

APPENDIX A—TECHNICAL DATA

SPECIFICATIONS

Physical

Size (without mounting brackets)
Length: 10.4"
Height: 7.6"
Depth: 3.4"
Weight
 2.5 lb.

Environmental

Storage
Temperature: -50 °C to 85 °C
Humidity: 0 to 95%, non-condensing
Operating
Temperature: -40 °C to 72 °C
Humidity: 0 to 95%, non-condensing

Mounting

Shelf or backboard, includes mounting brackets

Construction

Chassis
 Fully enclosed, anodized aluminum
 Externally accessible keypad, LEDs and connectors
Electrical
 All components mounted on conformal coated, internal PCBs

Power

Voltage
Range: 9 to 36 Vdc
Consumption
Maximum: 3.0 W (with GPS option)

Isolation

Power
Minimum: 3800 Vdc from B and N terminals to chassis and inputs
Digital Inputs (20)
Minimum: 3800 Vdc to any terminal
Analog Inputs (4)
Minimum: 3800 Vdc to any terminal
Input to Adjacent Input
Digital: minimum 3800 Vdc
Analog: minimum 3200 Vdc
Ethernet Ports (2)
Minimum: 3800 Vdc to any terminal
USB Host Port
Minimum: 3800 Vdc to any terminal

Alarms

Quantity: 20 total, appropriate for crossing applications, user-assigned
Types: Set, Cleared and periodic Health Check

Alarms (continued)

Definitions
 User-assigned inputs, input states and durations qualify each Alarm
Transmission
 Sent to message processing server via Ethernet Port 1 or 2 as assigned
Operating Modes
Automatic: messages sent via VPN or LAN/WAN using DNS name resolution
Maintainer Mode: disables Alarm transmission while crossing is being tested or repaired
Validation Time
 As defined by Alarm Configuration Table, 0 to 99,999 seconds

Capacities

Inputs
Digital: 20, all optically isolated
Analog: 4, voltage or current (optional)
Virtual: 16, user-assigned
Timer: 16, user-assigned
Alarm: 20 user-assigned
System: various for reporting power on/off, abnormal temp., clock sync, train speed, etc.
Output
Relay: form C, rated for 2 A at 24 Vdc or 1 A at 125 Vac, maximum switching capacity of 125 VA or 60 W, service life 1 million electrical (typical)

Event Storage
Standard: 310,888 records
Maximum: 3,012,928 records

OLED Panel
Characters: 80 total on 4 lines
Viewing Area: 2.8" by .8"

Front Panel Keypad
Quantity: 20 keys

Physical Inputs

Input Impedance
Digital: minimum 10 KOhms, optically isolated
Analog: minimum 10 MOhms

Range
Digital Input - On: 9 to 36 Vdc
Digital Input - Off: 0 to 1 Vdc
Analog DC Voltage: 3 scales, ± 25.5 Vdc, +51.1 Vdc, ± 255 Vdc
Analog AC Voltage: 2 scales, 25.5 Vac, 255 Vac
Analog Current: 2 scales, ± 25.5 Adc, 25.5 Aac

Event Validation Times
Digital: .01 to 32.767 seconds, compatible with fixed rate flashing circuits
Analog: fast and slow filter settings

Analog Limit Values

Voltage
High and Low Limits: in multiples of .1 V or 1 V
Current
High and Low Limits: in multiples of .1 A

Analog Input Accuracy

Typical Voltage: $\pm .15$ V or ± 1.5 V
Typical Current: $\pm .2$ A

Virtual Inputs

Definitions
 Any logical association shared by 1 to 4 variables (i.e., Digital, Analog, Alarm or other Virtual Inputs)
 Assigned by defining the state of the Virtual Input for each combination of variable states

Alarm Usage

Can be used to Set or Clear an Alarm as defined within the Alarm Configuration Table

Recording Usage

Creates standard Event Records

Relay Output Control

Can be used to control the state of the relay

Timer Inputs

Programming
 Any input can be assigned as a trigger or terminating source
 On or Off events can be assigned as a trigger or terminating source

Limit Values

High and Low Limits: in multiples of .1 seconds
Range: 0.0 to 999.9 seconds

Reporting

Measured time is reported in each Timer Input Event Record
 Violation of Limit Values are also reported

Temperature Sensing

Usage: measures and reports internal temperature of recorder
High and Low Limits: -67 °F to 257 °F

