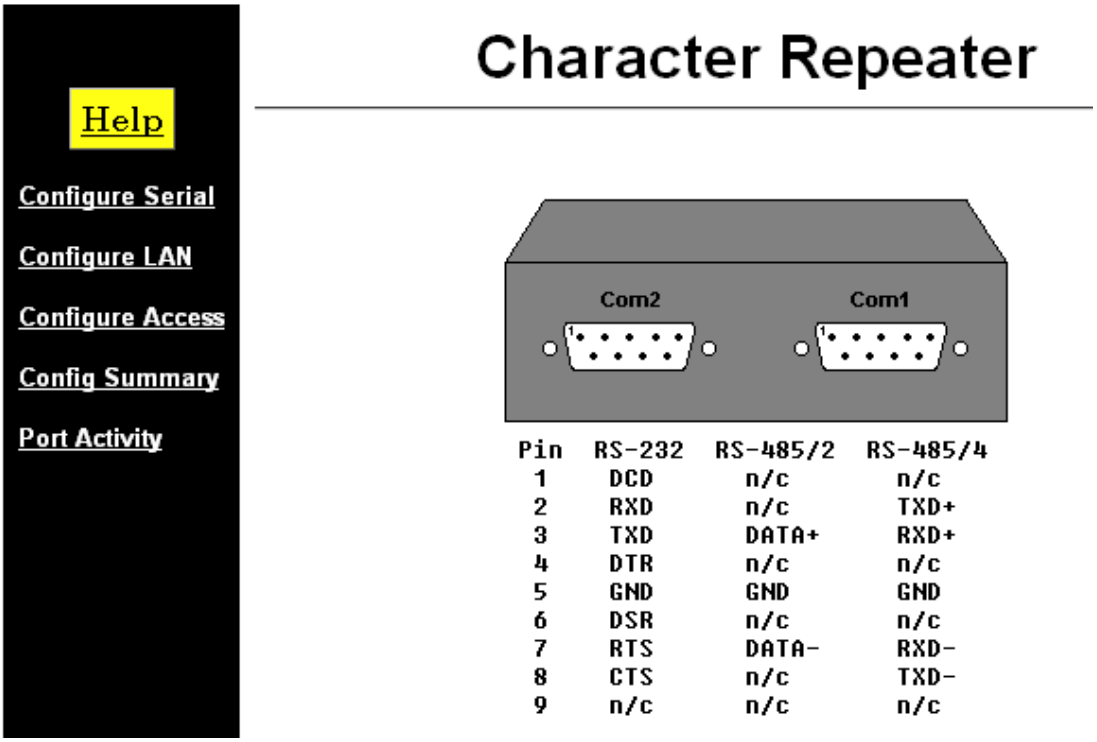
5.4.1 Telnet

Telnet screens are identical to the serial screens

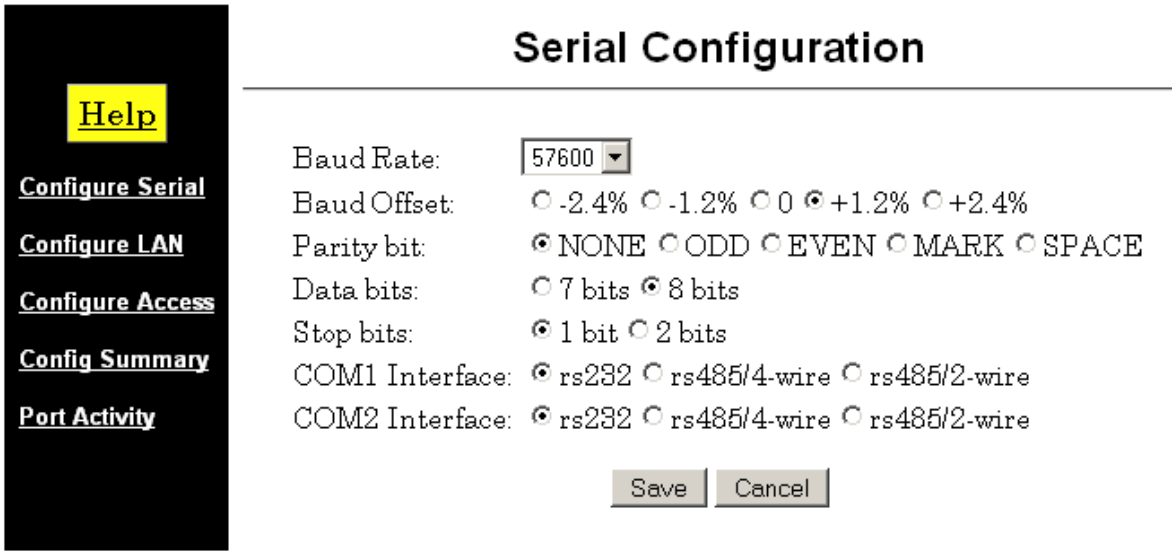
5.4.2 Browser screens:

NOTE
Context sensitive HELP is available for each browser screen.

