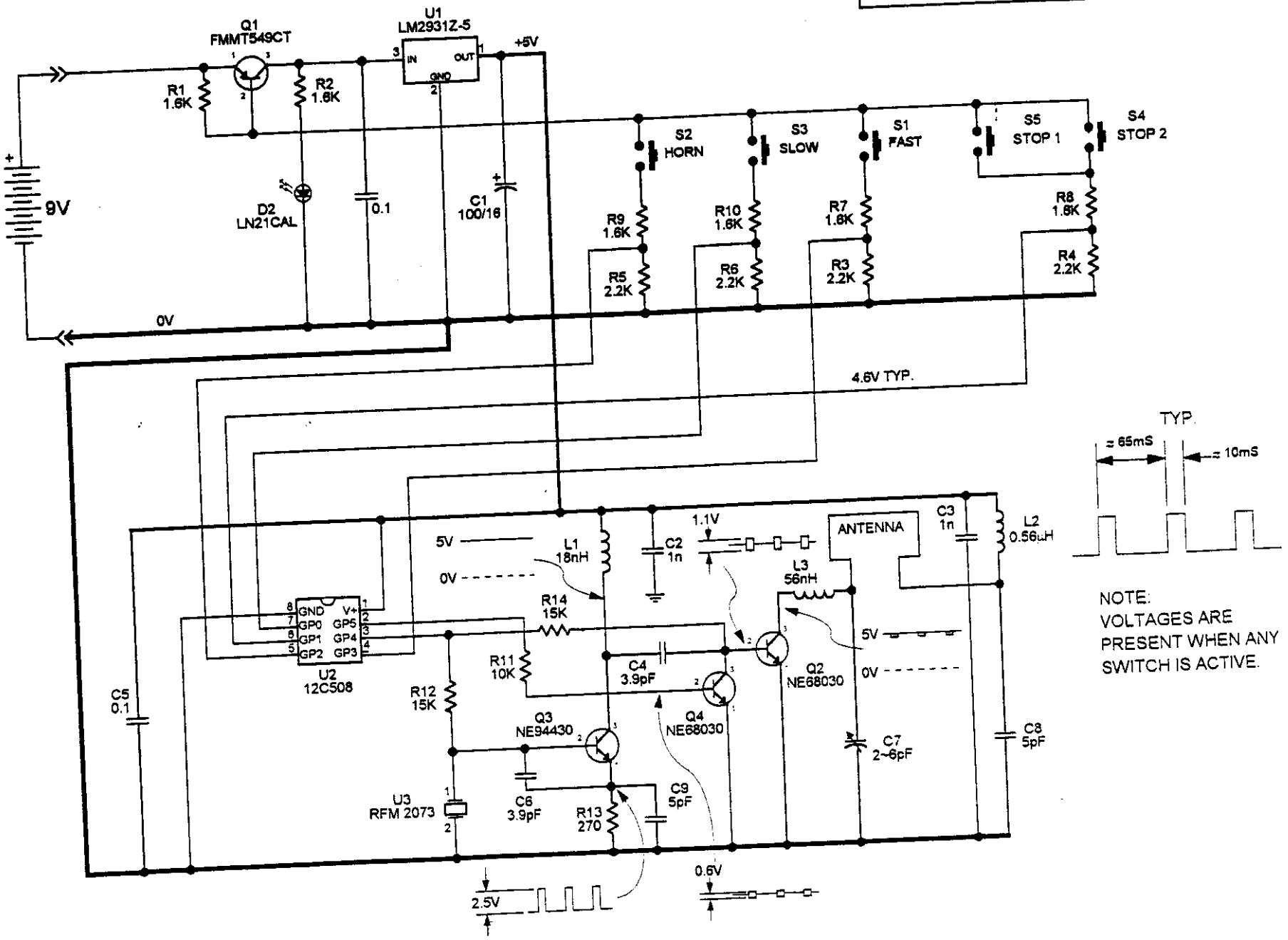
SHEET 1 OF 1 | SIZE A

FCC ID: N2N 600-023

DANE INDUSTRIES Inc.
9855 13th Ave. North
Plymouth, MN 55441
PHONE: (612) 544-7779
FAX: (612) 544-7644

TITLE: 418Mhz TRANSMITTER SCHEMATIC

DWG/PART NO. 680-014 | DWG DATE 06/04/99



DESCRIPTION OF CIRCUIT FOR DANE TRANSMITTER

The transmitter is used to control a motorized shopping cart pushing device. This enables a person in a parking lot to return multiple shopping carts back to the store they came from. Four commands can be sent from the transmitter to the receiver that controls the pushing device. They are: slow speed, faster speed, honk horn, and stop. These are activated only while the respective push button is held down. If no button is held down the pushing device reverts to stop.