Train Speed Monitor

Operation
 Reports excessive train speed
 Logs standard Event Record

Sensors

Digital Inputs: 2 required
Distance: 36" to 99" or 8" to 5280"

Limit Values

5 to 99 mph or 5 to 180 mph

A

Memory

Type

Non-volatile, Event Records and Setup Database are stored in flash memory chip

Newest data over-writes oldest data, 129th day over-writes first day

Storage Longevity

Infinite with power off

Rated for 100,000 write operations (with wear leveling)

Ports

Ethernet (2)

Usage: Provides remote or local access via browser-based interface

Browser Support: Chrome, Firefox, Edge, IE

Port Interaction: both ports operate concurrently and independently

Data Transfer Rates: 3,600 Event Records per second, 2.1 Mbps typical

Concurrent Sessions: users 4, Modbus unlimited

Assignable Addresses: IP, gateway, sub-net mask and DNS server (all dual)

Time Server Address: user-assigned

Type: 10/100 Base-T

Protocols: HTTP Get, Modbus, TCP/IP, SNMP-Unicast and -Multicast

USB Host

Compatible with any FAT-32 formatted flash drive

Can create a text file of Event Record data from any time span

Can be used to update software and save and restore Setup Database

GPS Receiver (optional)

Used to provide precise real-time clock control, latitude and longitude coordinates

Console

Factory use only (no user-access)

Connectors

Power

Detachable, tension clamp, 4-position, 12 to 22 AWG

Dual B and N terminals

Digital Inputs (20)

Detachable, tension clamp, 10-position, 12 to 22 AWG

Analog Inputs (4)

Detachable, tension clamp, 8-position, 12 to 22 AWG

Connectors (continued)

Relay Output (1)

Detachable, tension clamp, 3-position, 12 to 22 AWG

Normally open, normally closed and common terminals

Ethernet Port (2)

RJ-45 female

USB Host Port

USB Type A female

GPS Receiver (optional)

MCX female

Console Port

DE-9 male (no user-access)

Indicators

Display Panel

OLED design provides enhanced visibility and temperature stability

Displays numerous command menus for configuring the recorder and retrieving data

Front Panel LEDs (4)

Power: green, flashes while running

Active Alarm: red, illuminates when one or more Alarms are active

Message Sent: green, illuminates for 5 seconds when message is sent

Login: green, illuminates when one or more users are logged in

Ethernet Port LEDs (2 pair)

Green: link established

Yellow: data activity

Keypad

Located on front panel, below OLED panel

Keys: 0-9, Browse, Alpha, Setup, Esc/Maintainer Mode, Enter, Save/., left, right, up, down/-

Internal Clock

Accuracy

Typical: ±8 seconds per month (3ppm) when not synchronized

Volatility: maintains accuracy for minimum of 30 days with loss of power

Resolution: .001 seconds for all Event Records

Sync

SNTP-Unicast: via primary or secondary time servers, once per day at 00:05:00

SNTP-Multicast: per time server schedule

GPS: once per hour at 00:00 (with GPS option)

Internal Clock (continued)

Operation

Time Zones: selectable from 7 different North American settings

Daylight Saving Time: enable or disable automatic adjustment

Leap Year: automatically adjusted

GPS Receiver (optional)

Includes PCB and external antenna

PCB

Plugs into mating connector inside recorder

Antenna

Size: diameter 1.8", height .6" (not including mounting screw)

Weight: 2 oz. (less cable)

Operating Temperature: -40 °C to 85 °C

Mounting: bulkhead mountable to any surface less than 3/8" thick

Location: unobstructed skyward orientation, for use outdoors

Password Protection

Administrative Level

Access: unrestricted to all functions

Length: 8 characters

Restricted Level

Access: modifications restricted to site-specific parameters of Setup Database, unrestricted viewing of all data and Setup Database parameters

Length: 8 characters

Passcode

Access: unrestricted to most functions

Length: 8 digits

MICRO-AIDE reserves the right to make changes, at its sole discretion, to any specification listed herein.

TRANSFER RATES

Table 11 on page 104 lists typical bit transfer rates for each of the CWR-24B's user-accessible ports. In each case the same 20,000 Event Records were either dumped to a PC file or saved directly to a flash drive. The single-line record format was selected. The reports did not include a Digital Signature. The times listed are normalized relative to 1,000 Event Records.

Port	Time to transfer 1,000 Event Records (sec)	Actual transfer rate (bps)
USB Host	.16	n/a
Ethernet Ports	.28	2.1 Mbps

Table 11: Bit Transfer Rates by Port