Digital wireless RS-232C

Data Sheet Rev.1

User's manual

PRODUCT PREVIEW

This Products are suitable for WEEE*1 (Waste Electrical and Electronic Equipment) ／RoHS*2 (Restriction of the use of certain Hazardous Substances in electrical and electronic equipment)

2.4Ghz Digital Wireless RS-232C are intelligent anti jamming, low-power high-sensitivity 2.4Ghz RS-232C from DAJAETECH, based on the innovative DAJAE TECH WMAC mixed-signal hardware platform.

FEATURES

- **2.4Ghz Pure Digital 16bit ID RS-232C Streaming**
- **AFH38 Channel 2Group with 5bit ID**
- **On Air 2Mbps Data speed**
- **High gain Internal Antenna**
- **RF controller power consumption Tx 15mA Rx 18mA**
- **RS-232C standards**
- **RS-232C Latency 6.5ms**
- **Built in free voltage Ballast**
- **Automatic forward error correction**
- **RS-232C to DAJAE unique Protocol**
- **Up to 50m without repeater (2.0m DJT-W01)**

APPLICATION

This digital wireless system is designed for plug and play High quality lossless digital RS-232C full duplex for replacement Wired USITT RS-232C Asynchronous Serial Data Transmission Standard for any RS-232C equipment wire substitution for wireless.

