FCC ID: NWY-916

DESCRIPTION OF CIRCUIT FOR PETRONIX COLLAR

The Petronix **Collar** is one unit of a number of units comprising an electronic pet containment system. Use of the Collar on a household pet allows the owner to confine the animal to certain indoor or outdoor areas.

The Collar is powered by a 3.2V lithium coin cell. The battery supplies power to an activity switch circuit which will, when the Collar is moved by activity of the animal, provide power to a +3.3VDC boost regulator. The +3.3VDC supplies power to the microprocessor and it's related logic and to the 916.5MHz transceiver.

The microprocessor is a 16LC62B with an external 100KHz crystal. The transceiver uses an internal 916.5Mhz SAW filter as an oscillator.

The Collar receives instructions VIA 916.5MHz received signals and VIA 10KHz received signals. The Collar transmits status reports VIA OOK 916.5MHz.

The collar only responds to RF data packets that contain its ID address. In normal operation, this may occur only once or twice a day (it is possible that once an animal is trained, the collar may only send out RF data packets when a low battery condition occurs).

The RF data transmitted is in the form of a Manchester encoded data stream where each on/off period is 1 msec in duration. A standard data stream starts by sending four (4) Manchester encoded 1’s followed by a code violation bit. The code violation is a logic 0 of 3 msec duration followed by a logic 1 of 3 msec duration. After the code violation sequence a Manchester encoded start bit (1) is sent followed by 24 Manchester encoded data bits. Finally two (2) checksum bits are sent. Total transmission time of the data stream is 66 msec. During the remaining 84 msec of the frame, the console listens for a response from the addressed unit.

The microprocessor outputs signals to the 2KHz oscillator for drive to the piezo sounder and signals to the HV generator when animal correction is necessary. The Microprocessor also controls the functions of the 916.5 MHz transceiver. Signals to the transceiver provide the control over it's various modes of operation, transmit, receive and sleep. The microprocessor also controls the input selection activities for the 10KHz receiver.

Signals from the activity switch, attitude output and the 10KHz receiver RX data provide information to the microprocessor regarding the location and activity level of the animal.

Output from the 916.5Mhz transceiver is fed into a matching circuit to filter out the harmonics and to match the impedance of a wire antenna soldered to the circuit board.

FCC ID: NWY-916

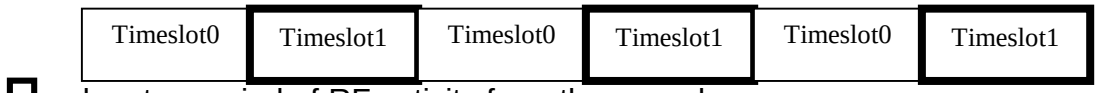
DESCRIPTION OF CIRCUIT FOR PETRONIX CONSOLE

The Petronix **Console** is used to communicate with the other components comprising the Petronix system such as the pet **Collar**, the **Indoor Zone Controller** and the **Outdoor Zone Controller**. Use of the Console enables a user to configure various Petronix units in a system to operate properly within a desired area and for the required number of pets. Operator input is allowed via nine pushbutton switches. In addition operator feedback is provided via bi-color LEDs associated with each of four switches and by way a piezo sounder.

The unit is powered by an unregulated +12VDC wall plug, ungrounded power supply. The +12VDC is regulated to +5VDC for the microprocessor, display and related logic. The +12VDC is also regulated to +3.3VDC for the 916.5Mhz transceiver functions.

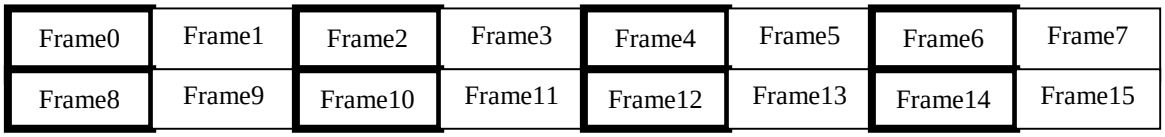
The microprocessor is a 80C154 with an external 12Mhz crystal. The real time clock has an external 32.769Khz crystal. The transceiver uses an internal 916.5Mhz SAW filter as an oscillator.

The command protocol consists a series of 'timeslots' which are divided into sixteen (16) transceiver frames (here after referred to as frames). The number of timeslots used is dependant on the number of console units which are within RF transmission range. The minimum number of timeslots allocated is two (2) with a maximum allocation of sixteen (16). Each timeslot has a period of 2.4 seconds. Thus in a one console environment, RF transmission from the console will be during the odd timeslot while the even timeslot is 'quiet' (when we use the term quiet, we mean that no RF signal is generated during this time from the console).



□ - denotes period of RF activity from the console

As mentioned in the above paragraph, each timeslot is divided into sixteen (16) frames. Each frame is associated with communication with a certain type of device. Frames 0 – 7 are used to communicated with zone controllers while frames 8 – 15 are used to communicate with pet collars. Under normal operating conditions, the console will send out a query to each device that has been configured within the system. Each frame lasts for 150 msec with the even numbered frames being the RF transmit-receive period and the odd number frames being quiet.



The RF data transmitted is in the form of a Manchester encoded data stream where each on/off period is 1 msec in duration. A standard data stream starts by sending four (4) Manchester encoded 1's followed by a code violation bit. The code violation is a logic 0 of 3 msec duration followed by a logic 1 of 3 msec duration. After the code violation sequence a Manchester encoded start bit (1) is sent followed by 24 Manchester encoded data bits. Finally two (2) checksum bits are sent. Total transmission time of the data stream is 66 msec. During the remaining 84 msec of the frame, the console listens for a response from the addressed unit.

