Techknow
DRIVE-THRU SYSTEMS & ANALYTICS

TECHKNOW, INC

Timer with Detection Puck Installation
900 MHz Radio – Domestic Model

INSTALLATION MANUAL

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Techknow Timer with Detection Pucks Installation Manual

1. Introduction

The Techknow Drive-Thru Timer/Stats system is a vital tool for the store's drive-thru operations. It is highly effective in increasing the speed of service and motivating employees to meet the goals of the organization in the drive-thru.

The Techknow Drive-Thru Detection Pucks are a quick and seamless way to be able to detect vehicles in the drive thru area. Quick and easy to install and maintain, they are far superior to traditional loops, which may short out or fail.

Note step 12

2. System Description

a. The Techknow Drive-Thru Timer/Stats system currently includes a 23" LCD monitor for increased visibility of the information displayed.

b. The Techknow Drive-Thru Detection Pucks are small, cylindrical wireless detectors which are buried in the concrete in the drive thru area.

3. Main Components

There are four main components to the Techknow Timer system with wireless Detectors:

a. **Timer Matrix Board** - This board contains the Timer, Puck Controller, Monitor Bracket and power bricks. There are two holes and a 'Z' bracket in the board for easy mounting.

b. **Detection Pucks** – This device is a magnetometer that detects a change in the local magnetic field. They constantly learn their environment, so metal located nearby will not trigger a response from them. All communication is wireless, as they can also be configured wirelessly.

Cash Window

Present Window

Menu Board
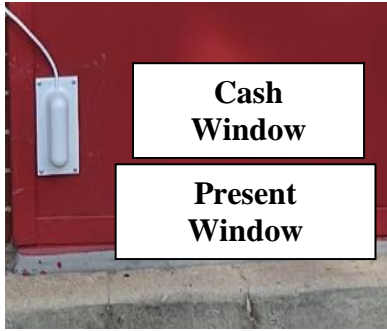
c. **Detector Puck Antenna** – This device gives extra range for the pucks to communicate with the system. System might also require a signal repeater. For international use, we utilize a 2.4 GHz frequency for all radio communication.

We use a flat panel antenna for the pay and present windows and an omni antenna for the menu board.

d. **Detection Loops –** Customer has the option of using traditional loops with any Techknow Timer.

4. Basic Timer Installation

➢ Mount Timer Matrix Board

➢ Connect power to Matrix Board

➢ Connect Monitor to Monitor Bracket, located on Matrix Board

➢ Connect HDMI cable from Timer controller to Monitor

➢ Run LAN cable from Timer to Switch

➢ Run POS cable to POS order port *if applicable*

➢ Run Antenna Cable

➢ Install and Connect Antenna

➢ Test pucks in drive thru area

➢ Bury pucks in drive thru area

➢ Install Software *if applicable*

5. Preparation for Installation

This section will inform you on everything that is required before you begin the installation of the Techknow timer. For most hardware location, refer to pre-site survey for exact locations.

NOTE: Please do not attempt to perform any work in which you may not be qualified. If needed, hire an electrician, contractor, or any other professional installer.

1. Please confirm that the power going to the Timer is 115VAC. Locate and label this circuit (Drive Thru Timer).
2. Locate area to install Timer Matrix Board.
3. The Cat-6 data cable must be run from the Timer to the Switch

4. Locate area outside for pucks to be buried. Pucks should be in a straight-line perpendicular to the direction of traffic, 2 feet forward from center of window or order point. First puck will be 2.5 ft. curb, 2nd puck will be 2.5 feet past the first puck. See diagram below.
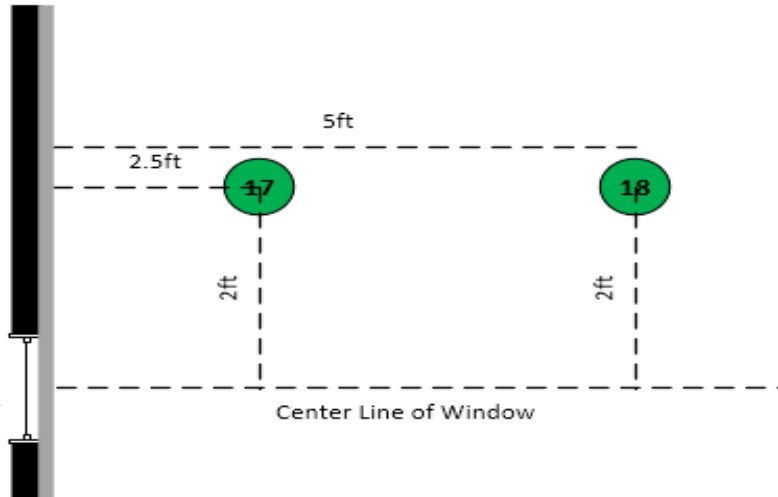
5. Locate area outside for mounting the Antenna.