DESCRIPTION

The DJT-W01 RF digital wireless RS-232C tranceiver are wireless RS-232C wire cable substitution system.
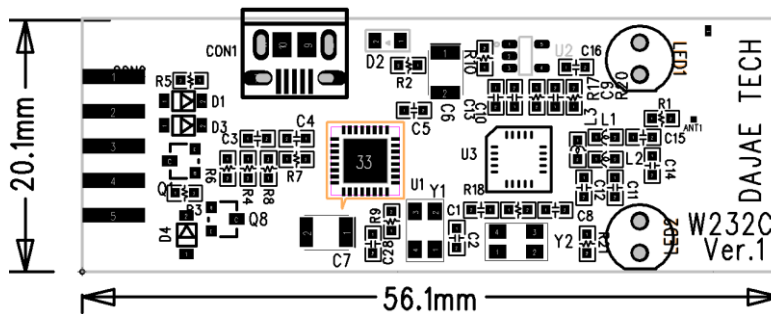
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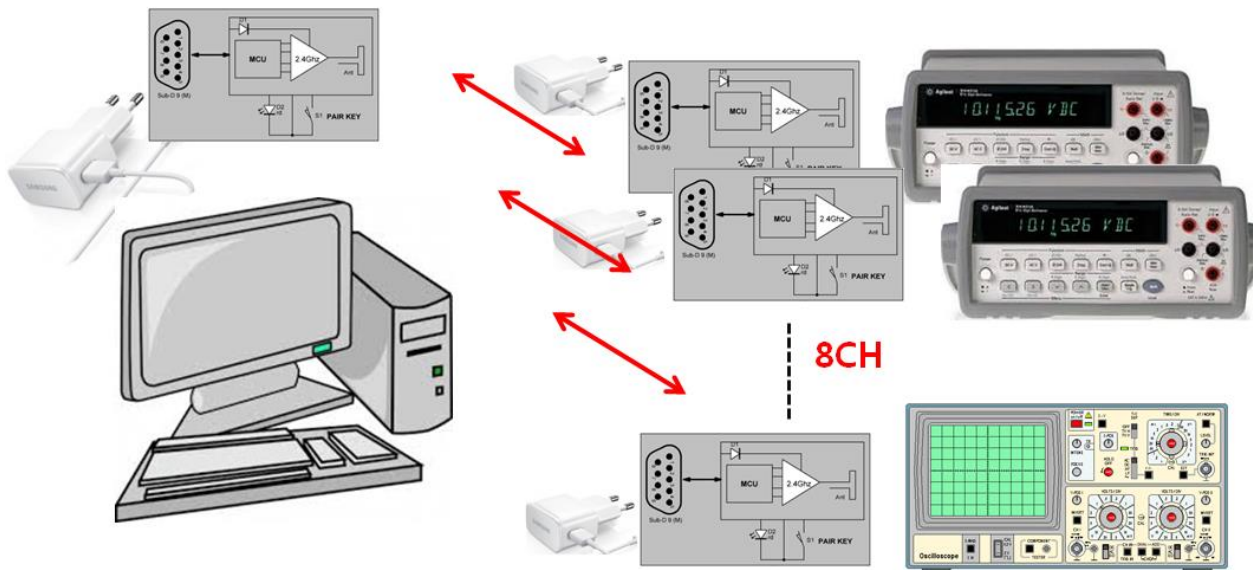
2.4Ghz Digital Wireless RS-232C Diagram
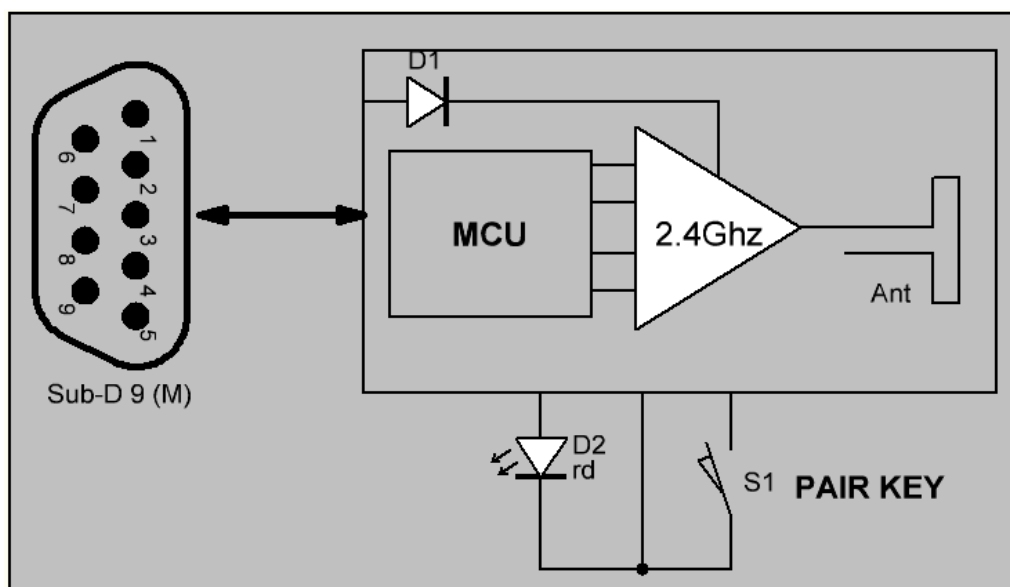
NOTE : The products, their specifications, service and other information appearing in this Publication are subjected to change by Dajae tech without notice.

Block Diagram Specification

Digital wireless RS-232C PCB TOP VIEW

System Block Diagram

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DB9 TERMINAL FUNCTIONS

TERMINAL		DESCRIPTION	
NAME	PIN NO.		
DCD	1	Data Carrier Detect	INPUT
RXD	2	Receive Data	INPUT
TXD	3	Transmit Data	OUTPUT
DTR	4	Data terminal ready	OUTPUT
GND	5	Ground	-
DSR	6	Data Set Ready	INPUT
RTS	7	Request To Send	OUTPUT
CTS	8	Clear To Send	INPUT
RI	9	Ring Indicator	INPUT

DC POWER TERMINAL FUNCTIONS

TERMINAL		DESCRIPTION
NAME	PIN NO.	
DC INPUT	1	DC 5V IN
	2	
	3	
	4	
GND	5	GND
SGND	10	Shilded GND

Absolute Maximum Ratings [1]

Over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	MAX	UNIT
TX VCC	Supply voltage range	VCC	+2.7	+3.5	V
RX VCC	AC Input voltage		+2.7	+3.5	V
T_A	Operating free-air temperature range		-20	85	°C
T_{STG}	Storage temperature range		-65	150	°C
T_{IH}	Input High Voltage (User TX DATA terminal)	Normal input	0.7VDD	VDD	V

(1) Stresses beyond those listed under absolute maximum rating may cause permanent damage to the device. These are stress ratings only, and
   functional operation of the device at these or any other conditions beyond those indicated under recommended operating conditions is not implied.
   Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

Recommended Operating Conditions

PARAMETER		TEST CONDITIONS	MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage range	DC 4~7	4		7	V
T_A	Operating free-air temperature range		-20		+80	°C

This transceiver can be damaged by over 4KV ESD. DJT-W01 recommends that all integrated circuits be handled with appropriate precautions.
Failure to observe proper handling and installation procedures can cause damage.