The transmitter is powered by a 9 VDC battery. This is fed into a PNP transistor which acts as an on/off switch. When a push button is activated the transistor is turned on and furnishes power to the rest of the circuit. With no button pushed the only power draw is the leakage across the transistor and the PC board. The battery is presumed to be dead when it will no longer activate the pushing device. From the on/off switch the voltage is fed to a LED indicating device and a 5 VDC regulator.

The 5 VDC is then fed to the rest of the active circuits, which consist of a microprocessor, a 418 MHz oscillator, a OFK modulator, and an amplifier. The microprocessor is a PIC 12C508 which has its own internal RC oscillator. This oscillator runs at ~ 4 MHz. Inputs to the microprocessor are the four push button switches (slow, fast, horn, and stop). When these are held down the respective commands are sent to the pushing device.

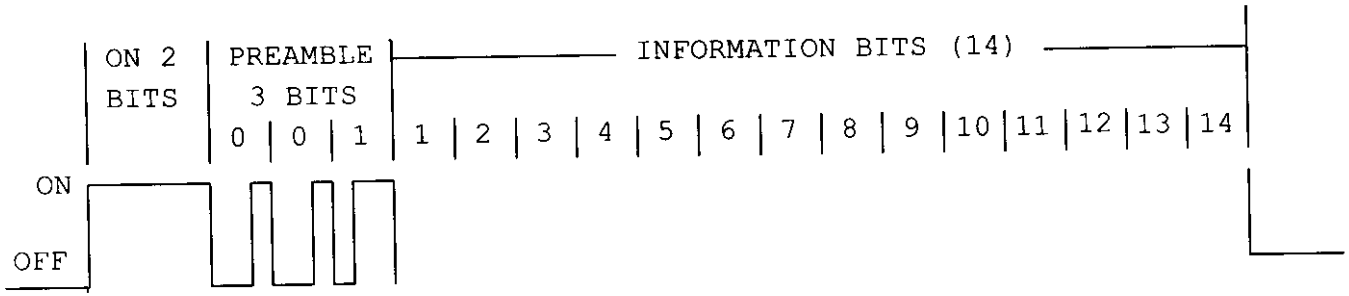
The command protocal consists of a pulse width OFK modulated signal . This has a start period of 750 microseconds to allow the receiver to enable. This is followed by a preamble of two zero's and a one. After this 14 bits of information is sent consisting of address, data, and a check sum. The worst case (all information bits being ones) time the command is transmitted is 4.75 milliseconds. A bit time is 375 microseconds, with a zero being 250 microseconds off and 125 on and a one the opposite, with 125 microseconds off and 250 microseconds on. This command is repeated every 50 milliseconds, which gives it a on time of 9.5 milliseconds every 100 milliseconds (9.5%). For a further description see next page.

The microprocessor outputs two signals. The first enables the 418 MHz oscillator, and the second sends the command to the modulator. The oscillator is a one transistor SAW oscillator which runs at 418 MHz. This is the fundamental frequency with no multiplication's of frequency used. When the microprocessor enables the oscillator it runs constantly.

The oscillator is then fed to an amplifier and a modulator. The modulator consists of a NPN transistor which is turned on or off. When it is on, it shunts the oscillator signal to ground and when off allows the oscillator signal to drive the amplifier. The amplifier consists of another NPN transistor and drives a passive matching circuit.

The matching circuit filters the harmonics and matches the impedance of a short piece of wire which is raised up off the PC board and acts as the antenna.

FCC ID: N2N 600-023



THE MESSAGE IS SENT USING PULSE WIDTH MODULATION AND OFK KEYING. A "1" IS ON FOR 250 US AND OFF FOR 125 US. A "0" IS IS ON FOR 125 US AND OFF FOR 250 US. WORST CASE TIME ON FOR THE MESSAGE IS: 750 US + 500 US + 3500 US. THIS IS A ON TIME OF 4750 US (4.75 MS). THIS IS REPEATED EVERY 50 MS FOR A ON TIME OF 9.5 MS EVERY 100 MS (9.5%)

Title: **MESSAGE FORMAT DANE TRANSMITTER**		
Size: A	Document Number: **HC 2029**	Rev: **A**
Date: Tuesday, June 15, 1999	Sheet 1 of 1	