6. Time Required for Installation

The time required to install the Techknow Timer is normally 3 to 6 hours. Please try to be considerate to the store's needs and not disrupt drive thru or store operations during peak times.

7. Tool Required for Installation

The following tools described are used in a normal installation. All hardware required to complete the installation is supplied with the system. Any mounting hardware needed to mount the LCD and Timer are the responsibility of the installer.

- Hammer drill with a 3.25" coring bit and Chisel Bit
- Drill with (2) ¼" bits. 1 for masonry and 1 for wood.
- Wire strippers/cutters
- Digital Multi meter
- Category 6 punch down tool
- RJ-45 Crimp tool
- Flat head and Phillips head screw drivers- Assorted Sizes
- Soldering Iron with solder
- Dikes- Medium Size Pair
- Bag of cable ties
- Conical wall anchors- ¼ size
- Electrical Tape
- Laptop Computer
- Cat 6 Cross over cable
- Cat 6 Straight thru cable

8. Timer Matrix Board Components

Every board will have the same four basic components, although the exact locations might differ:

1. Timer Computer
2. 900 MHz Puck Controller
3. Monitor Bracket
4. Interconnect Card
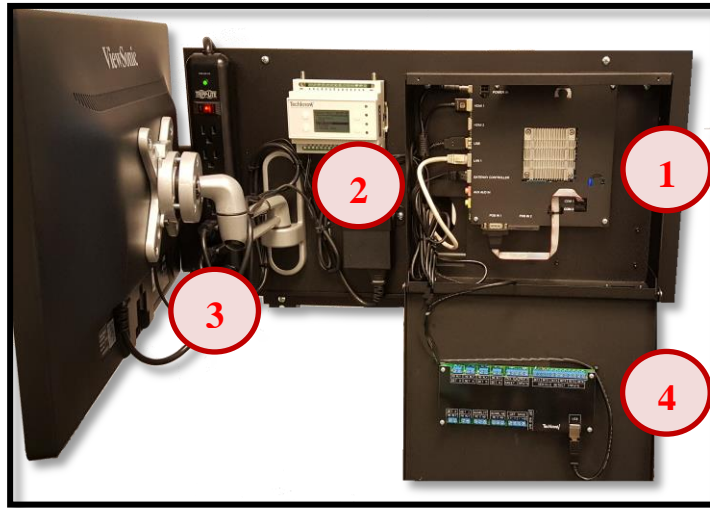
9. Cable Connections and Hardware Installation

The Techknow timer only requires 2 types of cables to operate.

1. **Data Cable --** Cable that runs from the Timer to the Hub/switch. This cable is Cat-6 and will be terminated using the RG-45 crimp tool and the Cat-6 female connectors.

2. **POS Cable** -- This cable will normally run from the primary drive thru register to the Timer. Some POS systems have other dedicated ports. If the store is Ethernet, then only a patch cable going to our Timer is required.

Please refer to the following Figures to aid in proper termination for Cat 6. And RG-58 (This is one type of Cat 6 punch down connector; others may be punched down in a different manner.)

10. Cable to the Register or network

If the POS uses serial communications, attach the POS cable supplied to the POS and the Timer's serial input. If the store is Ethernet based, a POS cable will not be needed.

Network Cable

This cable will be run from the store's back office switch to the Timer. This cable can be either a pre-made patch cable or a custom-made RG-45 cable depending on the length required.

**Current RJ45 Junction box, use the T-568B standard.**
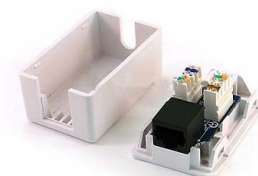
11. Hardware Installation

1. Mount Timer Matrix Board in a location that makes sense and looks ok, recommendations are the office or in the DT area. (You can use an existing hub if you have the connections for the cables). The Timer requires proper ventilation so it has to be mounted to the wall and at least 12 inches of clearance around it. **Do not mount Timer above ceiling tiles.**

   Use a level to mount the Z bracket on the wall. Use two studs if at all possible. Connect the Matrix board to the bracket. Then use screws in the two holes on the board to secure the board to the wall.