Electrical Characteristics

Vcc=3.3V, T_A=25°C, RF frequency f_{RF}=2420MHz, +10dB (for 2420MHz), DMX512 signal frequency

Supply voltages and currents

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
AC in	AC Supply voltage	TX and RX are the same voltage	85		265	V
$I_{CC\ TX1}$	Tx mode supply current 1	No data input, TXPOW[10dBm],		15		mA
$I_{CC\ RX1}$	Rx mode supply current 1	RS-232C output, RXPOW[10dBm], R_{TX}=open		18.0		mA
$I_{CC\ RX2}$	Rx mode supply current 2	DJT-01 Rx Mode Input, [DATA on], Load=open		18.0		mA
$I_{CC\ STBY1}$	Stand-by current 1	STBY TX mode		10	15	mA
$I_{CC\ STBY2}$	Stand-by current 2	STBY RX mode		10	15	mA

RF Characteristics

	PARAMETER	Range	UNIT
	Frequency Band	2.400 to 2.4835	GHz
	Number of Channels	38 x 2Group	CH
	TX output power	+10	dBm
	Channel Spacing	2	MHz
TxD	RS-232C Data Rate	1	Mbps
	Tx / Rx ANT Impedance	50	Ω
Δf	Frequency deviation	+/-320	KHz

TX / RX EIA RS-232C Specification INTPUT MODE

PARAMETER		TEST CONDITIONS	MIN	TYP	MAX	UNIT
Driver Output Voltage Open Circuit			+-1.5		+-6	V
L/Driver Output Voltage loaded	Load impedance	Rload=54 Ω	+-1.5		+-5	V
AC Terminal	(Withstand Voltage)				1000	V/AC
Insulation R					500	MΩ
Wire range			18		26	AWG

Data Transmission Signals

Each signal that transmits in an RS-232 unbalanced data transmission system appears on the interface connector as a voltage with reference to a signal ground. For example, the transmitted data (TD) from a DTE device appears on pin 2 with respect to pin 7 (signal ground) on a DB-25 connector.
This voltage will be negative if the line is idle and alternate between that negative level and a positive level when data is sent with a magnitude of ±5 to ±15 volts. The RS-232 receiver typically operates within the voltage range of +3 to +12 and -3 to -12 volts as shown in Figure 1.**Unbalanced Line Drivers**

Balanced Line Drivers

In a balanced differential system the voltage produced by the driver appears across a pair of signal lines that transmit only one signal. Figure 2 shows a schematic symbol for a balanced line driver and the voltages that exist. A balanced line driver will produce a voltage from 2 to 6 volts across its A and B output terminals and will have a signal ground (C) connection.

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Although proper connection to the signal ground is important, it isn't used by a balanced line receiver in determining the logic state of the data line. A balanced line driver can also have an input signal called an "Enable" signal.