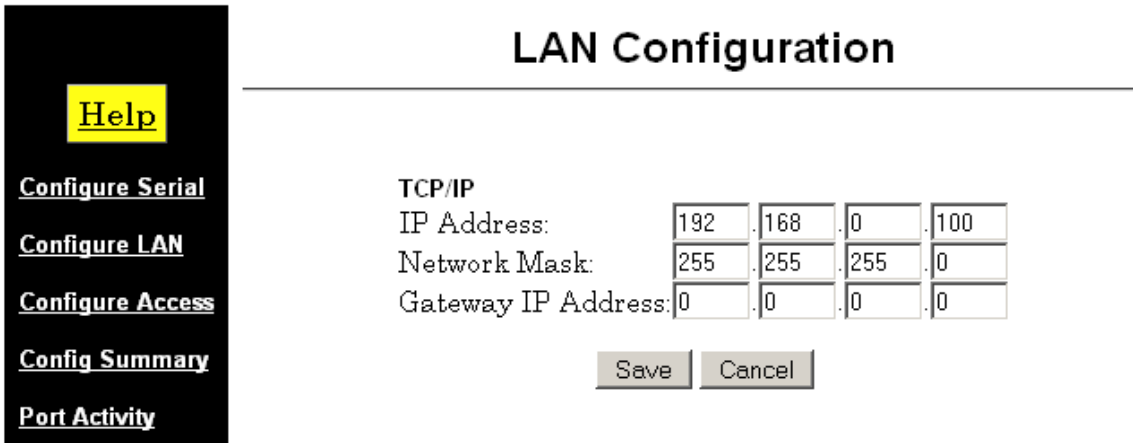
Main screen



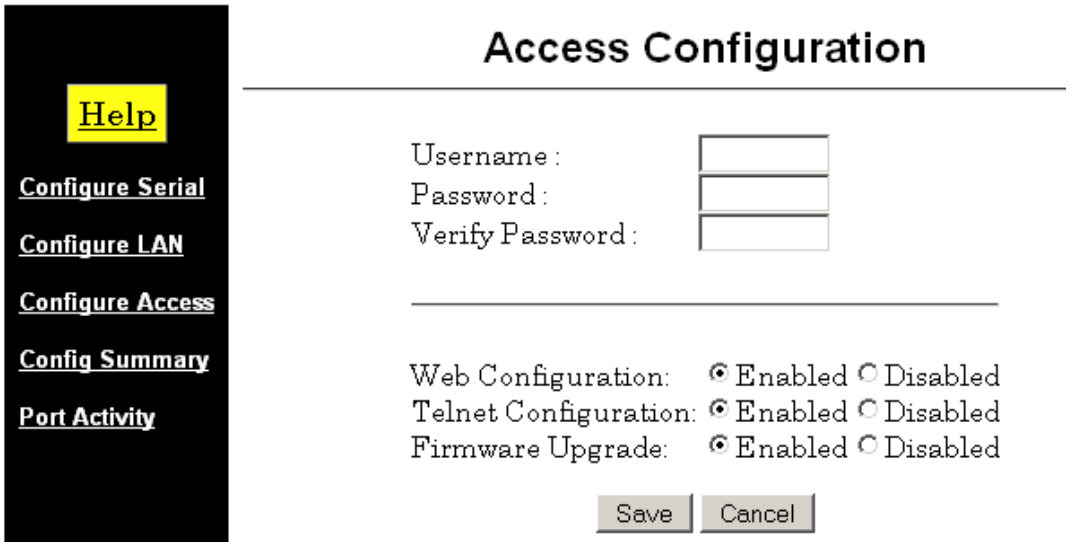
Configure Serial screen



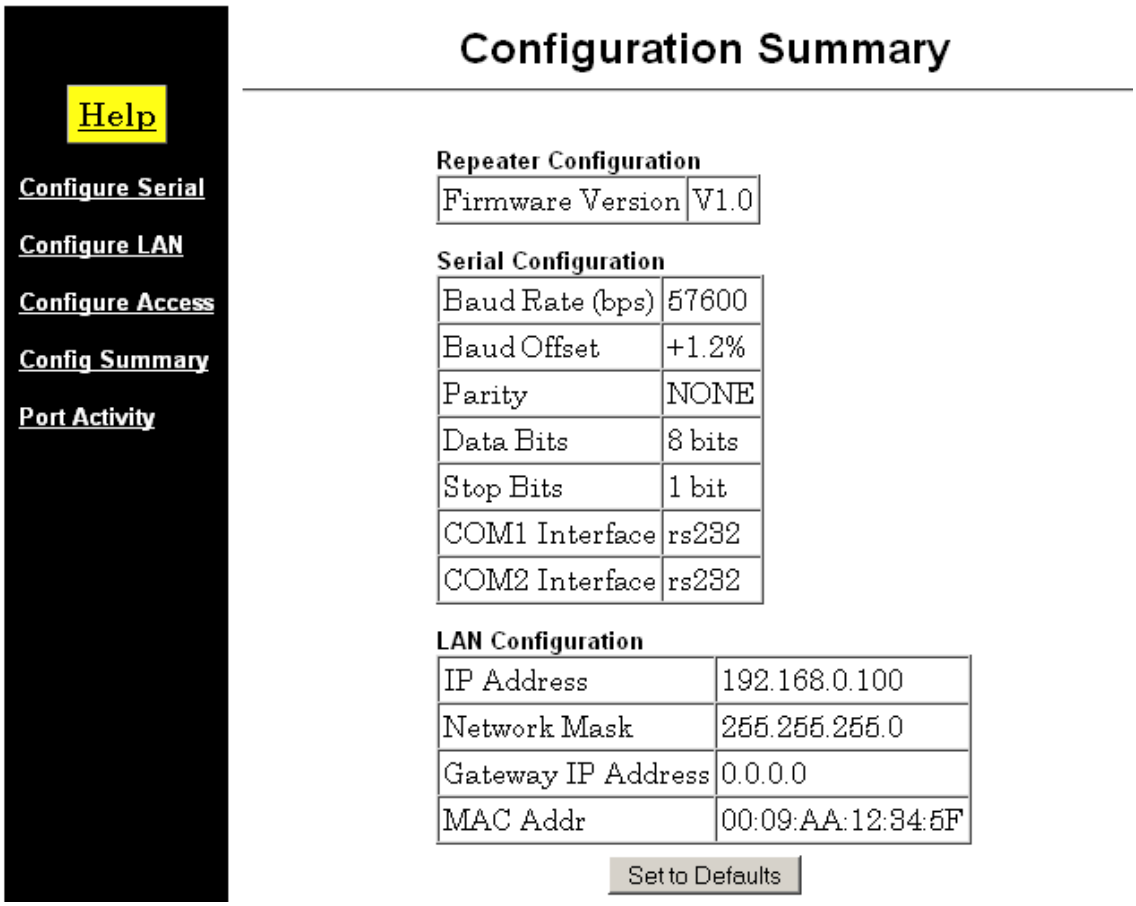
Configure LAN screen



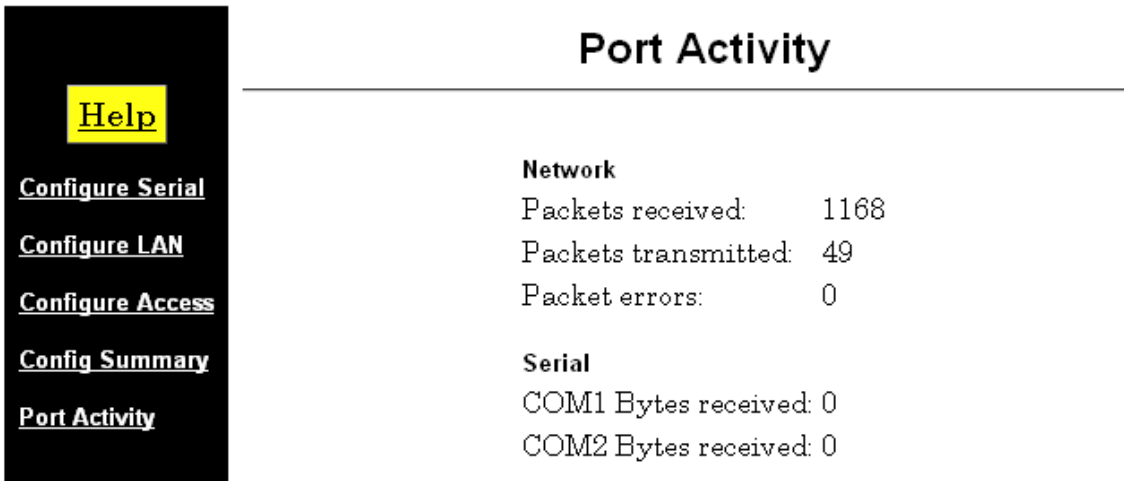
Configure Access screen



Configuration Summary screen



Port Activity screen



6. INTERFACE SIGNALS AND CABLING

6.1 Introduction

The serial ports on the CR-2 can be either RS 232 or RS 485 (2-wire or 4-wire). The configuration is changed using the serial port configuration menu.