2. Mount monitor to monitor bracket and connect HDMI cable.
3. Plug the power supply for the Timer into an available wall outlet or Power Conditioner.
4. Plug the POS cable running from Primary order taker to the Timer serial port.
5. Plug a cat 6 patch cable into the recently installed switch and then into the POS Switch.
6. Connect power strip to outlet. If needed, use twist lock adapter.
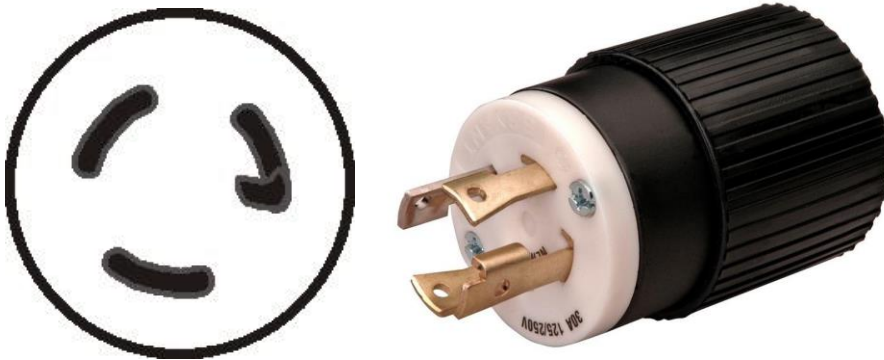
12. Activating the Pucks

Normally the pucks will activate themselves within 30 minutes from turning on the controller. **Place the pucks within 10 feet of the controller as soon as the controller has power.** If there is a puck activator included, you can turn the pucks on manually. Press and hold the Puck Activator button and then bring the red light from the puck directly over the puck's sensor. Once the light on the puck blinks red, the puck is active.
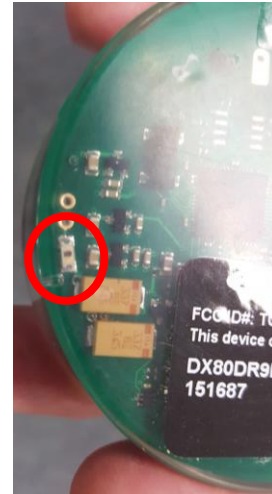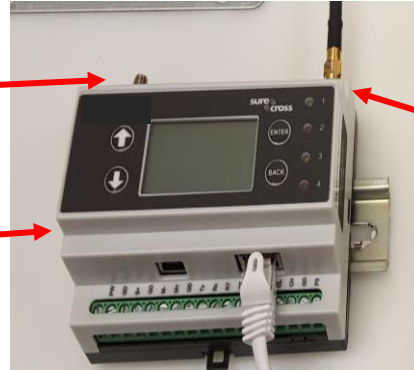
13. Antenna Installation

Find a suitable area for placement of the antenna, preferably in line of site of all the pucks. Run the antenna wire from the controller to the desired location. Since it is best to test the location before mounting the antenna, run the cable out a window for easy testing and moving.


Antenna Wire for Present Window

Antenna Wire for Cash Window

Controller

Hold the antenna and connect the cabling. Run the test described in the following step. If the pucks are not communicating within spec, move the antenna and re-run the test.

The 2.4 GHz Antennas are installed flush against the wall 2 ft. from the ground. They are installed by the cash and present window. If they have a pull forward area, move the present window antenna closer to the pull forward location. Check the signal strength for best location. No lightning surge protector needed.

At the menu board, run a Cat6 cable from the main Timer board to the menu area. Mount the Secondary Radio underneath the outer menu board. The repeater must have a clean line of sight to all pucks at the menu area.