The purpose of this signal is to connect the driver to its output terminals, A and B. If the "Enable" signal is OFF, one can consider the driver as disconnected from the transmission line. An RS-485 driver must have the "Enable" control signal. An RS-422 driver may have this signal, but it is not always required. The disconnected or "disabled" condition of the line driver usually is referred to as the "tristate1" condition of the driver.
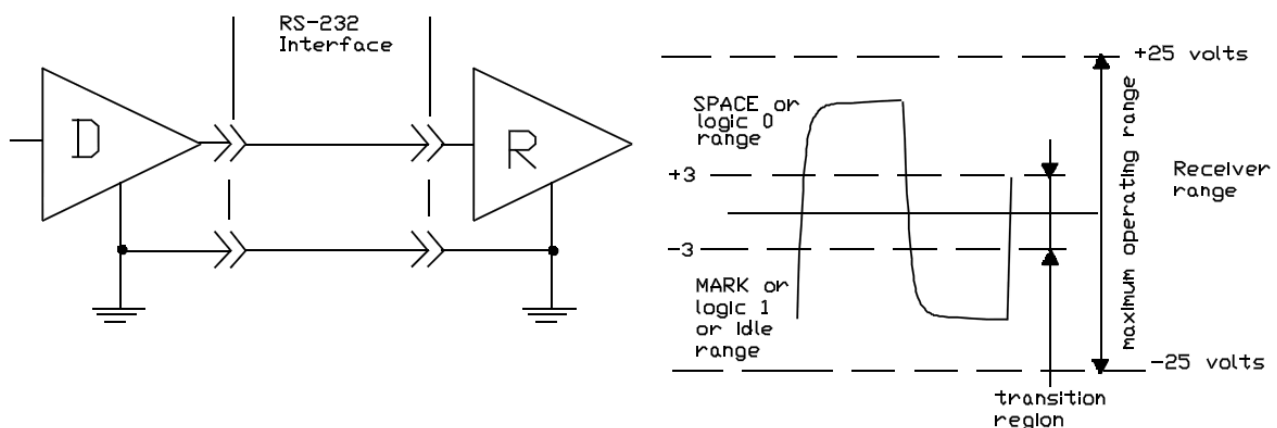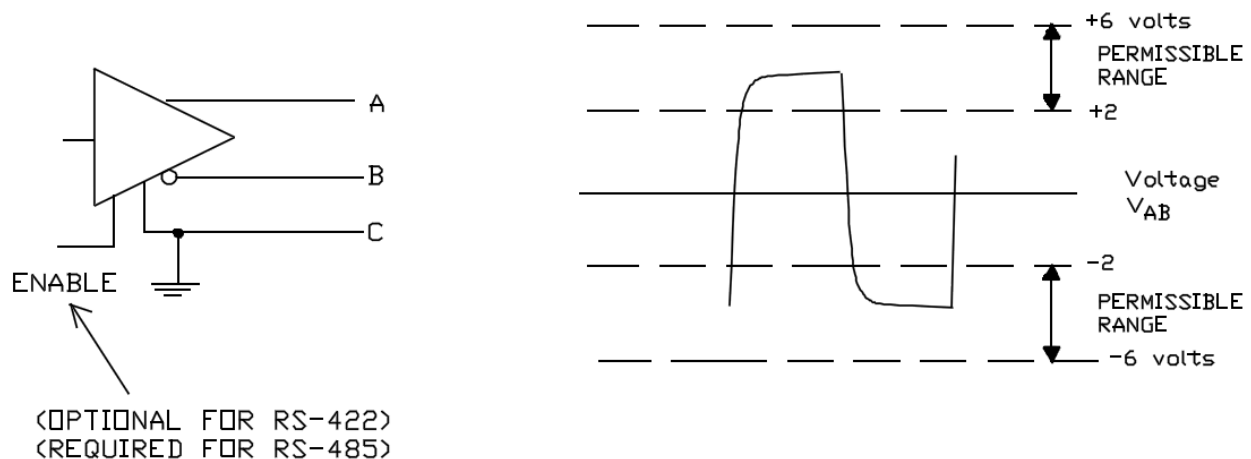
Figure.1 RS-232 Interface Circuit

Figure. 2 Blanced Diffrential Output Line

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EIA Standard RS-232c Data Transmission

There are two types of devices, Data Terminal Equipment (DTE) and Data Communications Equipment (DCE). EIA-232 defines a set of signals for connecting DTE equipment to DCE equipment. The signals are wired straight through for DTE-DCE. DTE refers to terminals, printers and computers that are at the end of the data chain. These devices display information in ways humans can read. DCE refers to Modems, CSUs/DSUs and similar equipment that connect serial cables to telecommunications or phone lines. Straight-through cables connect computers or terminals to modems. Null modem cables connect two computers together, eliminating the need for modems. Null modem cables should cross all the signals over in a prescribed manner, however many commercially made "Null modem" cables do not follow the prescribed standard fully or correctly. The EIA-232 standard includes one transmit wire, one receive wire and a single reference ground for transmit, receive and all hardware control signals. It is used for inexpensive, relatively slower communications for short distances. Other characteristics:

