RF Specifications & Modulation Format

INTRODUCTION

The 900MICROPULS Transceiver is designed especially for OEMs who would like to incorporate the advantages for wireless technology into their products. It is an effective solution for sending data over relatively short distances.

The WorldWireless Communications 900MicroPulse FEATURES include:

g   Small
g   Affordable
g   Simple Integration
g   Operates in License-free FCC Part 15 ISM Band
g   No post-production tuning required

WorldWireless Communications 900MicroPulse SPECIFICATIONS:

Receiver:

|	
Modulation Type	AM Single-Conversion Super Heterodyne
Frequency	916.5 MHZ +/- 300 kHz @ 3dB down
Sensitivity	-104 dBm +/- 3dB @ 5 Volts supply
Modulation Type	AM ASK or OOK

Transmitter:

Type	SAW-controlled ASK or OOK
Frequency	916.5 MHZ +/- 150 kHz
Effective Radiated Power (ERP)	25mW nominal peak power @ 5 Volts supply
Maximum Data Rate	2400 bps maximum-depends on modulation type
Interface	TTL (Transistor-Transistor Logic) or CMOS

Power Requirements

Supply Voltage	4.5 - 6 Volts dc (3 volts on special order)
Average Current Consumption	32mA receive mode, 25 mA transmit @ 5 Volts supply

Dimensions

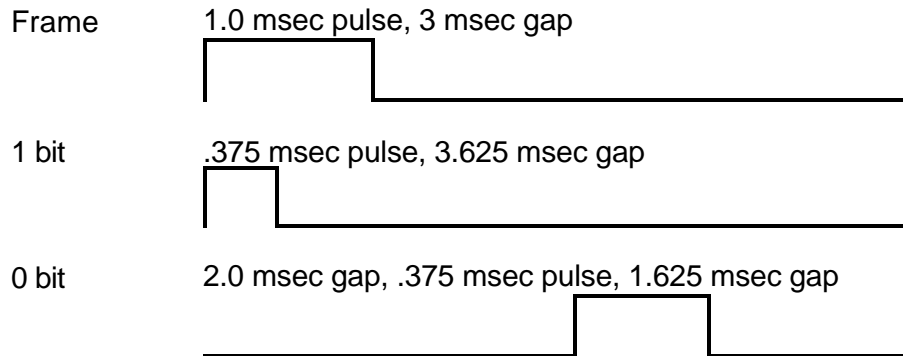|	
Width	0.91 inches (23.11mm)
Length	1.97 inches (50.04mm)
Height	0.35 inches (8.89mm)
Temperature Range	-30 to +70EC
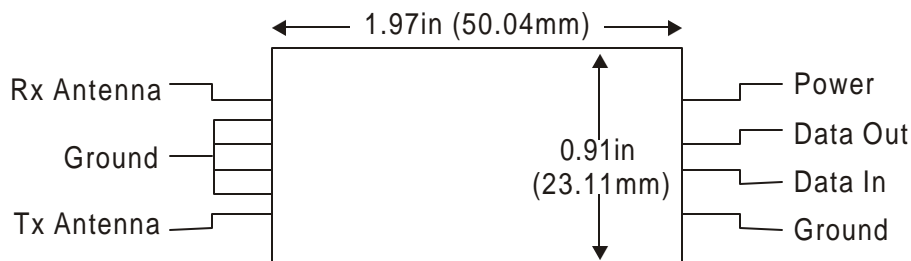
Applications
Telemetry, SCADA, Remote Monitoring, Security and Alarm, Transportation, Agriculture Controls, Manufacturing

Handheld Unit to Main Control Unit

The command packet is transmitted and the unit waits 3 seconds for a response. If the unit does not receive a response, the unit will repeat the packet twice at 3 second intervals. The reception of a response will terminate the retransmit cycle. Failure to receive a response will result in a "nc" condition and the unit will wit for either keyboard entry of sleep mode time out.