Cash Window

Present Window
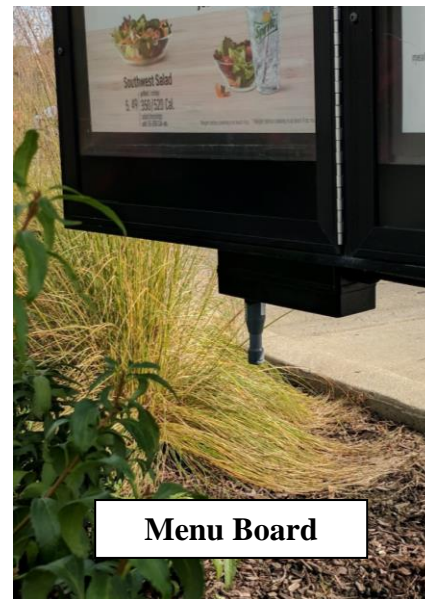
Menu Board

To connect the repeater at the Menuboard, use 2 wires from the Cat6 per node. Cabling from the Secondary Radio to the controller is as follows: 485+ to M+, 485- to M-, GND to GD and PWR to PW.
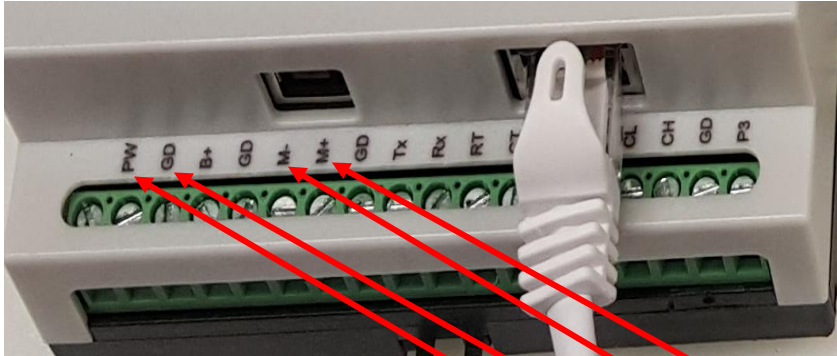

Main Controller	Cables to Use	Secondary Master
PW	Blue & Green	PWR
GD	Blue Striped & Green Striped	GND
M-	Orange Striped	485-
M+	Orange	485+

14. Puck Placement and Testing

The pucks are labeled in order; please refer to the pre-site survey to determine which pucks go where. The pucks should be placed in a straight-line perpendicular to the drive thru, 2 ft. past the center of the window or ordering point. The first puck should be 2.5 ft. from the curb or edge of the driveway and the 2nd puck should be 2.5 ft. past the first puck (5 ft from the curb). Pucks are labeled and need to be placed in numerical order, starting with the inner menu board, then outer menu board (if multi-lane), followed by pay and pick up windows. Always put the lower numbered puck on the inside, closest to the building.

Once the pucks are in place, use the Puck Controller on the matrix board to run the Site Survey:
- From the main screen, select 'ISM Radio' and press ENTER
- Select 'Site Survey' and hit ENTER
- Select the Node Number on the puck you are testing and press ENTER
- You will get back this screen:
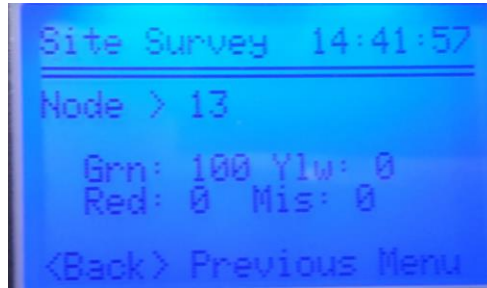
- Grn should be above 90, Mis (missing packets) should be below 10.
- Run the test at least twice for each puck.
- If a puck is not testing within spec, you will have to move the antenna in the drive through.
- Once the test comes back positive for all pucks, mount the antenna. **Be sure to connect the antenna's lightning protector to ground!**

15. Binding Pucks to Timer

Occasionally you will need to replace a puck. To use a new puck, we first must bind it to the Timer. This is a two-step process:

Step 1) – Put the Controller in Binding Mode
- On the wireless controlled, select 'ISM Radio'
- Select 'Binding'
- Choose the node number we wish to bind to (call Techknow Support to check for the correct node)
- Hit Enter - The controller will now be in Binding Mode.

Step 2) – Put the Puck in Binding Mode
- Using the Puck Activator (see step 13), flash the puck's sensor rapidly three times
- The lights on the puck will flash green – red for 2 seconds

Once complete, test the new puck by doing a site survey as described in section 15.

16. Puck Installation

Mark on the ground the puck locations. Please refer to the site survey for exact location. Using a hammer drill with a 3 ¼" coring bit, drill a 2¼" deep hole into the surface of the driveway. Use a chisel bit to remove the core.

Place the puck in the holes with the battery side up and the battery aligned with the direction of traffic.

DIRECTION OF TRAFFIC

Once all the holes are drilled and all the pucks are placed, prepare the sealant gun. Carefully apply the sealant to all the pucks so they are completely covered and the holes are flush with the surface of the driveway. The sealant will harden within minutes of being poured. The sealant gun will also quickly dry and jam, so the sealant must be quickly applied for all the pucks consecutively. We recommend using a piece of cardboard to catch drippings. Once the sealant dries, it is near impossible to remove. **Be sure to make sure the pucks have passed the site survey before sealing!** Use a piece of cardboard to catch the drippings between pucks. Once the sealant sets, it is almost impossible to remove.