- Data rates of up to 115K (some special chips can support faster speeds) for short distances but speed decreases with distance; practical limits are usually 9600- 38400 baud with longer cable runs ƒ
- Distances from 50-100 feet, depending on environment (or 140 feet with low capacitance cable such as CAT5) ƒ
- Can only be used for point-to-point communications

The RS 232 standard is very widely used and is probably the most widely used standard for serial data communications over distances. The RS 232 standard is often referred to by the other related standards and in particular V.24 which is the ITU / CCITT designation for the serial data communications standard. Whatever it is called, the RS 232 standard has stood the test of time, and being introduced in 1962 it has been in use for well over 54 years.

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2.4GHz ISM Band Global regulation

Region	Frequency Allocation	Output Power	Relevant Documents	Regulatory
Europe	2.400-2.4835GHz	10dBm	ERC 70-03EN 300-400	http://www.ero.dk
USA	2.400-2.4835GHz	50mV/m2	FCC 15.249	http://wireless.fcc.gov
JAPAN	2.400-2.4835GHz	10dBm	STD-T66	http://www.arib.or.jp

Adaptive Frequency Hopping (AFH Group Table)

Channel / Stand-by setting

CH	AFH Group A [MHz]	AFH Group B [MHz]
CH0	2404	2409
CH1	2430	2435
CH2	2456	2461
CH3	2406	2411
CH4	2432	2437
CH5	2458	2463
CH6	2408	2413
CH7	2434	2439
CH8	2460	2465
CH9	2410	2415
CH10	2436	2441
CH11	2462	2467
CH12	2412	2417
CH13	2438	2443
CH14	2464	2469
CH15	2414	2419
CH16	2440	2445
CH17	2466	2471
CH18	2416	2421
CH19	2442	2447
CH20	2468	2473
CH21	2418	2423
CH22	2444	2449
CH23	2470	2475
CH24	2420	2425
CH25	2446	2451
CH26	2472	2477
CH27	2422	2427
CH28	2448	2453
CH29	2474	2403
CH30	2424	2429
CH31	2450	2455
CH32	2476	2405
CH33	2426	2431
CH34	2452	2457
CH35	2478	2407
CH36	2428	2433
CH37	2454	2459

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Product are sets are two kinds of group used "each DEFAULT " value in Frequency Group A and B table.

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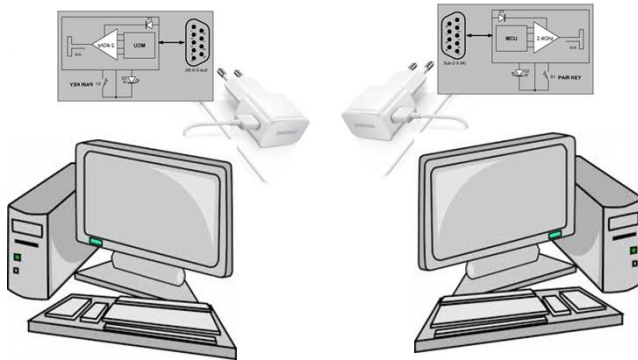
PC to PC application

Figure. 3-a DJT-W01 Connection   Figure. 3-b DJT-W01 Connection

NOTE : This application information is advisory and performance-check is required at actual DJT-W01 application circuits.