The microprocessor outputs signals to the LCD, the LEDs, piezo sounder, the RS-232 port and to the 916.5 Mhz transceiver. Signals to the transceiver provide the control over it's various modes of operation, transmit and receive. A separate microprocessor line will allow operation of the 916.5Mhz transmitter at a reduced power level.

Output from the 916.5Mhz transceiver is fed into a matching circuit to filter out the harmonics and to match the impedance of a whip antenna mounted to the circuit board.

FCC ID: NWY-916 & NWY-10K

DESCRIPTION OF CIRCUIT FOR PETRONIX INDOOR ZONE CONTROL

The Petronix **Indoor Zone Control** is one unit of a number of units comprising an electronic pet containment system. Use of the Indoor Zone Control enables a user to establish an electronic zone that can serve as boundary or area beyond which a pet is not allowed.

The unit is powered by an unregulated +12VDC wall plug, ungrounded power supply. The +12VDC is regulated to +5VDC for the microprocessor and related logic. The +12VDC is also regulated to +3.3VDC for the 916.5Mhz transceiver functions. The +12VDC is utilized to supply power to the FET bridge.

The microprocessor is a 16C558 with an external 16Mhz crystal. The transceiver uses an internal 916.5Mhz SAW filter as an oscillator.

The Indoor Zone Control receives instructions and transmits status reports VIA OOK 916.5MHz. The Zone Control also generates a modulated 10KHz signal radiated by an internal antenna to produce a "zone" of coverage around the unit.

The zone controller only responds to RF data packets that contain its ID address. In normal operation, this may as frequently as once every 4.8 seconds and as long as once every 2.5 minutes

The RF data transmitted is in the form of a Manchester encoded data stream where each on/off period is 1 msec in duration. A standard data stream starts by sending four (4) Manchester encoded 1’s followed by a code violation bit. The code violation is a logic 0 of 3 msec duration followed by a logic 1 of 3 msec duration. After the code violation sequence a Manchester encoded start bit (1) is sent followed by 24 Manchester encoded data bits. Finally two (2) checksum bits are sent. Total transmission time of the data stream is 66 msec. During the remaining 84 msec of the frame, the console listens for a response from the addressed unit.

The 10KHz command protocol consists of a Manchester encoded signal where each on/off period is 2 msec. The 10KHz is sent out in alternating periods of 150 msec (opposite periods of the RF frames). A standard data stream starts by sending four (4) Manchester encoded 1’s followed by a code violation bit. The code violation is a logic 0 of 7 msec duration followed by a logic 1 of 7 msec duration. After the code violation sequence a Manchester encoded start bit (1) is sent followed by 24 Manchester encoded data bits. Finally two (2) checksum bits are sent. Total transmission time of the data stream is 66 msec.

The microprocessor outputs signals to the FET driver, LED, piezo sounder and to the 916.5 Mhz transceiver. Signals to the transceiver provide the control over it's various modes of operation, transmit and receive. Other microprocessor lines allow snubbing of the 10KHz signal energy in the antenna.

Output from the 916.5Mhz transceiver is fed into a matching circuit to filter out the harmonics and to match the impedance of a whip antenna mounted to the circuit board.

FCC ID: NWY-916 & NWY-10K

DESCRIPTION OF CIRCUIT FOR PETRONIX OUTDOOR ZONE CONTROL

The Petronix **Outdoor Zone Control** is one unit of a number of units comprising an electronic pet containment system. Use of the Outdoor Zone Control enables a user to establish one or more electronic zones that can serve as boundary beyond which a pet is not allowed.

The unit is powered by an unregulated +12VDC wall plug, ungrounded power supply. The +12VDC is regulated to +5VDC for the microprocessor and related logic. The +12VDC is also regulated to +3.3VDC for the 916.5Mhz transceiver functions. The +12VDC is utilized to supply power to the FET bridge.

The microprocessor is a 16C558 with an external 16Mhz crystal. The transceiver uses an internal 916.5Mhz SAW filter as an oscillator.

The Outdoor Zone Control receives instructions and transmits status reports VIA OOK 916.5MHz. The Zone Control also generates a modulated 10KHz signal radiated by a wire loop arranged to create a boundary in the desired location(s).

The zone controller only responds to RF data packets that contain its ID address. In normal operation, this may as frequently as once every 4.8 seconds and as long as once every 2.5 minutes

The RF data transmitted is in the form of a Manchester encoded data stream where each on/off period is 1 msec in duration. A standard data stream starts by sending four (4) Manchester encoded 1's followed by a code violation bit. The code violation is a logic 0 of 3 msec duration followed by a logic 1 of 3 msec duration. After the code violation sequence a Manchester encoded start bit (1) is sent followed by 24 Manchester encoded data bits. Finally two (2) checksum bits are sent. Total transmission time of the data stream is 66 msec. During the remaining 84 msec of the frame, the console listens for a response from the addressed unit.

The 10KHz command protocol consists of a Manchester encoded signal where each on/off period is 2 msec. The 10KHz is sent out in alternating periods of 150 msec (opposite periods of the RF frames). A standard data stream starts by sending four (4) Manchester encoded 1's followed by a code violation bit. The code violation is a logic 0 of 7 msec duration followed by a logic 1 of 7 msec duration. After the code violation sequence a Manchester encoded start bit (1) is sent followed by 24 Manchester encoded data bits. Finally two (2) checksum bits are sent. Total transmission time of the data stream is 66 msec.

The microprocessor outputs signals to the FET driver, LED, piezo sounder and to the 916.5 Mhz transceiver. Signals to the transceiver provide the control over it's various modes of operation, transmit and receive.

Output from the 916.5Mhz transceiver is fed into a matching circuit to filter out the harmonics and to match the impedance of a whip antenna mounted to the circuit board.