

# UART interface board

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The UART interface board used for CCR (Command Controlled Radio unit)\*, which is designed to be equipped with Circuit Design's RF module, is an on-board type interface board that enables external control of the RF module and radio communication via a UART interface. Since this board is an on-board type, the user can build their own original radio device easily simply by mounting this board onto their own board designed using a general-purpose micro controller (with UART interface). The simple command system for module control and communication makes the creation of software easy. The conceptual diagram is shown in Fig.1.

In combination with an optional UART-232C board, an RS-232C connection to a PC is available. For UART connection cables, TX, RX, RTS and CTS can be used. If the data stream is short enough, it can be processed using only TX and RX.

The UART interface board is designed based on a high frequency circuit board design to ensure stable operation of the RF module mounted on the board.

\*CCR is a generic term for Circuit Design's UART interface radio products equipped with Circuit Design's RF modules.

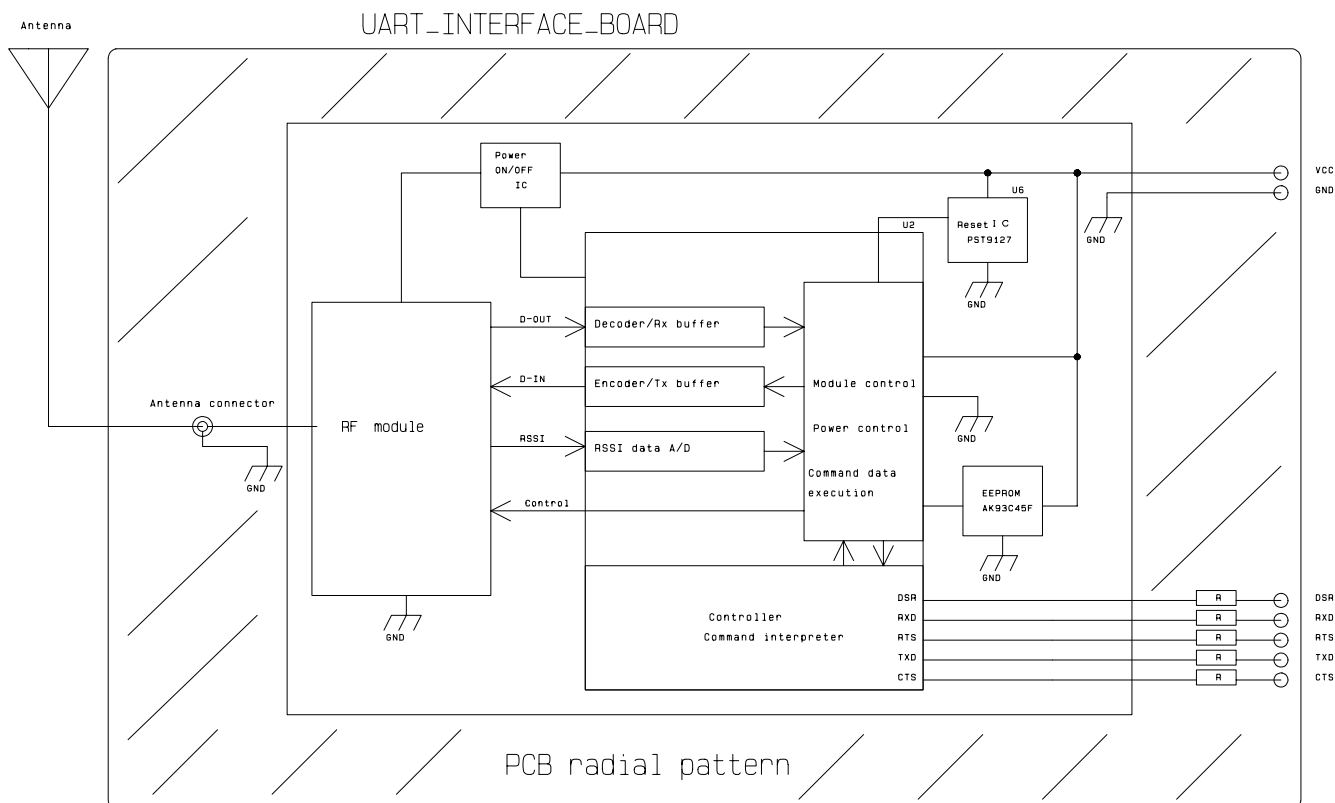


Figure 1

For input to UART, there are three input modes, Command, Text and Binary:

### 1 Command mode

This is a basic input mode for controlling radio communication with the user's software. Data input/output and the controls required for RF communication (channel change, field strength reading, baud rate change, etc) can be performed. Each command consists of 2 bytes. Responses to the input commands are returned without fail, making it easy to confirm correct operation.