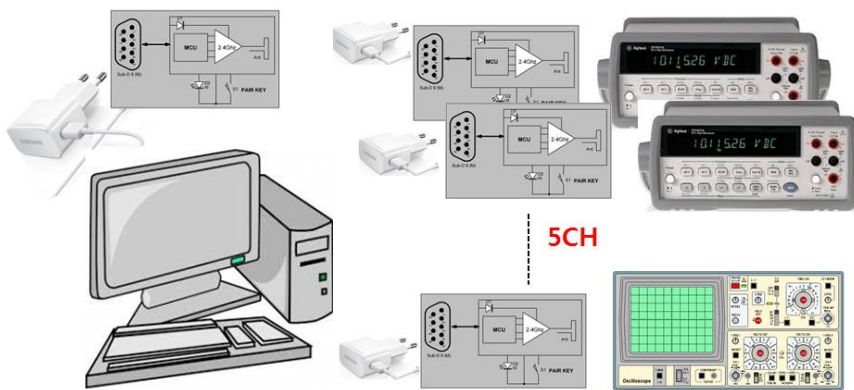## PC to Measure equipment application

Figure. 3-c PC Connection   Figure. 3-d Measure equipment connection

NOTE : 5V power can be supply from USB connector .
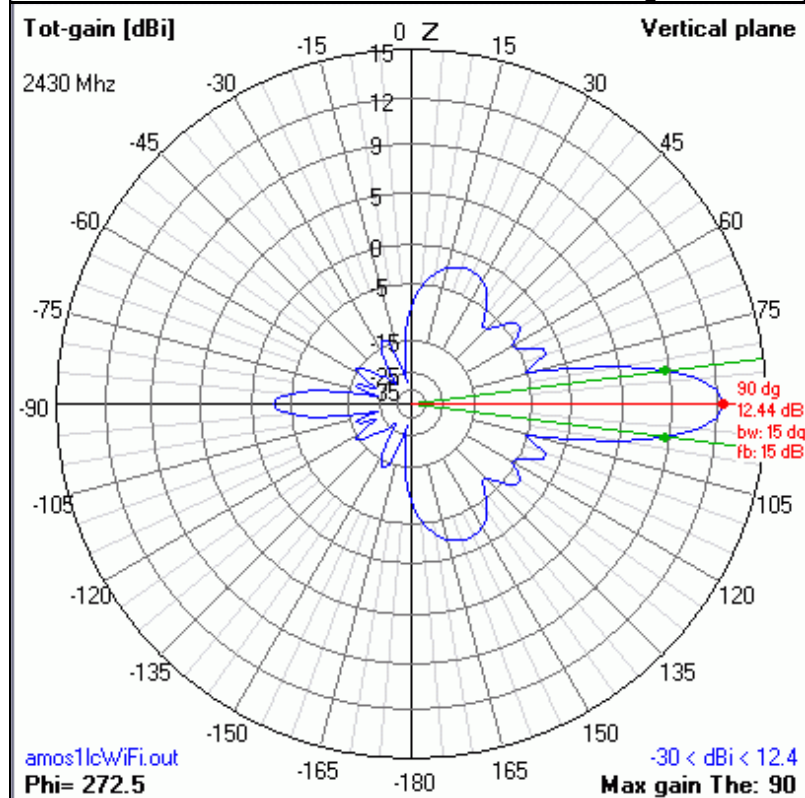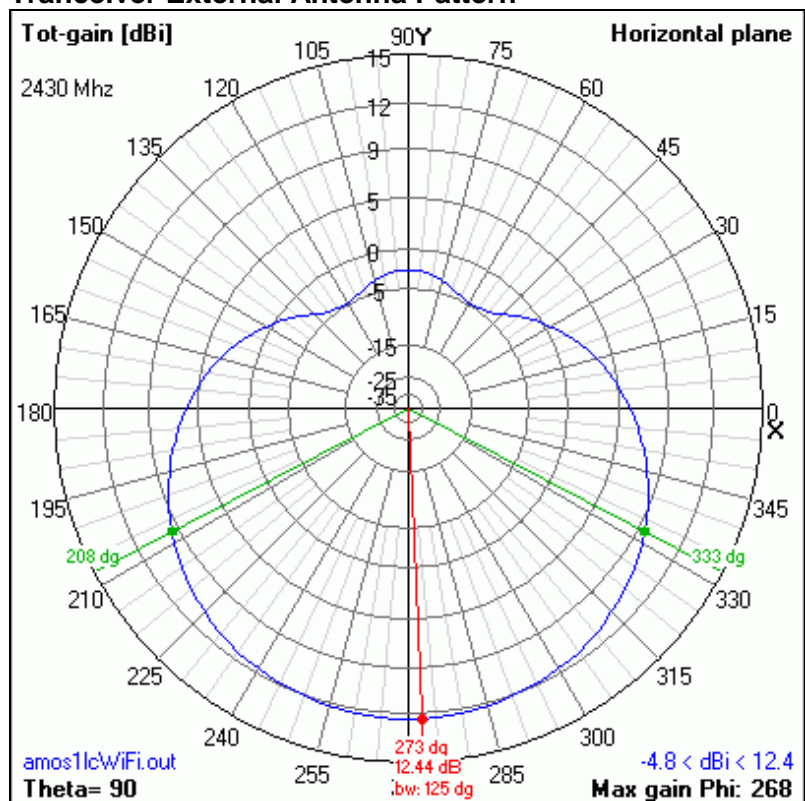
Antenna considerations

