

FRH-SDO6TU

Theory of Operation

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Radio Control Equipment Group

Futaba Corporation

-- Outline

FRH-SDO6TU is a 2.4GHz radio modem using modern digital modulation technology. .

Data Terminal Equipment (DTE) interface is RS-232C(TTL), best fit for industrial use data communication. Communication speed is from 300bps to 38400bps. Two basic communication mode over the radio link, data transparency mode and packet transmission mode, are available. The data transparency mode acts just like two terminal being connected by wire. No needs to be aware of the existence of the radio link or radio modem. The packet transmission mode uses a command to send a message to specified destination modem. The command can control the packet transmission operation, therefore, N to M terminal multiple communication can be achievable.

The system has 24 individual channels to be able to operate among different communication systems in same area without effecting each other. Each channel can be operate at a group mode. Pair of modem communicate on a channel where channel condition is good. Once conditions goes bad, the modem searches the frequency in the group where condition is good. Each channel allocates in the space of 2MHz.

-- Applications

Main application of the modem is industrial use data transferring such as Automated Guided Vehicle (AGV), item picking cart system in a warehouse, between CAD terminal and Numeric Controlled (NC) tooling, machine, production line processing schedule and result information etc..

-- Transmission Power

The modem peak output power is within the requirements of section 15.249 of the FCC Rules. The modem is already approved under other standard, e.g. RCR-STD33 (Japan).

--System circuitry operation

(The system diagram figure is attached)

1 Transmission Path

Modulation data generated from control micro processor is fed to modulation processing LSI. This digital signal will be transmission radio signal at 1st IF frequency by modulate the local oscillator, in the FSK Modulation directly by the digital signal. The transmission signal goes through the buffer amplifier and transmission power control circuit and is converted at frequency mixer section with 1st local signal to 2.4GHz. This 2.4GHz signal is amplified and finally radiated from the antenna.

2 Receive Path

Receive path consist of TX/RX common-use antenna circuit and reception-use antenna circuit. These two antenna circuits are configured to be able to use the diversity reception function. Received signal, good reception condition is selected by the diversity function, is fed to low noise amplifier. The amplified signal is converted into 1st IF. The 1st IF signal is again filtered and amplified and fed into FM demodulation IC which operates both 2nd IF amplifier operation and demodulation operation. In the demodulation IC, after the signal is amplified, the signal is lead to the limiting amplifier and is demodulated by the quadrature FM demodulation circuit.

3 Control

The microprocessor handles all of the operation include RF control and serial (RS232C) control. Especially, in the RF circuit control, the processing of the microprocessor is mainly PLL frequency setting and transmission and receive data generation and control.

FRH-SDO6TU
TWO-WAY WIRELESS COMMUNICATION SYSTEM
Radio Control Equipment Dept., FUTABA Corp.
FEATURES

- 1 The operating distance is approximately 200 feet indoors and 1000 feet outdoors(line of sight with no obstructions)
- 2 The transmitter operates in the 2.4GHz frequency band, and uses modern digital modulation technology. This technology is suitable for withstanding noise interference or multi-path fading channels.
- 3 The FRH-SDO6TU is approved under RCR STD-33, the Japanese regulation rules.
- 4 The Time-divided half duplex packet communication enables full duplex two-way communication between two terminals.
- 5 The FRH-SDO6TU has 24 individual channels . Up to 24channels can be used in one area.
- 6 The software command function enables the N to M terminal communication application.
- 7 External interface conforming to RS-232C(TTL level interface), can interface PC directly. Supports DTE speed up to 38400bps.
- 8 Small sized 3.3x2x0.5inches
- 9 Wide range of power supply from 3.3V to 10V DC.

SPECIFICATIONS

1 Radio Characteristics

Regulation	RCR-STD33 (Japanese version) FCC Rules Part 15.249 (U.S. version)
Radio Communication	Half Duplex
Frequency Range	2472MHz - 2595MHz (Japanese version)
Channel	24
Frequency control	Crystal controlled frequency synthesizer
Antenna configuration	RX antenna diversity
Operating Distance	200 feet indoors 1000 feet outdoors: Line of sight, no obstructions

2 Radio communication control

Error checking	CRC-CCITT
Error handling	ARQ (Automatic Resend Query)
Multi access function	Connect at good channel in channel group

3 Data terminal interface

Data interface	RS 232 C (TTL Serial)
Physical interface	Flat cable connector
Communication	Half Duplex / Full Duplex
Synchronization	Asynchronous
Data buffers	TX, RX
Baud rate	up to 38400 bps
Data flow control	XON/XOFF, RTS/CTS
Data length	7 or 8 bit
Stop bit	1 or 2
Parity bit	Odd, Even or None

4 General

Power source	DC 3.3 - 10V)
Operating Temperature	-100°C to +50°C

Storage Temperature	-2°C to +60°C
Humidity	Up to 90% RH, no-condensing
Indicator	2 color LED
Control connector	Monitor output, Reset input
Case	Black anodized aluminum
Dimensions	3.3 x 2 x 0.5 inches excluding antenna
Weight	Approximately 3.5oz, 100g