

User's Manual

for

DataTracker - Model CD1201

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Preliminary Draft

Manufactured By:



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Product Description:

Caution: *Please read Important Information to the User later in this manual.*

CX2's model CD-1201, "DataTracker" is a subscriber end-unit radio transceiver designed specifically for communication within the CX2 wireless data network.

The CX2 network provides point-to-multipoint, two-way, over-the-air data communications between a DataTracker and the single CX2 base station to which it is registered. In the CX2 network, over-the-air data communication is managed using a proprietary version of slotted-aloha, half-duplex, packet protocol. The DataTracker is not capable of direct RF communications with other subscriber end-units.

The CD-1201 transceiver can operate in half-duplex mode on any of the 200, 5 kHz spaced channels specified by the FCC in the 220 to 222 MHz band.

The CX2 Base-Station operates in full-duplex mode, with the Base Station transmitter always on-the-air. A transmission from a DataTracker to the Base Station occurs in synchronous, burst mode within specific time-slots as directed by the base station. The DataTracker must be receiving and locked to the base station before it can transmit.

An annotated photograph of the CD-1201 DataTracker is shown below as *Figure 1*. Detailed specifications for the CD-1201 are included in a later section of this document.

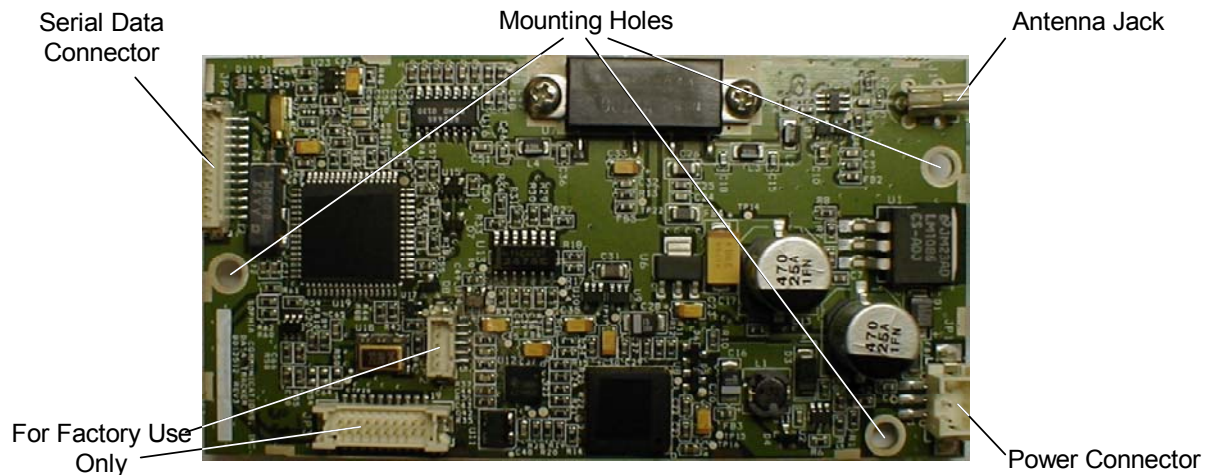


Figure 1: Top View of the DataTracker Model CD-1202

Installation: Mounting and Interconnection (Refer to Figure 1):

Caution: Do not attach wiring or components to any points other than the specific connectors described below.

Mounting: As shown in the figure there are three 0.15” diameter mounting holes. The DataTracker board should be mounted on ¼” or higher metal or plastic standoffs using #4, #5 or #6 machine screws or studs. Use care to insure that any metal standoffs, screw heads, nuts or washers used to mount the DataTracker do not short to adjacent components or board traces that are not a part of the ground circuit on the PC board.

Antenna Connector: The female coaxial RF antenna jack (Taiko-Denki type: TMP-K01X-A1) is shown in the upper right. The mating female connector is the Taiko-Denki type: TMP-K01X-A1). A suitable ¼-wave or ½-wave vertically polarized 50-Ohm antenna and feeder must be connected to this point before the radio is powered on.

Caution: The antenna radiating element should be mounted such that no person comes within 20 cm. (8 inches) of the antenna during normal operation. Example: Center of car roof.

While the DataTracker is not overly sensitive to high VSWR conditions at the antenna port, prolonged transmissions without a matching 50-ohm resistive load could damage the transmitter components.