Each packet consists of 96 bits;

Each bit is formatted as follows:

Frame   1.0 msec pulse, 3 msec gap

1 bit   .375 msec pulse, 3.625 msec gap

0 bit   2.0 msec gap, .375 msec pulse, 1.625 msec gap

1.   The first 24 bits sent are frame bits.
2.   The following 72 bits are broken into groups of 9 bits.
3.   The first 3 groups consist of a frame bit followed by eight 1 bits.
4.   The next 9 bit group is a frame bit followed by a 0 bit and then the 7 bit address of the unit.
5.   The next 9 bit group is a frame bit followed by bits D15 through D8 of the command word.
6.   The next 9 bit group is a frame bit followed by bits D7 through D0 of the command word.
7.   The next 9 bit group is a frame bit followed by an 8 bit check sum of the address and command word.
8.   The last 9 bit group is a frame bit followed by eight 1 bits.

Note all bytes or words are transmitted MSB first.

```
F F F F F F F F F F F F F F F F F F F F F F F F 1 1 1 1 1 1 1 1 F 1 1 1 1 1 1 1 1

F 1 1 1 1 1 1 1 1 F 0 A A A A A A A F D D D D D D D D F D D D D D D D D
                    6 5 4 3 2 1 0   1 1 1 1 1 1 9 8   7 6 5 4 3 2 1 0
                                    5 4 3 2 1 0

F C C C C C C C C F 1 1 1 1 1 1 1 1
  7 6 5 4 3 2 1 0
```

The command word is formatted as follows, note: if a command bit is set then the function is active.

D15   SETPOINT D5
D14   SETPOINT D4
D13   SETPOINT D3
D12   SETPOINT D2
D11   SETPOINT D1
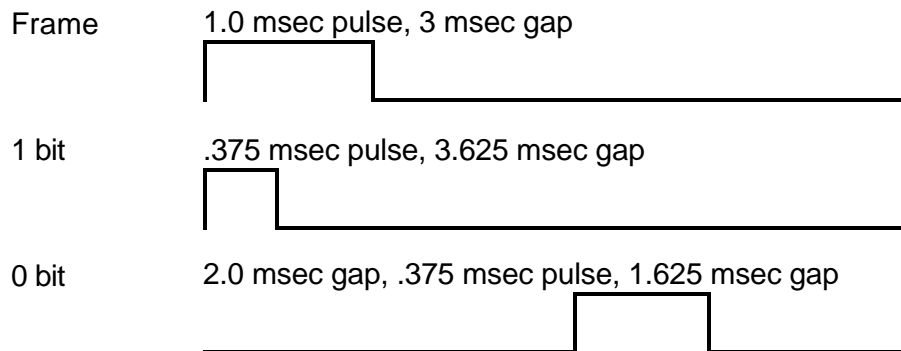D10   SETPOINT D0
D9   CALIBRATION COMMAND

D8   STATUS REQUEST COMMAND
D7   (not used, set 0)
D6   THERMOSTAT COMMAND
D5   LIGHT COMMAND
D4   JETS COMMAND
D3   AUXILIARY 3 COMMAND (usually bubbler or blower)
D2   AUXILIARY 2 COMMAND
D1   AUXILIARY 1 COMMAND
D0   (not used, set 1)

Main control unit to Handheld

The Main control unit transmits both command and temperature packets. The command packet contains both commands and temperature set point information. The temperature packet contains a redundant copy of the command information and the current water temperature. All command packets are followed 5 seconds later by a temperature packet and are sent in response to a received command packet, or a status change in a function (command/valve/fireman's time out, of heater on/off). Temperature packets are transmitted solo in the event of a change in the water temperature. The command or temperature packets are repeated 3 in a single transmission and do not require a response from either the hand held or hard wire units.

