BRITISH COLUMBIA

Ministry of Transportation and Infrastructure

TRAFFIC CONTROLLER DESIGN MANUAL

Section 300

TRAFFIC CONTROLLER CABINET INSTALLATION AND CONFIGURATION

Transportation Systems and Road Safety Engineering

July 2024

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301 INTRODUCTION

301.1 SECTION SUMMARY

.1 This section describes the general processes for preparing and configuring a new traffic controller cabinet for field installation. For more information and specific details regarding the Ministry's TS1 and TS2 cabinets and internal components, refer to the Traffic Controller Assembly Manual Volume 1 (TS1) and the Traffic Controller Assembly Manual Volume 2 (TS2).

302 ASSEMBLY AND MODIFICATION

302.1 TRAFFIC CONTROLLER CABINET LAYOUT

.1 Figures 1 to 4 provide the general layout and configuration for the corresponding TS1 and TS2 traffic controller cabinets.

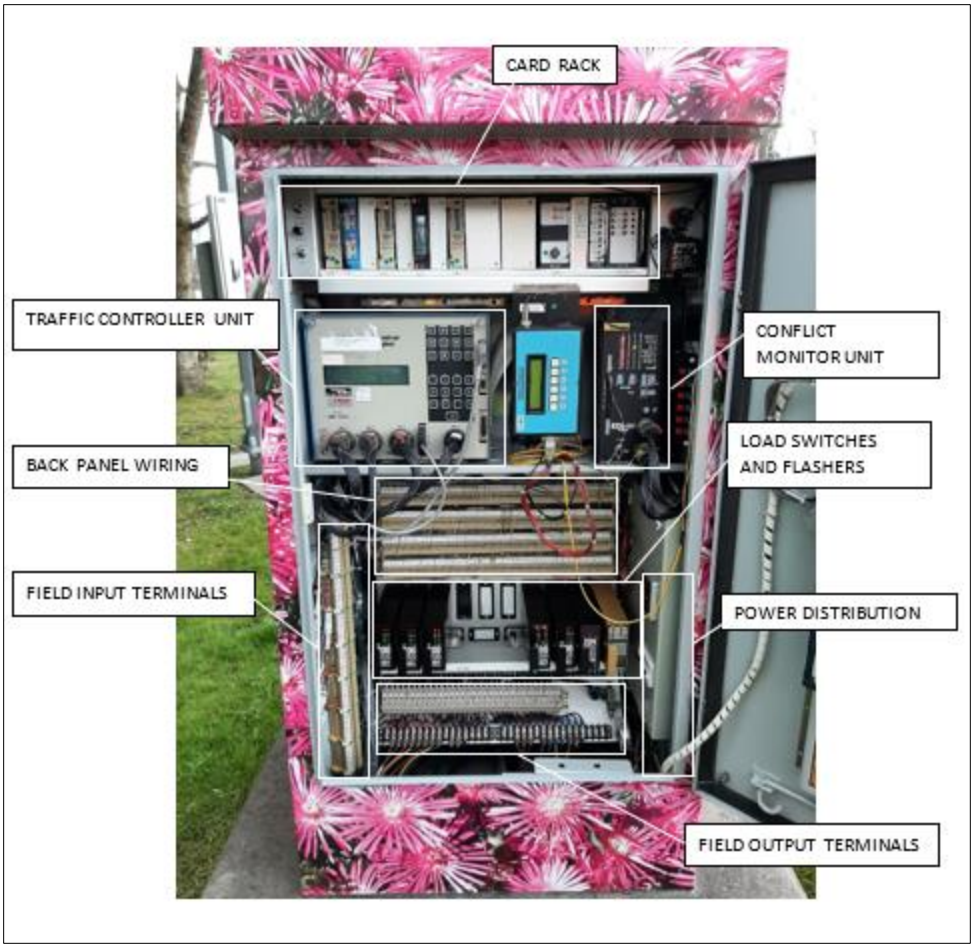

Figure 1. TS1 Four Phase ‘M’ Cabinet front layout

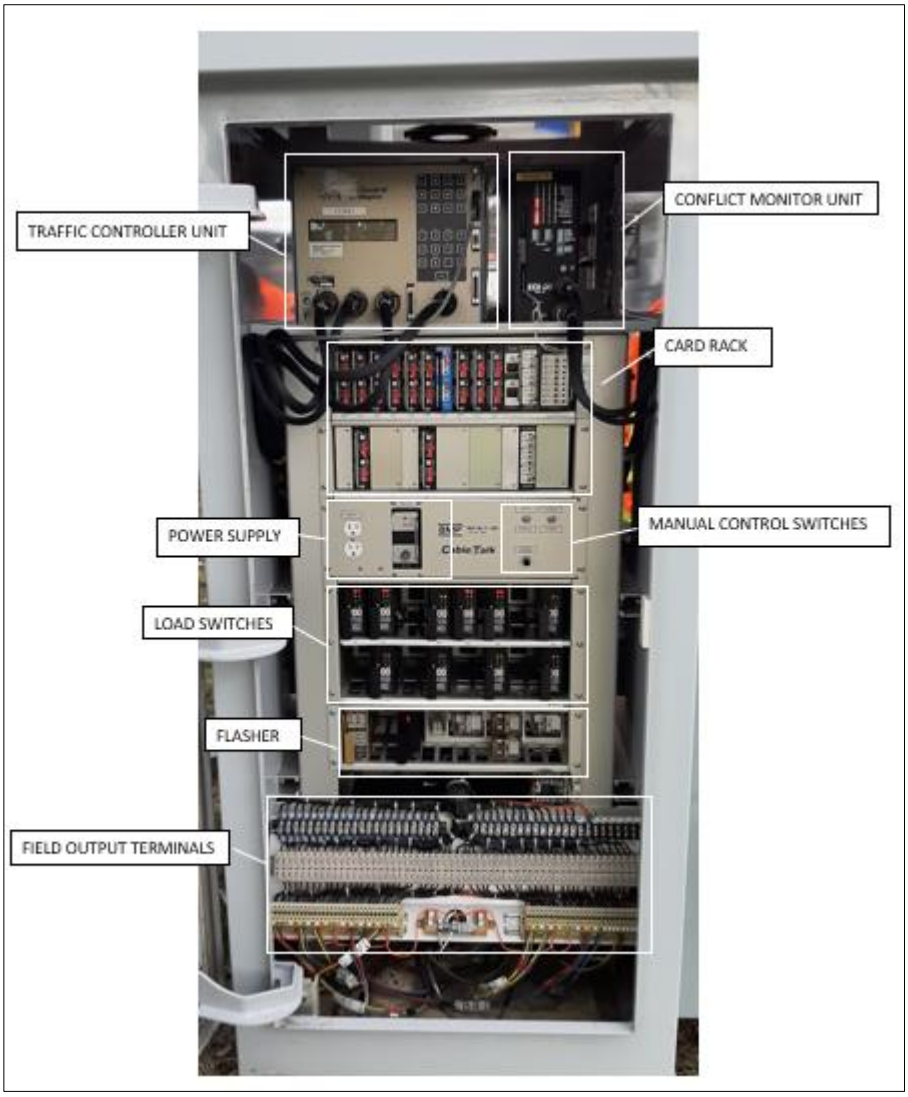

Figure 2. TS1 Eight Phase ‘S’ Cabinet front layout

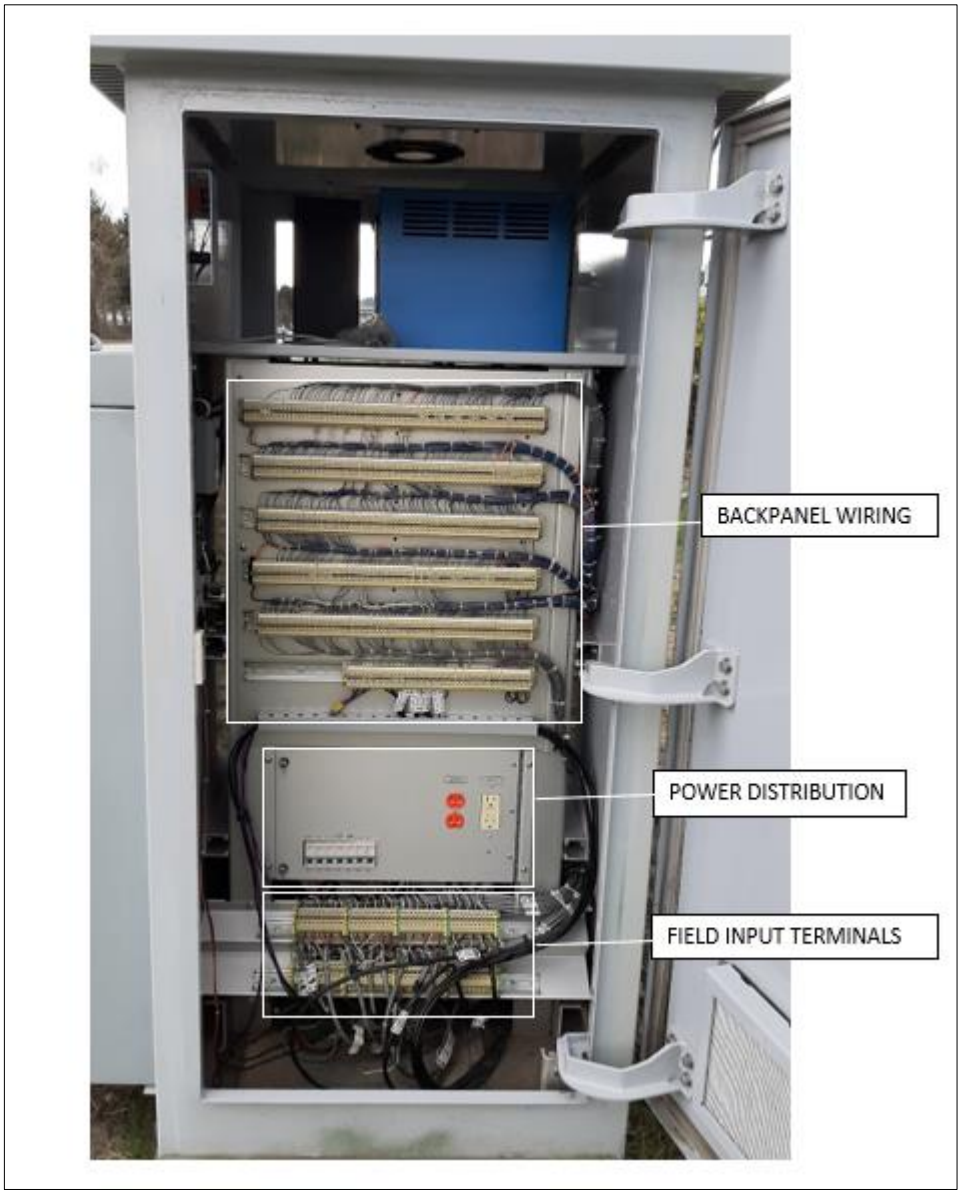

Figure 3. TS1 Eight Phase ‘S’ Cabinet rear layout

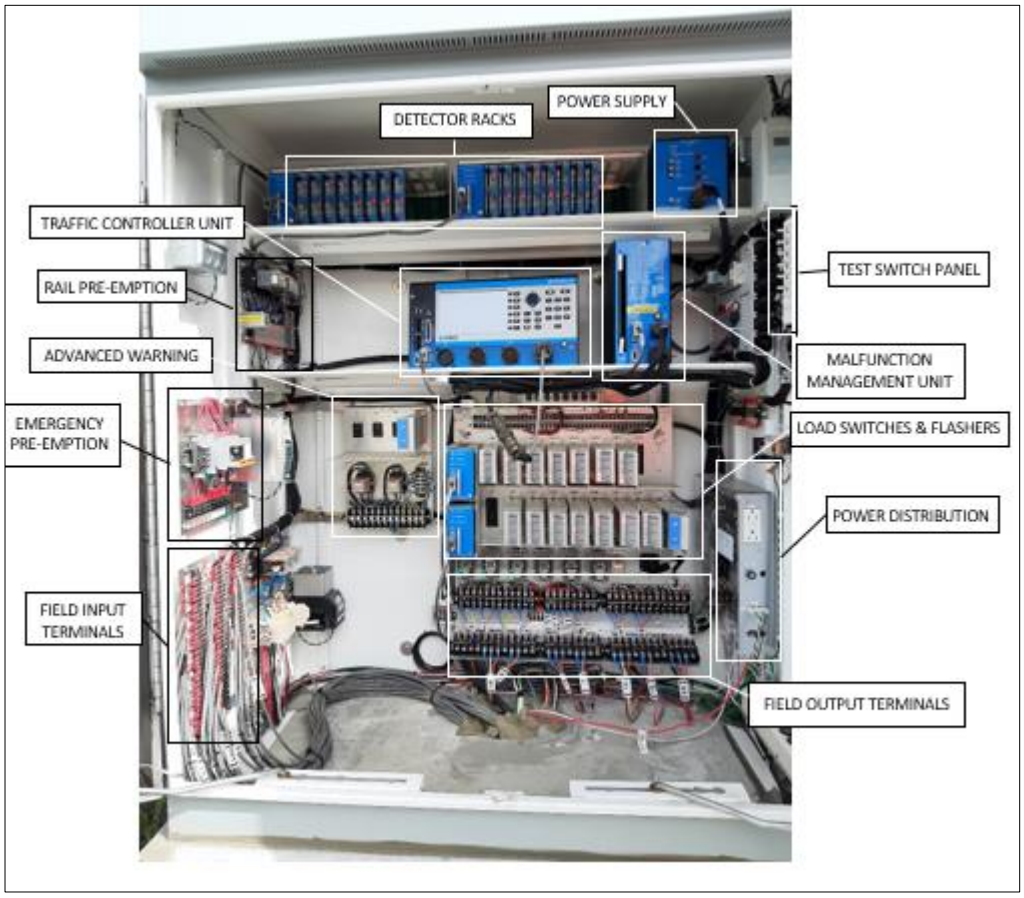

Figure 4. TS2 ‘P6’ Cabinet layout

302.2 WIRING MODIFICATIONS AND EQUIPMENT INSTALLATIONS

302.2.1 Construction and wiring standard

.1 All wiring shall be completed in a neat and organized manner.

.2 Wires shall be bundled in with existing harnesses, where applicable.

.3 Any unused wire ends shall be bundled and insulated.

.4 Crimp-on connectors shall be attached using a proper ratchet crimp tool.

.5 All wiring connections shall be tight and secured.

302.2.2 TS1 – Four and Eight Phase Cabinets

.1 This section describes the installation of existing TS1 cabinets currently operating in the field and is for reference only. The Ministry

no longer installs TS1 cabinets for new signalized intersection projects or replacements of existing traffic controller cabinets. All wiring and equipment modifications shall be documented in the TS1 Traffic Cabinet Construction Document and the corresponding Traffic Controller Drawings.

.2 Traffic Controller Cabinet – Wiring and Modifications

.1 Power Distribution Section

.1 This section connects the traffic controller cabinet to 120VAC from the local electrical service panel.

.2 Field Output Section

.1 This section includes the output terminals to connect the required intersection display wiring.

.2 #14AWG (stranded copper) jumper wires are required to be connected across all unused red outputs to 120VAC.

