TRANSPORATION ELECTRICAL EQUIPMENT SPECIFICATIONS
TEES 2020 ERRATA

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4.2.1   Compatibility

The BBS shall be compatible with NEMA, Caltrans 332LS, 342LX Cabinets, Model 170E Controllers, Model 2070 Controllers and cabinet components for full-time operation.

5.6.5   Configuration and Output
As a minimum, the user must be able to use the Web browser for the following:
1. Change operating modes (presence or pulse)
2. Change sensitivity level
3. Configure network parameters
4. Program new images to device
5. Upgrade firmware
6. Reset the device
7. Output session data to .txt file

Vehicle classification parameters shall be configurable.

5.6.9   Vehicle Classification
The sensor unit shall have vehicle classification capability as described by the Federal Highway Administration (FHWA) Traffic Monitoring Guide (TMG). The vehicle classification data must include the following information: location ID, direction of travel code, lane of travel/channel, date (month, day, year), time, total internal volume/occupancy, restrictions, and vehicle class. The location ID, direction of travel code, lane of travel/channel, date, and time shall be configurable.

The traditional classified by the FHWA are described in Appendix C of the TMG; the classes are:
    Class 1: Motorcycles
    Class 2: Passenger Cars
    Class 3: Two-Axle, Four-Tire Single Unit
    Class 4: Buses
    Class 5: Two-Axle, Six-Tire Single Unit
    Class 6: Three-Axle, Single Unit
    Class 7: Four or More Axle, Single Unit
    Class 8: Four or Less Axle, Single Trailer
    Class 9: Five-Axle Tractor Semitrailer
    Class 10: Six or More Axle, Single Trailer
    Class 11: Five or Less Axle, Multi Trailer
    Class 12: Six-Axle, Multi Trailer
    Class 13: Seven or More Axle, Multi Trailer

CHAPTER 6
CABINET SPECIFICATIONS MODELS 332LS, 334LS, 336LS, 342LX, 344LX & 346LX

6.1.1   Composition
Unless otherwise specified the model shall be furnished, ready for operation with the following composition.

Cabinet Model	PDA	Output Files		Power Supply
332LS	2LX	1LX	2LX (Model 520)	206L
334LS	3LX			206L
336LS	2LS	1LX		206LS
342LX	2LX	1LX	2LX (Model 520)	206L
344LX	3LX			206L
346LX	2LS	1LX		206LS

6.1.1.5 Model 344LX Cabinet
Model 344LX Cabinet shall consist of Housing 3 and two ITS Mounting Cages.

First Mounting Cage shall consist of:

Input File I	C1 Harness #2
Input Panel #3	Service Panel #1
PDA Assembly #3LX	

6.4.1.8 Socket Types
Socket types for the following equipment shall be

Switch Pack	BEAU S-5412-XX (or equal)
Flasher Transfer Relay	BEAU S-5408-XX (or equal)
Flasher Unit & Power Sup Mod	BEAU S-5406-XX (or equal)
208 Monitor Unit	PCB 22/44S
210 Monitor Unit	PCB 28/56S

6.4.3.1.1   PDA #2LX
    1   -- Duplex NEMA 5-15R Controller Receptacle
    2   -- Duplex NEMA 5-15R Equipment Receptacle (one with GFCI)
    1   -- 1 Pole 15 Amperes minimum, 120 VAC Signal Bus Circuit Breaker
    1   -- 1 Pole 15 Amperes minimum, 120 VAC Clean Power Circuit Breaker
    6   -- 1 Pole Ganged, 10 Amperes, 120 VAC Signal Bus Circuit Breaker
              with Auxiliary Switch
    1   -- 1 Pole 15 Amperes, 120 VAC Equipment Circuit Breaker
    1   -- 2 Pole Ganged, 10 Amperes, 120 VAC Flash Bus Circuit Breaker
    1   -- Solid State Relay (Normally Closed) - rated minimum 50 Amperes,
              120 VAC, Crydom A2450-B or equal.
    2   -- Model 204 Flasher Unit and Socket
    1   -- Model 206L/E Power Supply Module and Socket
    1   -- AUTO/FLASH Control Switch
    1   -- Flash On Indicator Light
    3   -- 10 Position TBK T1, T2 & T4
    1   -- 4 Position TBK T3
    1   -- SSR Fault Indicator Light
    1   --HI Health Indicator Relay
    1   --K24 VDC Controlled Relay

