ALPHAWAVE
NARROWBAND RADIO MODEMS
WIRELESS SOLUTIONS

AW100Tx

DSP based OEM Radio Transceiver with Built-in wireless link Monitoring and Management Tools:

- Both Licensed and Unlicensed operation modes
- 8 miles Maximum Distance Range
- Data Speed over the air 38400 bps at 25 kHz and 19200 bps at 12.5 kHz
- Programmable Output Power (30 mW to 1 W)
- Advanced Forward Error Correction (FEC)
- UART serial interface with RTS/CTS flow control support
- Data Speed over the serial port 9600 to 115200 bps
- Testing, monitoring and control of the unit over   the air
- AlphaWave SuperScan® - automatic search and select for best frequency/channel

The AW100Tx radio transceiver provides a high-speed Point-to-Point and Point-to-Multipoint wireless data transfer at up to 38.4 kbps. AW100Tx supports user selectable modulation techniques (GMSK, 4FSK, DBPSK, DQPSK, D8PSK, or D16QAM), which allows the user to achieve the highest data speed for a given range (up to 8 miles). It also includes a selectable error correction, which improves the functioning of the radio modem under interference.

The unmatched features of AW100Tx include data scrambling, frequency hopping, user selectable transmit output power level, low power consumption sleep modes, autoscanning for base and plug-and-play installation for remote terminals.

AW100Tx supports two separate Application Data and Maintenance modes of single UART serial port.

The built-in software tools provide the wireless link testing, units' status and error statistics monitoring as well as units' settings change over the air. The software of the AW100Tx radio transceiver resides in a flash memory. The updating of the radio modem programs is entirely software-based. The flash memory is re-programmable through an UART interface or over the air.

AW100Tx

General Specification

- Input Voltage: 4.2 V ± 5 %
- Power Consumption (average): 3 W – transmit with 50% duty cycle (1 W TPO)
  1 W – receive mode
- Operation Temperature: -40ºC ... +60ºC
- Storage Temperature: -40ºC ... +80ºC
- Dimensions: L: 80 mm x W: 46.5 mm x H: 7.6/9.5 mm
- Weight: 41 g

Features

- DSP-Modem
- Multi-Modulation Technologies
- Zero-IF Technologies
- 138 - 174 MHz Frequency Range
- Up to 115200 bps Data Rate
- Embedded Firmware Compensation for Operation and Extremely Low at High Temperatures
- Compact Design

External Connectors:

RF Connector

J2 is Antenna Input / Output Connector: MMCX RIGHT ANGLE PCB JACK, AMPHENOL P/N 908-24100.

Main Connector (J1)

16-Lead Header Connector, ECS Corp. P/N 9616-D1-01-03

PIN #	Signal Designator	Signal name	Description	I/O	Comments
1	GND	GND	Ground	-	Signal and Chassis Ground
2	DSP UART 1	TXD	Transmitted Data	TTL Input	Serial Data Input
3	DSP UART 2	RXD	Received Data	TTL Output	Output for received serial data
4	DPORT5	DTR or DP/MP	Data Terminal Ready	TTL Input	Control line can be used as a backup method for entering Command mode: (0V) – Maintenance Mode; (3.3V) – Data Mode An internal 100K pull-up enables Data Mode if this signal is left unconnected. Maintenance Mode is also accessible by transmitting an escape sequence.
5	DPORT1	CTS	Clear to Send	TTL Output	Used to control transmit flow from the user to the radio: (0V) – Transmit buffer not full, continue transmitting (3.3V) – Transmit buffer full, stop transmitting
6	TTLI1	SLEEP	Sleeps/wakes radio Receive only	TTL Input	In sleep mode, all radio functions are disabled consuming less than 50µA. An internal 10K pull-down wakes up the radio if this signal is left unconnected. At wake up, any user programmed configuration settings are refreshed from flash memory, clearing any temporary settings that may have been set: (3.3V) – Sleep Radio; (0V) – Wake Radio As an option could be used as TTL Input Line 1.
7	DPORT3	MDM_GRN	Data Carrier Detect	TTL Output	Used by remotes to indicate that the remote has successfully acquired the signal from base station: (0V) 1 – Carrier detected (synchronized) (3.3V) 0 – No carrier detected (not synchronized)
8	DPORT4	RTS	Request to Send	TTL Input	Gates the flow of receive data from the radio to the user on or off. An internal 10K pull-down enables data receive if this signal is left unconnected. In normal operation, this signal should be asserted: (0V) – Receive data (RxD) enabled (3.3V) – Receive data (RxD) disabled
9	DPORT2	DSR	Data Set Ready	TTL Output	Used to control transmit flow from the user to the radio: (0V) 1 – Receive buffer has data to transfer; (3.3V) 0 – Receive buffer is empty
10	RES CONT	RESCONT	Reset the radio	TTL Input	Reset the radio by shortening this pin to the ground.
11	TTLO1	TTLOUT1	TTL Output Line 1	TTL Output	Reserve line
12	TTLO2	TTLOUT2	TTL Output Line 2	TTL Output	Reserve line
13	GND	GND	Ground	-	Signal and Chassis Ground
14	TTLI2	TTLIN	TTL Input line	TTL Input	An internal 100K pull-up resistor is applied.
15	VCC36	PWR	Power Supply	External	Regulated positive 4.2V DC from ext. Power Supply.
16	VCC36	PWR	Power Supply	External	Regulated positive 4.2V DC from ext. Power Supply.