Example 1 Transmission of 5-byte data "12345"

User input command	@DT 0512345CrLf
Response from UART board	*DT= 05CrLf
Output from RX UART board	*DR= 0512345 CrLf

Example 2 Channel setting of the RF module to 15 ch

User input command	@CH 15CrLf
Response from UART board	*CH=15CrL

### 2 Text mode

This mode is used to verify operation using RS-232C communication software (Hyperterminal etc) on a PC. Text data can be input and output directly.

### 3 Binary mode

This mode is used to verify operation using RS-232C communication software (Hyperterminal etc) on a PC. Binary data (file data) can be input and output directly.

### **Features**

- Equipped with a UART interface, this board is available for various applications.
- The on-board type allows mounting directly on a user's board having a general-purpose micro controller (with UART interface).
- The design, based on a high frequency circuit board design, reduces the user's workload when designing their own radio devices using RF modules.
- The RF module for mounting on the board can be selected from Circuit Design's RF module lineup<sup>\*1</sup>. The interface with external circuits is common to all modules.
- Various communication combinations can be created easily (between the user's original radio devices, a PC to the user's original device, PC to PC, etc).
- The simple command system enables easy radio data communication with simple control of the RF module.
- Even if a user's system is not completed, a performance evaluation of the RF part can be performed using a PC alternatively in the early stages of development.

### **Applications**

- Serial data transmission (RS232C communication etc.)
- Telemetry (Remote sensing data collection, etc.)
- Telecontrol (Actuator control, etc.)

### **Main specifications**

#### **Serial I/F part**

<b>Parameter</b>	<b>Specification</b>
Communication format	Asynchronous UART
Data rate	1200/2400/4800/9600/19200/38400/57600 bps <sup>*2</sup>
Flow control	RS/CS Hardware control
TX/RX buffer	TX 255 B / RX 255 B

#### **Miscellaneous**

<b>Parameter</b>	<b>Specification</b>
Switch	Reset switch for initialization
LED	POWER, TX and RX
Board dimensions	53 x 52 mm
Operating voltage	3.0 V - 5.0 V DC

\*1: Some RF modules cannot be used with the UART interface board. For detailed information, contact Circuit Design, Inc.

\*2: For serial interface communication speed, it is recommended to use more than twice the data speed of radio communication.