6.4.3.1.2   PDA #2LS
    1   -- Duplex NEMA 5-15R Controller Receptacle
    2   -- Duplex NEMA 5-15R Equipment Receptacle (one with GFCI)
    1   -- 1 Pole 15 Amperes minimum, 120 VAC Signal Bus Circuit Breaker
    1   -- 1 Pole 15 Amperes minimum, 120 VAC Clean Power Circuit Breaker
    6   -- 1 Pole Ganged, 10 Amperes, 120 VAC Signal Bus Circuit Breaker
              with Auxiliary Switch
    1   -- 1 Pole 15 Amperes, 120 VAC Equipment Circuit Breaker
    1   -- 2 Pole Ganged, 10 Amperes, 120 VAC Flash Bus Circuit Breaker
    1   -- Solid State Relay (Normally Closed) - rated minimum 50 Amperes,
              120 VAC, Crydom A2450-B or equal.
    2   -- Model 204 Flasher Unit and Socket
    1   -- Model 206LS Power Supply Module and Socket

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1        -- AUTO/FLASH Control Switch
1        -- Flash On Indicator Light
3        -- 10 Position TB T1, T2 & T4
1        -- 4 Position TB T3
1        -- SSR Fault Indicator Light
1        --HI Health Indicator Relay
1        --K24 VDC Controlled Relay
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6.4.3.1.3 PDA #3LX
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1        -- Duplex NEMA 5-15R Controller Receptacle
2        -- Duplex NEMA 5-15R Equipment Receptacle
1        -- 1 Pole 15 Amperes, 120 VAC Equip. Circuit Breaker
2        -- 1 Pole 10 Amperes, 120 VAC Field Circuit Breakers
1        -- 1 Pole 15 Amperes, 120 VAC Clean Power CB
1        -- Model 206L/E Power Supply Module and Socket
1        -- Model 208 Monitor Unit and Socket
1        -- Model 430 Flash Transfer Relay and Socket
            (Transfer Relay)
1        -- Watchdog Timer ON/OFF-RESET Control Switch
3        -- Model 200 Switch Pack Sockets
3        -- 10 Position TB T1, T2 & T4
1        -- 4 Position TB T3
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6.4.3.11   Model 206L/LS Power Supply Module

6.4.6   Flash Transfer Relay (Model 430)

6.4.5.1.3 Terminal Positions
TB O1 and O3 terminal positions shall be labeled functionally. A permanent label reading ~~"Channels 9 & 10 Separated"~~ "PED YLW NOT MONTR" shall be placed on the right Output File mounting flange.

6.4.5.2.5 Ped Yellow Disconnect
There shall be an internal Molex type connector to disconnect switch packs 13, 14, 15, and 16 (respectively known as 2P, 4P, 6P, 8P) yellow outputs from the conflict monitor. The connector shall be labeled "CONNECT FOR TESTING ONLY".

CHAPTER 9
MODEL 2070 CONTROLLER
SPECIFICATIONS

9.1.1   Controller Unit

The Controller Unit shall be composed of the Unit Chassis, modules and assemblies per their version. The following is a list of 2070 Versions, their interface rolls and composition:

UNIT VERSION	DESCRIPTION
2070LX+ UNIT	LX+ Unit mates to 170 & ATC cabinets. It consists of: 2070LX + UNIT CHASSIS, 2070-1C CPU, 2070-2E+ (2C+ if ATC Cabinet) FIO, 2070-3B+ FRONT PANEL, 2070-4 POWER SUPPLY, and Model 2070-LAN Module.
2070LX UNIT	LX Unit mates to the 170 & ATC cabinets. It consists of: UNIT CHASSIS, 2070-1C CPU, 2070-2E+ (2C+ if ATC CABINET), FI/O, 2070-3B FRONT PANEL and 2070- 4 POWER SUPPLY

 Note: See Chapter 11 for 2070 NEMA Versions.