Power Connector: The proprietary 3-pin power connector is shown in lower right. A mating 3-pin plug with 6” power leads is provided by CX2 with each DataTracker. The three power leads should be connected as follows:

Pin 1, Black Lead:	- VDC and chassis ground
Pin 2, Yellow Lead:	Device Enable, connect to +12 VDC to Enable
Pin 3, Red Lead:	+ 12 VDC (nominal)

Serial Data Connector: The proprietary, 12-pin data connector is shown to the upper left. A mating 12-pin plug with 6” leads is provided by CX2 with each DataTracker. The data leads should be connected as follows:

Pin 1	Serial Port A, TX Data
Pin 2	Serial Port A, RX Data
Pin 3	Serial Port B, TX Data
Pin 4	Serial Port B, RX Data
Pin 5	Reserved for future use
Pin 6	Reserved for future use
Pin 7	Reserved for future use
Pin 8	Reserved for future use
Pin 9	Reserved for future use
Pin 10	Reserved for future use
Pin 11	Reserved for future use
Pin 12	Serial Data Common and Chassis Ground

Other: The two jacks shown to the bottom left in Figure 1 are for factory use only.

Operation:

Text for this section TBD.

Detailed Specifications

General:

Model:	CD-1201
Type:	220 MHz, Synthesized, Two-Way, Half Duplex, Split-Frequency, 5 kHz Channels Using a Proprietary Air-Link Protocol Operating in Synchronous Burst Mode
Intended Payload:	Balanced, Two-Way, Store and Forward Data Messages in Packets Up to 2000 Bytes in Length
Antenna Jack:	50-Ohm Coaxial
Compliance:	FCC Parts 2, 15, 90 FCC ID QKS-CD1201

Digital Configuration:

Processors:	100 MIPS DSP and Separate 8-bit RISC Micro Controller with 128KB Flash and 4KB SRAM
Data Interface:	Two TTL Level Proprietary Serial Ports

Transmitter:

Type:	DSP Modulator with Linear Up-Converter and Amplifier
Frequency Range:	221.0025 – 221.9975 MHz. (All 200 FCC Channels)
Channel Spacing:	5 kHz
Frequency Stability:	0.1 ppm, -30 to +60 Degrees C when locked to the base station, otherwise 1.5 ppm. -30 to +60 Degrees C. Note: During normal operation the Transmitter cannot be keyed unless it is locked to the base station.
Modulation Type:	QPSK
Occupied Bandwidth:	4 kHz (Meets the FCC Mask for 5 kHz Channel Spacing, as per Part 90, Section 90.210(f))
Output Impedance:	50 Ohms, Coaxial
RF Power Output:	1 Watt PEP

Transmit Duty Cycle: 30%, Maximum
Spurious Output: -55 dB. Complies with 47CFR 90.210(F)
Transmitter Keying: Automatic, Processor Controlled

Receiver:

Type: Linear LNA and Down-Converter with DSP Demodulator
Frequency Range: 220.0025 – 220.9975 MHz. (All 200 FCC Channels)
Channel Spacing: 5 kHz
Frequency Stability: 0.1 ppm, -30 to +60 Degrees C when locked to the base station, otherwise 1.5 ppm. -30 to +60 Degrees C.
Input Impedance: 50 Ohms, Coaxial
Sensitivity: 12 dB SINAD @ -118 dBm
Intermodulation: -60 dB
Selectivity: -40 dB Typical at Adjacent Channel
Bandwidth: 4 kHz

Primary Power:

Voltage: 13.8 VDC (Nominal), Negative Ground (Operable from 11 to 16.8 VDC)
Current (Typical): Receive and Standby 110 mA; Transmit 2.0A @ 13.8 VDC
Connector: Proprietary, 3 Pins
Circuit Protection: Internal Reverse Voltage Protection

Physical & Environmental:

Operating Temperature Range: -30 to +60 Degrees C. for full specification
-40 to +80 Degrees C. with 6 dB Degradation
Relative Humidity: 0 to 95% @ 50 Degrees C.
Dimensions (LWH): 4.25" x 2.25" x 0.9" (108mm x 58 mm x 23 mm)
Weight: 5 oz. (140 g)

Important Information to the User

Operational Authority:

Caution: This radio transceiver is authorized to transmit only in conjunction with a licensed base station. The unit will not transmit until it is correctly receiving the control protocol of the CX2 Technologies base station. It will cease transmission if it subsequently loses reception of the base station.

Caution: In order to maintain compliance with FCC requirements and retain the authority to operate this equipment, the user must not make any changes or modifications to the equipment unless they have been expressly approved by CX2 Technologies beforehand.

Radiation Exposure:

Caution: The antenna radiating element should be mounted such that no person comes within 20 cm. (8 inches) of the antenna during normal operation. Example: Center of car roof.

Interference to Broadcast or Other Receivers:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.