

TEXAS DEPARTMENT OF TRANSPORTATION  
DEPARTMENTAL SPECIFICATION  
TO-7010  
NETWORKED SCHOOL ZONE FLASHER SYSTEMS

**1.0 SCOPE**

This specification sets the minimum acceptable requirements, materials and workmanship for a school flasher system that is networked via wireless or hardwired communication methods to a central work station.

**2.0 BIDDER AND/OR SUPPLIER REQUIREMENTS**

Only materials with approved product codes and/or designations from TO-7010 prequalified products list (QPL) will be accepted for bid, if required and stated in the procurement or contract documents. The Traffic Operations Division of the Texas Department of Transportation (TxDOT) maintains the QPL.

TO-7010 may be viewed at the following website:

<http://www.dot.state.tx.us/gsd/purchasing/supps.htm>

**3.0 APPLICABLE DEFINITIONS PERTAINING TO THIS SPECIFICATION**

- 3.1 Web Browser: Software application for retrieving, presenting and traversing information resources on the World Wide Web.
- 3.2 Application Software: Computer software designed to help the user perform specific task. Application software may run from a web browser and/or system software.
- 3.3 System Software: Operating software designed to operate computer hardware and to provide a platform for running application software.
- 3.4 Graphical User Interface (GUI): User interface allowing the user to interact with other electronic devices with a graphical image rather than text commands.
- 3.5 WLAN: Wireless local area network
- 3.6 WIFI: Wireless Fidelity
- 3.7 WIMAX: Worldwide interoperability for microwave access
- 3.8 Client/Server Model: Computing model acting as distributed application which partitions tasks or workloads between the providers of a resource or service, called servers and service requesters, called clients.

- 3.9 Local School Flasher Unit: Integral electronic device at each school flasher location controlling the operation of the beacons, also referred to as a clock.
- 3.10 Flash Period: Time period when the flashing beacon is on. The start and end of a flash period is user programmable with on/off times in the application software.

#### **4.0 GENERAL REQUIREMENTS**

- 4.1 School zone flashing systems utilizing wireless communication devices (WIFI devices) in the 2.4 GHZ and 5 GHZ frequency bands must comply with all applicable IEEE 802.11 requirements.
- 4.2 School zone flasher systems using 900 MHz wireless communication devices must use frequency hopping spread spectrum technology (FHSS).
- 4.3 Wireless communication devices must comply with all applicable FCC Part 15 requirements as defined in subparts A, B, C, D, E and G.
- 4.4 WIMAX devices must meet all applicable IEEE 802.16 requirements.
- 4.5 School flasher systems using WIFI and WIMAX devices must be able to operate over a secure network.
- 4.6 School zone flasher systems using wireless communications must operate in the unlicensed frequency bands except in the case of cellular. Cellular frequencies used will be determined by the provider.

#### **5.0 APPLICATION SOFTWARE REQUIREMENTS**

- 5.1 The school flasher system application software must be compatible with Windows XP (32 bit), Windows 7 (64 bit) or newer Windows version operating system software. Application software utilizing a Web browser must be compatible with Windows explorer 8.0, Windows explorer 9.0 or newer windows explorer file manager software.
- 5.2 School zone flasher systems using a Client/Server model must run application software on the server and allow workstation access from a computer. The user must be able to upload, download and exchange data between the workstation and server. The user must be able to build schedules and program on/off times as required by this specification. School zone flashers must be clients in this model.

- 5.3 As a minimum the application software must be able to program 99 different groups or 99 different calendar programs. A group must be comprised of school flasher locations that share common daily, weekly and annual programs. Each group or calendar program, as a minimum, must be able to accommodate 99 different school zone flasher locations. The application software must be able to identify each group by an alpha-numeric name. School flasher locations within a group must be identified in the application software using an alpha-numeric unique ID.
- 5.4 A function must be provided that will enable or disable Group programming or alternately, any attempted program change will cause the application software to prompt the user for confirmation. This feature will eliminate the possibility of making a program change inadvertently. The user must be able to scroll through the Group entries and print a list of the groups without enabling the Group programming.
- 5.5 The software must allow the operator to add a group or calendar, delete a group or calendar, list the groups by name and list the groups by number. Print capability must be provided when listing the groups by name or number. It must be possible to scroll through the Group programming.
- 5.6 The programming of each location must include the location name, location type, group number and a unique location ID. Each new location type must be automatically added to a pull down list eliminating the need to re-enter the same location type more than once.
- 5.7 The software must allow the operator to add a location, delete a location, list the location by name and list the locations by group number. Print capability must be provided when listing the locations by name or number.

5.8 **Flasher programming Schedule**

The application software must provide programming for the following:

- 1) A daily default program or calendar used for controlling on/off times (flash periods) typically used Monday through Friday during the course of a normal school week but any combination of days may be selected including Saturday and Sunday.

The user must be able to program a start date and end date for the default programs or calendar programs to run during the year.