.3 Back panel Wiring Section

.1 This section includes the traffic controller cabinet system input and output terminals for the following purpose:

.1 Installing jumper wires for the Detector Card Rack Monitoring function.

.2 Installing a jumper wire for the Full Operating Point (FOP) output function.

.3 Installing a jumper wire for the All-Red Time (ART) output function.

.4 Installing the wiring required for the Advance Warning System.

.5 Installing the wiring required for the Pre-emption System.

.6 Installing the wiring modifications to the TEC-3 cable connection points

.7 Installing the TEC-6 cable.

.2 All jumper wires required for this section shall be #22AWG (stranded copper).

.4 Field Loop Connections Section

.1 This section includes the input terminals for connecting the required field loop detectors.

.3 Traffic Controller Cabinet – Internal components

.1 Flasher Section

.1 This section includes the sockets for the following devices:

.1 Flash Transfer Relays

.2 Flash Control Relay

.3 Advance Warning Flashers

.4 Intersection Flasher

.1 The flash frequency switch located at the front of the flasher should be set to 60FPM (Flashes Per Minute). See Figure 5.

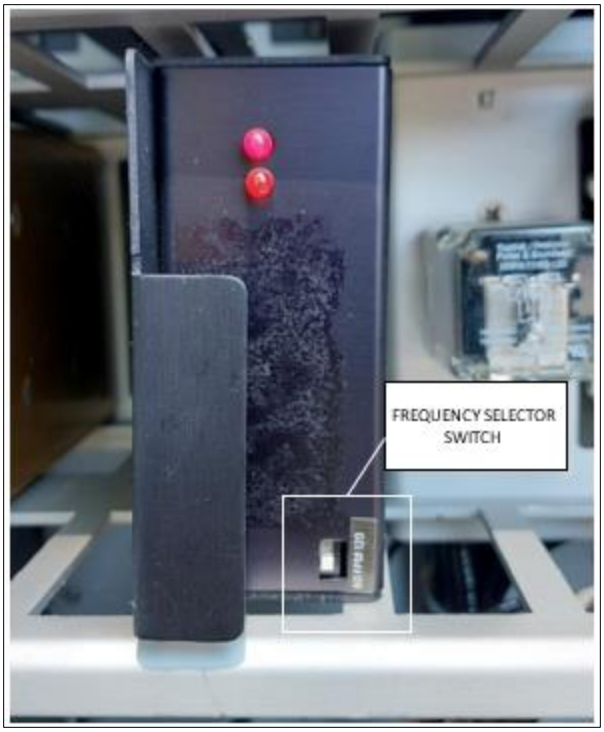

Figure 5. Intersection Flasher

.2 Load Switch Section

.1 This section includes the sockets for connecting the required load switches.

Figure 6. Cabinet Load Switches

.3 Card Rack Section

.1 This Section includes the sockets for connecting the following devices:

.1 Pedestrian / Vehicle Input Modifier Card

.2 Emergency Pre-emption cards.

.3 Detector Unit cards.

Figure 7. Cabinet card rack

.4 Power Supply Section

.1 This section includes the socket for connecting the TEC-PS power supply card.

.5 Communications (if required)

.1 This section includes the provisions to install the TEC5 cable harness to interface the traffic controller with an external modem.

.6 Conflict Monitor Unit (CMU)

.1 This section includes the provisions for interfacing the CMU to the Traffic Controller Cabinet. See Figure 8.

.2 The CMU compatibility programming card shall be programmed specifically for each intersection and shall always remain with the CMU in operation.