The default setting is RS 232.

6.2 RS-232 Port Interface (DE-9P)

Pin	Signal	In/Out
1	Carrier Detect	IN
2	Receive Data	IN
3	Transmit Data	OUT
4	Data Terminal Ready	OUT
5	Signal Ground	----
6	Data Set Ready	NOT USED
7	Request to Send	OUT
8	Clear to Send	IN
9	NOT USED	

6.2.1 Internal RS-232 Signal Paths Through the CR-2

Com 1 Com 2

TxD< ----------<RxD
RxD> ---------->TxD
RTS< ----------<CTS
CTS> ---------->RTS
DTR<----------<DCD
DCD>---------->DTR
DSR Ignored DSR

6.3 RS-485 Interface (DE-9P)

Pin	Signal 4W	Signal 2W
1	nc	nc
2	TxD+	nc
3	RxD+	Data+
4	nc	nc
5	Ground	Ground
6	nc	nc
7	RxD–	Data–
8	TxD–	nc
9	nc	nc

6.4 Optical Isolated Version RS-485/422 4-wire Interface

There is a RS-485/422 only model with optical isolation. This unit does not include RS-232 ports. The Optical Isolated version uses screw terminal connectors.

Screw Terminal Assignments		
Pin	**Signal Name**	**Type**
1	Transmit Data (TX+)	Out
2	Transmit Data (Tx-)	Out
3	Receive Data (Rx+)	In
4	Receive Data (Rx-)	In
5	Signal Ground (GND)	SG

6.4 Optical Isolated Version RS-485/422 4-wire Interface

There is a RS-485/422 only model with optical isolation. This unit does not include RS-232 ports. The Optical Isolated version uses screw terminal connectors.

RS-485 4-wire Interface

Screw Terminal Assignments 4-Wire		
Pin	**Signal Name**	**Type**
1	Transmit Data (TX+)	Out
2	Transmit Data (Tx-)	Out
3	Receive Data (Rx+)	In
4	Receive Data (Rx-)	In
5	Signal Ground (GND)	SG

RS-485 2-wire Interface

Screw Terminal Assignments 2-Wire		
Pin	**Signal Name**	**Type**
1	No Connection	N/A
2	No Connection	N/A
3	Data (+)	Data +
4	Data (-)	Data -
5	Signal Ground (GND)	SG

6.5 Cables

The RS-232 serial ports on the CR-2 are configured as Data Terminal Equipment (DTE). This is the same configuration used on PC COM ports. To connect the CR-2 to peripheral equipment, use the same cable that would be used to connect that equipment to a PC COM port.

To connect two CR-2s back-to-back for bench testing, use the serial port setup cable provided.

7. TROUBLESHOOTING

When troubleshooting problems, a rational plan can save you many hours of frustration. The following is a brief outline of standard troubleshooting procedures.

1. Gather the facts to determine the exact nature of the problem.

2. Draw a picture of the system showing the equipment at both the host and remote ends and the phone lines or in-house wiring. Use this as a reference to note your observations, test steps and test results. A picture keeps you focused and often saves duplicate effort.

3. Record the front panel indications before changing anything. This is an important part of fact gathering

4. If you change anything, change only one thing at a time.

5. Record your results.

8. WARRANTY

This DCB product is warranted to be free of defects in materials and workmanship for two years. Data Comm for Business, Inc. will repair or replace any equipment proven to be defective within the warranty period. All warranty work is F.O.B. Champaign, IL. This warranty is exclusive of abuse, misuse, accidental damage, acts of God or consequential damages, etc. DCB liability shall not exceed the original purchase price.

All equipment returned for repair must be accompanied by a Returned Material Authorization (RMA) number. To receive an RMA number, call (217) 897-6600 between the hours of 8 AM and 5 PM central time. Equipment must be shipped prepaid to DCB and will be returned at DCB's expense.

Ship returned items to:

Data Comm for Business
2949 County Road 1000E
Dewey, IL 61840
ATTN: RMA (number)

Data Comm for Business, Inc.
PO Box 6329
Champaign, IL 61826-6329

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Fax (217) 897-1331
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