The DAJAE DJT-W01 tranceiver have internal polded dipole antenna. If requires an external reflet pannel antenna to be connected to this equipements. It is recommened reflect antenna option request . Whenever possible, connect the semi reget cable or SMA connector use and outside high gain 2.4Ghz antenna. (external antenna not recommended)

Antenna cables

RF antenna option cables are used to connect DJT-W01 between external antenna.
Recomende for LMR-195 or eqv.

PRODUCT PREVIEW

Tranceiver External Antenna Pattern

Tot-gain [dBi]   Horizontal plane
2430 Mhz
amos1lcWiFi.out
Theta= 90
-4.8 < dBi < 12.4
Max gain Phi: 268
273 dg
12.44 dB
bw: 125 dg
208 dg   333 dg

Tot-gain [dBi]   Vertical plane
2430 Mhz
amos1lcWiFi.out
Phi= 272.5
-30 < dBi < 12.4
Max gain The: 90
90 dg
12.44 dB
bw: 15 dg
fb: 15 dB

PRODUCT PREVIEW

Disclaimer

DJT-W01 belives that all information is correct and accurate at the time of issue. DJT-W01 reserves the right to make changes to this product without prior notice. Please contact for the latest available version.

DJT-W01 does not assume any responsibility for the use of the described product or convey any license under its patent rights.

DJT-W01 warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with DJT-W01 standard warranty. Testing and other quality control *techniques are used to the extent* DJT-W01 *deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.*

General recommendations

Metal enclosure should not be used. Using low profile enclosure might also affect antenna tuning.
Placing high profile components next to antenna should be avoided.
This DJT-W01 should not be placed next consumer electronics which might interfere with 2.4Ghz frequency band.

Warning

The original Equipment Manufacturer (OEM) must ensure that the OEM modular transmitter must be labelled with its own regulation ID number. This includes a clearly visible label on the outside of the final product in closure that displays the contents shown below. If the FCC ID is not visible when the equipment is installed inside another device, then the outside of the device into which the equipment is installed must also display a label referring to the enclosed equipment.

Modifications not expressly approved by this company could void the use's authority to operate this equipment (FCC section 15.21). More detailed information about CE marking requirements you can find at "DIRECTIVE 1999/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL" on 9 March 1999 at section 12.

Caution

This devices manufacured are Moisture sensitive devices for require special storage condition provide.
1. They are maintained at conditions equal to or less then 30℃/85% RH, and
2. They are solder reflowed at a peak body temperature which does not exceed 260℃
3. Devices require bake, before mounting, if
    a) Humidity Indicator card is > 10% when read at 23+-5℃
    b) Reference IPC/JEDEC J-STD-033 for bake procedure.
    c) Level and body temperature defined by IPC/JEDEC J-STD-020

PRODUCT PREVIEW

Technical Support

Technical support is provided by Dajae tech Co,.Ltd.
E-mail : jeong.osc@gmail.com
Please refer to Support Terms and Conditions for full details.
E-mail : jeong.osc@gmail.com

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