The default program or calendar must allow the user the ability to program unique flash periods on a daily basis. Up to six different flash periods must be programmed on a daily basis.

- 2) Scheduled holidays or no school days. The application software must allow the user to omit normal default programming on a given day for a specific local school flasher unit or units during holidays or “no school days”.
- 3) As a minimum the application software must provide 30 days to the default program for holidays or no school days in which flash periods do not operate.
- 4) The application software must allow for exception day programming with unique flash period times allowing the user to operate a local school flasher unit or units with flash periods different than the default program. Exception day programming would take precedence over default programming.

When programming flash periods, default programs, holidays, exception days, or calendars the application software must perform error checks and prompt the user when an erroneous error in chronology of times, dates or overlapping commands occurs for a flash period. This does not require the user program flash periods in chronological order.

#### 5.11 Program Override/ Manual Control

The application software must include a program override function that when accessed will allow the operator to implement a program override state. The override function must operate in real time and allow the user to run a manual flash period or disable a flash period to a single unit or group of units for a period up to 7 days. This feature must allow the user to initiate a manual program due to inclement weather, special holidays or any unforeseen event.

#### 5.12 Verification

From a central location the operator must be able to verify the on/off status of a local school flasher unit or units networked on the central operating system. The user must be able to confirm the success or failure of data transfer from the central software or server to the local school flasher unit.

## 6.0 LOCAL SCHOOL FLASHER UNIT

- 6.1 Local controller unit must be wired and equipped with an AMP 206036-1 (16 pin male) connector mounted on the clock housing. An adapter cable with an AMP 206037-1 (16 pin female) must be provided and connected to the unit. As a minimum each wire of the adapter cable must be 18 AWG stranded copper 24 inches long, wired and color coded as follows:

<u>Pin</u>	<u>Function</u>	<u>Cable Wire Color</u>
1	AC Positive	Black
2	AC Neutral	White
3	Chassis Ground	Green
4	Relay 1 N.O.	Red
5	Relay 1 N.C.	Yellow
10	Relay 1 Common	White/Yellow
11	DC Positive	White/Red
12	DC Negative	White/Black

- 6.2 The local school flasher unit must be able to operate on either 12V DC +/- 2V DC or AC power source between 95 and 135V AC. The AC and DC power supply must be an integral part of the school flasher unit circuit board.

A separate power supply module, similar to those used for calculators and battery chargers, is not acceptable.

- 6.3 Power Back-up System

The real time clock circuit (RTC) must continue to operate and maintain time of day during a power loss to the local school flasher unit. Should a power outage occur, an electric double layered capacitor (EDLC) or super capacitor must be used to back up the real time clock circuit. The use of batteries to back-up the real time clock is not acceptable for this application. The super capacitor must be sized accordingly to supply power to the real time clock circuit for 7 days of autonomy at 25°C without power to the school flasher unit. The RTC circuit must have an accuracy of +/- 3 seconds drift within a 30 day period.

An alternative method to the real time clock circuit is acceptable with preapproval from the Traffic Operations Division of TxDOT. Alternative methods must be able to retrieve time of day from an external source or the network immediately upon the return of power to the local school flasher unit.

- 6.4 The school flasher unit must keep track of any duration time and relay output condition during a power failure. If the duration time does not expire during the power failure, the school flasher unit must keep the relay in the same condition when power is restored. If the duration time did expire during the power failure, the school flasher unit will change the condition of the relay when the power is restored.
- 6.5 Non-volatile memory such as flash RAM and EEPROM must be used for operating system software, application software and firmware located in the school flasher unit.
- 6.6 The school flasher unit output relay must be a SPDT relay output rated at 15 amps resistive at 120V AC.

## **7.0 SOFTWARE TRAINING**

The vendor must provide software training at a time agreed upon by the vendor and a TXDOT representative.

## **8.0 TESTING AND ACCEPTANCE**

The vendor must be required to set-up all components of the networked school flasher system to demonstrate compliance to the requirements of this specification for a test period of 30 days. The vendor will train TXDOT personnel on how to program and operate the school flasher unit and networking components of the school flasher system.

## **9.0 DOCUMENTATION**

The vendor must provide installation instructions, operations manual for local school flasher unit, application software for central system, and all other components of the networked school flasher system. All documentation must be provided in electronic form using portable document format (pdf).

Upon request, the vendor must make available schematics, parts reference and parts list of all components of the networked school flasher system. All documentation must be provided in electronic form using portable document format (pdf).

## **10.0 WARRANTY**

The school flasher programming device software, hardware and the school flasher units must be warranted to be free from defects in material and workmanship for a period of five years from the date of shipment. Any warranty service required must be promptly performed at the manufacturer's facility or the manufacturer's authorized service agency. The vendor must pay shipping charges for equipment received and returned to TXDOT under warranty. Service information must be available to TxDOT consisting at minimum schematics, parts locators and parts lists.