CHAPTER 9-SECTION 2
MODEL 2070-1 CPU MODULE

9.2.1 ~~**Model 2070-1M CPU Module**~~
~~The Model 2070-1M CPU Module shall meet the specifications of a Model 2070-1C with exception that it shall host the OS-9 Operating System for Power PC.~~

9.2.8.7   Linux Network Requirements
The following Network utilities not listed under FHS-3.0 shall be provided resident in the Model 2070-1C CPU Module:

arp, ifconfig, netstat, ping, showmount, ntpdate, ntpq, ntptime ntp-wait, and rpcinfo

Full support for NFS and shall have the following daemons resident:

rpc.mountd, and rpc.nfsd

Full support for OpenSSH 7.6 or later and shall have the following daemons and utilities resident:

ssh, scp, sftp, ssh-add, ssh-keysign, ssh-keyscan, ssh-keygen,

sshd, sftp-server and ssh-agent.

Full support for VSFTP in addition to sftp-server and shall have the following daemons resident:

vsftpd release v3.0.3
Full support for NTP and shall have the following daemons resident:

ntpd and ~~ntdpe~~ntpdc

9.2.10 Communications Loading Test
The Model 2070 Controller using the Model 2070-1C~~A and 1E~~ CPU shall pass a Communications Loading Test consisting of Serial and Network Communications. The test shall run Sp1, Sp2, Sp3, and Sp8 at 9600 bytes per second in a continuous full duplex asynchronous/synchronous communications loop with the network stack initialized and a telnet session established for each port with standard out, in and standard error directed to the telnet session port. The test shall not exceed a maximum CPU load of ~~30~~10% during test duration of 96 hours for Model 2070-1C~~E~~ Module. The controller using Model-1C Module ~~shall have a maximum CPU load of 10% for the above test and~~ shall meet all test requirements as defined in Section 8.1.1 of the latest ATC Standard.

9.2.13.1 Copies Delivery

Two copies of the following items will be provided to the purchasing AGENCY on a CD disk readable by a PC compatible computer.

1. Specific hardware memory addresses, including FLASH, SRAM, and DRAM starting addresses, shall be specified and provided. Written documentation of addresses shall be in PDF form and will have the file name of "Memory Map.pdf"

2. Copies of the vendor kernel, and platform drivers ~~and OS-9 utility executable modules~~.

3. Copy of all provided written manuals in PDF form.

4. RE-FLASH Utility and the procedures for its use in PDF form. The PDF documentation of the procedures shall have the file name of "Reflash Utility Procedures.pdf".

10.14.8 System Configuration
The Model 2070-CELL shall support the following features:
- Linux operating system
- Provide TCP and UDP over IP protocol communications.
- Firmware upgrade and system debug via the USB host port on the faceplate.
- Basic firewall, including port forwarding, allowed inbound and outbound IP addresses. Allow access to the modem through SSH using port 2658.
- System health monitoring and remote management
- Hardware watchdog

10.14.9   Web Interface
The Model 2070-CELL shall be provided with Web-Based-Interface (WBI). The WBI shall allow the user to set Network Configuration Parameters and all system configurations using a Web Browser.