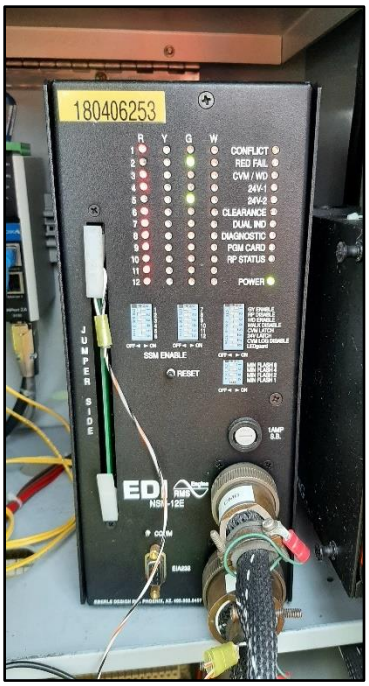

Figure 8. ‘M’ Cabinet Conflict monitor unit.

.7 Blanking Plates

.1 Blanking plates shall be installed to cover any unused detector and/or input card slots.

.2 Blanking plates require sider plates to secure them in place.

.3 Requirements for the blanking and slider plates are as follows:

.1 Single Space – 1 blanking plate, 1 slider plate

.2 Double Space – 1 double blanking plate, 1 slider plate

.3 Ten Spaces – 10 space blanking plate, 2 slider plates

Figure 9. Cabinet Blanking Plates

302.2.3 TS2 – Eight Phase Cabinet

.1 The processes described in this section apply to the installation of the TS2, eight phase Traffic Controller Cabinet required for new signalized intersection developments or replacement of existing TS1, four or eight-phase Traffic Controller cabinets.

.2 Traffic Controller Cabinet – Wiring Modifications

.1 Power Distribution Cabinet

.1 This section connects the Traffic Controller Cabinet to power (120VAC) fed from the local electrical service panel.

Figure 10. ‘P6’ Cabinet Power distribution

.2 Field Output Section

.1 This section includes the output terminals to connect the required intersection display wiring.

.3 Field Loop Connections Section

.1 This section includes the input terminals for connecting the required field loop detectors.

.3 Traffic Controller Cabinet – Internal Component

.1 Flasher Section

.1 This section includes the sockets for the following devices.

1. Flash Transfer Relays
2. Flash Control Relay
3. Advance Warning Flashers
4. Intersection Flasher

Figure 11. ‘P6’ Flash Transfer relays

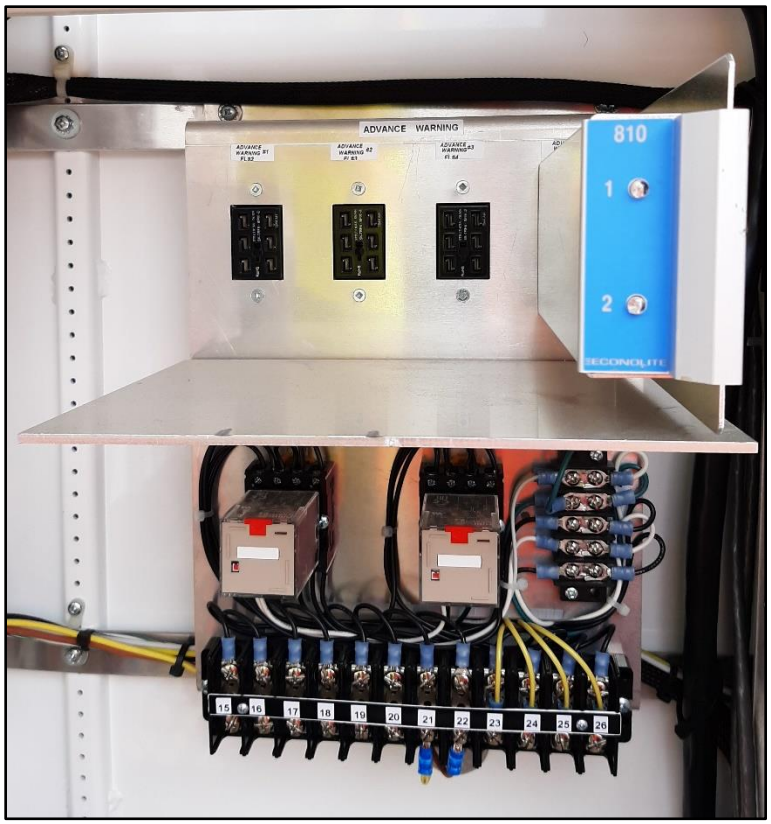

Figure 12. ‘P6’ Cabinet Advanced Warning Flasher.