Radio Transmitter Specifications

Component	Details
Transmitter Output Power	+15... +30 dBm in 1 dB step / 50 Ω
Carrier Power Stability	+1 dB / -2 dB

Radio Transceiver Specifications

Component	Details
Frequency Range	138-174 MHz
Channel Spacing	25/20/12.5/6.25 kHz
Carrier Frequency Stability	±1 ppm
Modulation	GMSK/4FSK/DBPSK/DQPSK/ D8PSK/D16QAM
Communication Mode	Half duplex, simplex

Radio Receiver Specifications

Component	Details
Receiver Sensitivity for DBPSK (BER 1x 10^{-4})	-113 dBm for 25 kHz Channel Spacing -113 dBm for 20 kHz Channel Spacing -114 dBm for 12.5 kHz Channel Spacing -114 dBm for 6.25 kHz Channel Spacing
Receiver Sensitivity for DQPSK (BER 1x 10^{-4})	-110 dBm for 25 kHz Channel Spacing -110 dBm for 20 kHz Channel Spacing -111 dBm for 12.5 kHz Channel Spacing -111 dBm for 6.25 kHz Channel Spacing
Receiver Dynamic Range	-119 to -10 dBm

Modem Specification

Component	Details
Interface DSP	UART (serial port)
Interface Connector	16-lead Connector
Data Speed of Serial Interface	9600 - 115200 bps
Data Rate of Radio Interface (25 kHz Channel Spacing)	9600 bps – DBPSK/GMSK 19200 bps – DQPSK 28800 bps – D8PSK 38400 bps – D16QAM
Data Rate Radio Interface (20 kHz Channel Spacing)	7500 bps – DBPSK/GMSK 15000 bps – DQPSK 22500 bps – D8PSK 30000 bps – D16QAM
Data Rate Radio Interface (12.5 kHz Channel Spacing)	4800 bps – DBPSK/GMSK 9600 bps – DQPSK 14400 bps – D8PSK 19200 bps – D16QAM
Data Rate Radio Interface (6.25 kHz Channel Spacing)	2400 bps – DBPSK 4800 bps – DQPSK 7200 bps – D8PSK 9600 bps – D16QAM
Forward Error Correction (FEC)	Reed-Solomon Error Correction
Data scrambling	Yes

Compliance

Parameter	Specification
FCC	FCC Part 90
Industry Canada	RSS-210
ETSI	ETSI EN 300 113-2 , ETSI EN 301 489-1, ETSI EN 301 489-5

BOTTOM
2.95 in
75.00 mm
1.83 in
46.50 mm
3.15 in
80.00 mm
.3 in
7.6 mm
.37 in
9.50 mm
SIDE
Connector, 16-lead, Thru-hole 2x8, Header, ".050"