Each packet consists of 80 bits;;

Each bit is formatted as follows:

Frame   1.0 msec pulse, 3 msec gap

1 bit   .375 msec pulse, 3.625 msec gap

0 bit   2.0 msec gap, .375 msec pulse, 1.625 msec gap

Command Packet Format

1.   The first 24 bits sent are frame bits.
2.   The following 56 bits are broken into groups of 9 bits.
3.   The first 3 groups consist of a frame bit followed by eight 1 bits.
4.   The next 9 bit group is a frame bit followed by the wait status bit and then the 7 bit address of the unit.
5.   The next 9 bit group is a frame bit followed by bits D15 through D8 of the command word.
6.   The next 9 bit group is a frame bit followed by bits D7 through D0 of the command word.
7.   The next 9 bit group is a frame bit followed by an 8 bit check sum of the address and command word.
8.   The last 9 bit group is a frame bit followed by eight 1 bits.

```
          F F F F F F F F F F F F F F F F F F F F F F F F 1 1 1 1 1 1 1 1

          F W A A A A A A A F D D D D D D D D F D D D D D D D D F C C C C C C C C
            6 5 4 3 2 1 0   1 1 1 1 1 1 9 8   7 6 5 4 3 2 1 0   7 6 5 4 3 2 1 0
                            5 4 3 2 1 0
```

F 1 1 1 1 1 1 1 1

The command word is formatted as follows, note; if a command status bit is set then the function is active.

D15   SETPOINT D5
D14   SETPOINT D4
D13   SETPOINT D3
D12   SETPOINT D2
D11   SETPOINT D1
D10   SETPOINT D0
D9   HIGH LIMIT ALARM STATUS
D8   MARGINAL POWER ALARM STATUS (request for heater and jets in lower power system)
D7   THERMOSTAT READY (heater off, water at temperature)
D6   THERMOSTAT COMMAND (heater on, water below temperature)
D5   LIGHT STATUS
D4   JETS STATUS
D3   AUXILIARY 3 STATUS (usually bubbler or blower)
D2   AUXILIARY 2 STATUS
D1   AUXILIARY 1 STATUS
D0   (set 1 to denote command packet)

W   WAIT FLAG (if set, system is in either valve or fireman's timeout)

Temperature Packet Format

1.   The first 24 bits sent are frame bits.
2.   The following 56 bits are broken into groups of 9 bits.
3.   The first 3 groups consist of a frame bit followed by eight 1 bits.
4.   The next 9 bit group is a frame bit followed by the wait status bit and then the 7 bit address of the unit.
5.   The next 9 bit group is a frame bit followed by bits D15 through D8 of the command word.
6.   The next 9 bit group is a frame bit followed by bits D7 through D0 of the command word.
7.   The next 9 bit group is a frame bit followed by an 8 bit check sum of the address and command word.
8.   The last 9 bit group is a frame bit followed by eight 1 bits.

F F F F F F F F F F F F F F F F F F F F F F F F 1 1 1 1 1 1 1 1

F W A A A A A A A F D D D D D D D D F D D D D D D D D F C C C C C C C C
    6 5 4 3 2 1 0   1 1 1 1 1 1 9 8   7 6 5 4 3 2 1 0   7 6 5 4 3 2 1 0
                      5 4 3 2 1 0
F 1 1 1 1 1 1 1 1

The temperature word is formatted as follows, note; if a command status bit is set then the function is active.

D15   TEMPERATURE D7
D14   TEMPERATURE D5
D13   TEMPERATURE D5
D12   TEMPERATURE D4
D11   TEMPERATURE D3
D10   TEMPERATURE D2

D9   TEMPERATURE D1
D8   TEMPERATURE D0
D7   THERMOSTAT READY (heater off, water at temperature)
D6   THERMOSTAT HEAT   (heater on, water below temperature)
D5   LIGHT STATUS
D4   JETS STATUS
D3   AUXILIARY 3 STATUS (usually bubbler or blower)
D2   AUXILIARY 2 STATUS
D1   AUXILIARY 1 STATUS
D0   (set 0 to denote temperature packet)

W   WAIT FLAG (if set, system is in either valve or fireman's timeout)

C:\WINDOWS\TEMP\WWC 900 MicroPulse.wpd