As a minimum a user shall be able to do the following via the Web Browser:
- System and Network Status
- WAN Configuration
- LAN Configuration
- Firewall / Security
- Port forwarding
- System Configuration / Administration

MODEL 210 MONITOR UNIT
CABINET WIRING TO EDGE CONNECTOR

CONNECTOR PIN No.	MONITOR FUNCTION	TERMINATION	CONNECTOR PIN No.	MONITOR FUNCTION	TERMINATION
1	SWPK 2 Green		A	SWPK 2 Yellow	
2	SWPK 13 Green		B	SWPK 6 Green	
3	SWPK 6 Yellow		C	SWPK 15 Green	
4	SWPK 4 Green		D	SWPK 4 Yellow	
5	SWPK 14 Green		E	SWPK 8 Green	
6	SWPK 8 Yellow		F	SWPK 16 Green	
7	SWPK 5 Green		H	SWPK 5 Yellow	
8	SWPK 13 Yellow	Molex (See 6.4.5.3.2)	J	SWPK 1 Green	
9	SWPK 1 Yellow		K	SWPK 15 Yellow	Molex (See 6.4.5.3.2)
10	SWPK 7 Green		L	SWPK 7 Yellow	
11	SWPK 14 Yellow	Molex (See 6.4.5.3.2)	M	SWPK 3 Green	
12	SWPK 3 Yellow		N	SWPK 16 Yellow	Molex (See 6.4.5.3.2)
13	SWPK 9 Green		P	Channel 17 Yellow	T&B
14	Channel 17 Green	T&B	R	SWPK 10 Green	
15	SWPK 11 Yellow		S	SWPK 11 Green	
16	SWPK 9 Yellow		T	Channel 18 Yellow	T&B
17	Channel 18 Green	T&B	U	SWPK 10 Yellow	
18	SWPK 12 Yellow		V	SWPK 12 Green	
19	Channel 17 Red	T&B	W	Channel 18 Red	T&B
20	EQUIP. GROUND	01-TERM 9	X	Unassigned	
21	AC-	01-TERM 10	Y	DC GROUND	02-TERM 2
22	WATCHDOG	C4-37	Z	EXTERNAL RESET	02-TERM 5
23	24 VDC	02-TERM 1	AA	24 VDC	
24	Tied together	LOGIC RELAY COIL	BB	STOPTIME	02-TERM 3
25	Tied together	DC GROUND	CC	Unassigned	
26	Unassigned		DD	Unassigned	
27	Output SW, Side #3		EE	Output SW, Side #2 (MC Coil)	01-TERM 12
28	OUTPUT SW, SIDE #1	AC+	FF	AC+ Line	01-TERM 11

NOTES: (FOR THIS DETAIL)

1. Top of relays shall be flush with face of file.
2. The isolation relay shall be Potter & Brumfield R10-E1-X2-115
 (or equal). The logic relay (LR) shall be Potter & Brumfield
 KUP11(D11 or 15) or equal.
3. See connectors C4 & C5 wiring lists for connector/file interface.
4. Sheet definitions:
 CKT = CIRCUIT
 FU = FLASHER UNIT
 FTR = FLASH TRANSFER RELAY
 IFI-14D = INPUT FILE "I", TB 14, POSITION D
 SSR = SOLID STATE RELAY
 MU = MONITOR UNIT
 N.C. = NORMALLY CLOSED RELAY CIRCUIT
 N.O = NORMALLY OPEN RELAY CIRCUIT
 PDA FU1 CKT1 = PDA FLASHER UNIT 1, OUTPUT CIRCUIT 1
 POL PAN = POLICE PANEL
 SW = SWITCH
 SWPK = SWITCH PACK
 T&B = CONDUCTORS CONNECTED TO PIN, TWO FEET IN LENGTH WITH RING
 LUG ON UNCONNECTED END, TIED & BUNDLED SEPARATELY.
 2P-2 = PHASE 2 PED. PIN 2
5. For details, see A2-3 & A2-4.
6. All dimensions shown are in inches.

TITLE:
INPUT/OUTPUT FILE DETAILS
CABINET WIRING TO EDGE CONNECTOR
SHEET 13 OF 13

Errata	NO SCALE
TEES 2020	A6-55