17. Interconnect Card

The interconnect card allows the use of traditional loops in addition to the wireless pucks. The interconnect card also allows us to connect to an audio greet signal and gives us two additional relay outputs.

For Audio Greet, connect CN5 pins 1 and 2 to the base station's /TALK 1 port. If there are two base stations, use /TALK 2 for the second base station. These usually carry 2.5V - 5V, but fall to 0V (Active Low) to signal greet.

For traditional inductive loops, connect the relay cables from a vehicle detector to the appropriate V/DET INPUT port (CN6). In general, we connect the furthest back loop to V/DET 1 (CN6 pins 1 and 2) and count up from there. (If there are two Menu Board loops, count the one closest to the building first.)

If another device needs an additional relay, the V/DET OUTPUTS (CN 1 – 4, 7, & 8) can be used to send the detection signal back out from the Timer. These inputs are dry relay contacts, so they carry no voltage.

/TALK (CN5) TO BASE STATION				
/TALK 1		NC	/TALK 2	
1	2	3	4	5

V/DET INPUTS (CN6)											
V/DET 1		V/DET 2		V/DET 3		V/DET 4		V/DET 5		V/DET 6	
1	2	3	4	5	6	7	8	9	10	11	12
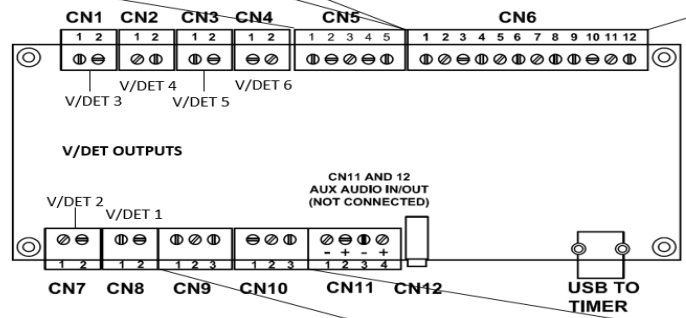
1	2	1	2	1	2	1	2	1	2	1	2	1NC	2COM	3NO	1NC	2COM	3NO
V/DET 1 CN8 NO		V/DET 2 CN7 NO		V/DET 3 CN1 NO		V/DET 4 CN2 NO		V/DET 5 CN3 NO		V/DET 6 CN4 NO		AUX RLY7 CN9 NC/NO			AUX RLY8 CN10 NC/NO		
V/DET OUTPUTS																	
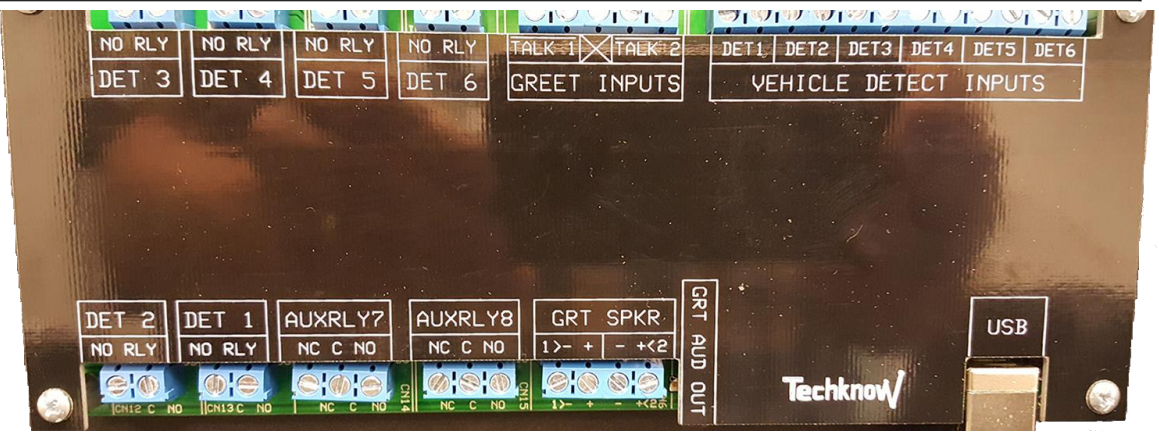
18. Full System Test

Check the monitor and confirm that the display is working correctly. The system should display all 000 for the times. When the first car drives on the first pad then you should see it start counting. When the car drives off the last pad we are tracking then the monitor should stop ticking unless a new car is on the pad, then will display that cars time. If the Techknow monitor is performing all the above functions, the system is working 100%. To ensure that the stats software is working correctly, several cars need to activate the pad before stats can be pulled and viewed.