## Command list

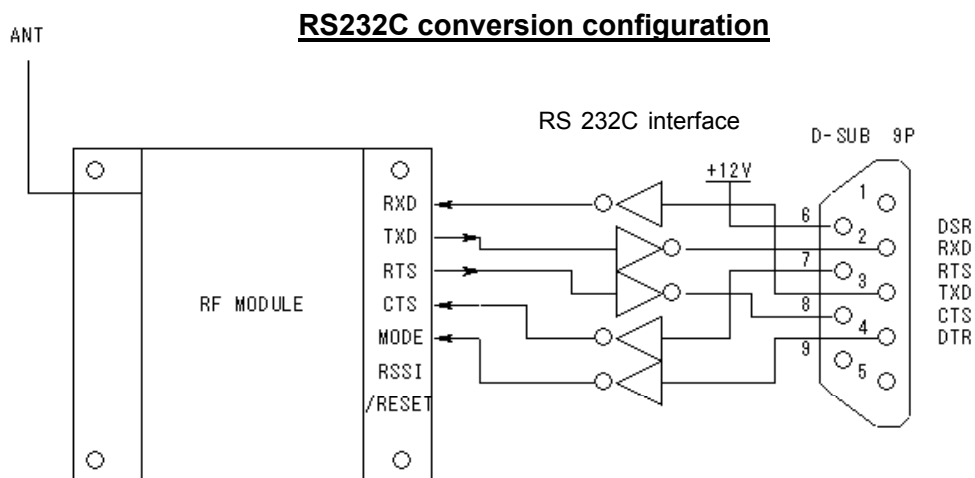
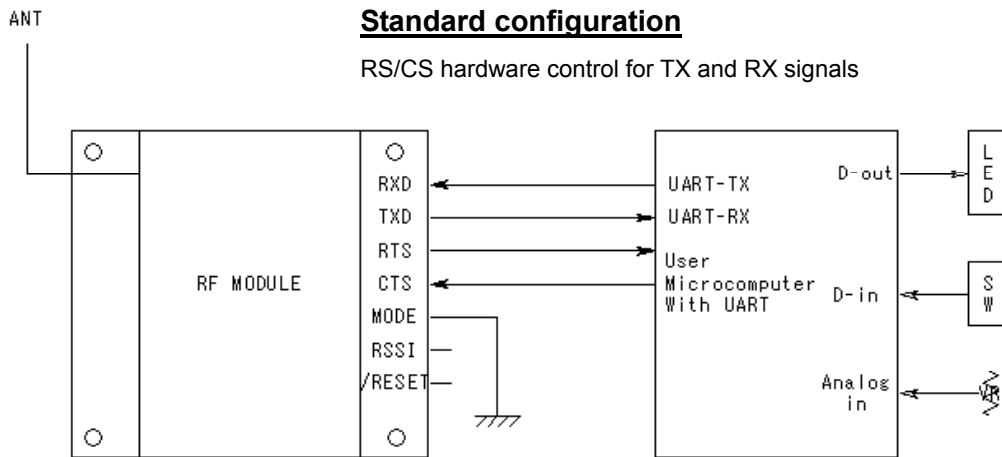
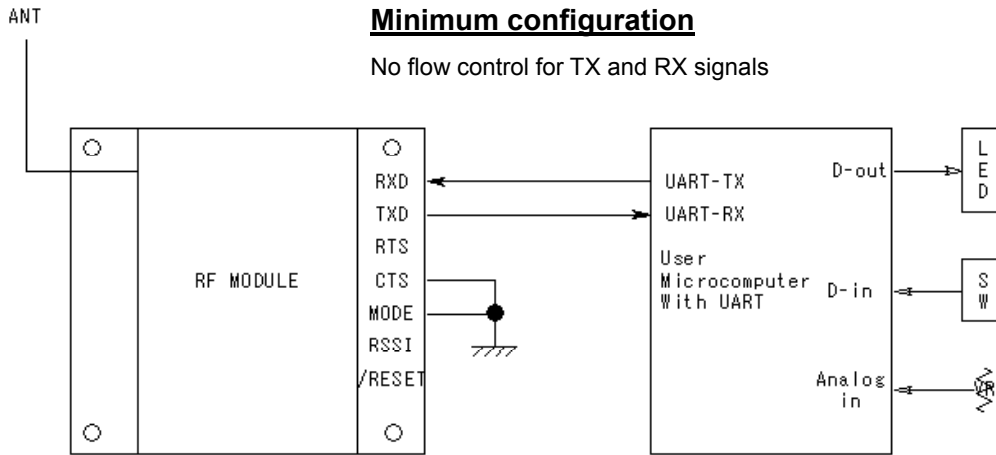
### Basic commands

@DT	inputs transmission data (1 to 255 bytes)
*DR	outputs reception data (1 to 255 bytes)
@CH	changes frequency channels
@RS	reads the RSSI level for the set-up channel
@CA	reads the carrier sensing level for the set-up channel
@MD	changes operation mode (default: command mode (CD))
@BR	changes RS232C baud rate (default: 19,200 bps)
@PB	changes RS232C parity (default: Non-parity)
@SB	changes RS232C stop bit (default: 1)

### Detailed setting commands

@TC	limits input time in the command mode (default: 00H (no limit for input time))
@TB	changes no-input time in the binary mode (default:: 10H (0.512 sec))
@IT	changes transmission ID (default: 0000)
@IR	changes reception ID (default: 0000)
@IS	changes system ID
@CT	turns on/off continuous transmission (default :off)
@EM	switches the error display that is returned at command input; Code display/Text display (default: code display)
@VR	reads the ROM version
/W	stores the setting values into an EEPROM

**Application connections**



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