.2 Load Switch Section

.1 This section includes the sockets for connecting the load switches required.

.2 A jumper connection (spare jumper forks provided by vendor) between terminals 1 and 3 is required for each unused load switch socket.

Figure 13. ‘P6’ Load Switches

.3 Detector Rack Section

.1 This section includes the sockets for connecting the required detector unit cards.

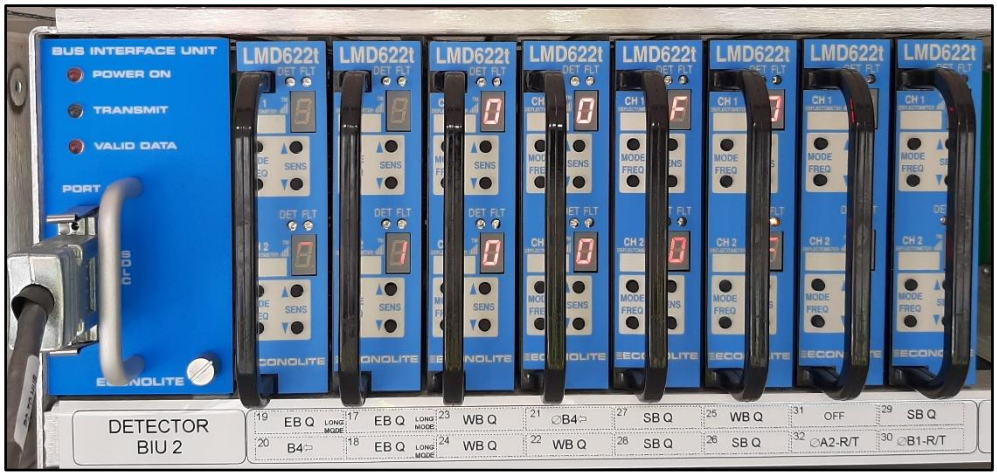

Figure 14. ‘P6’ Detector Rack

.4 Power Supply Section

.1 This section includes the provisions to interface an external shelf-mounted power supply to the traffic controller cabinet.

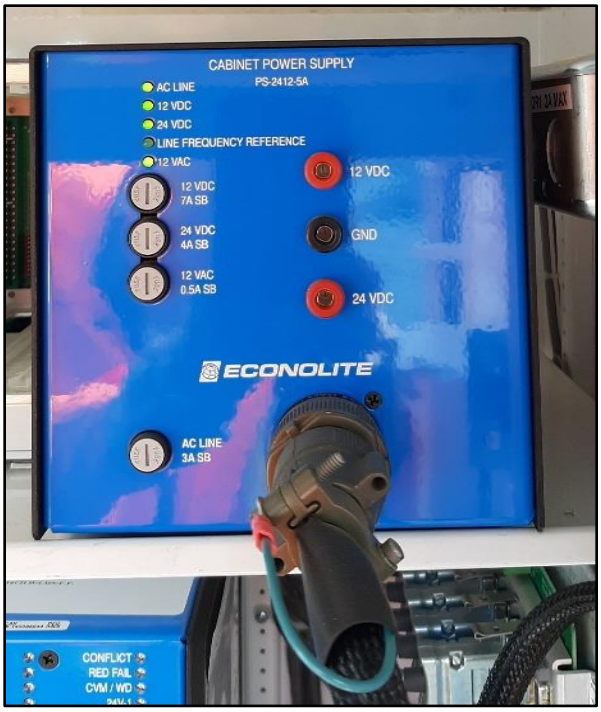

Figure 15. ‘P6’ Cabinet power Supply

.5 Communications (if required)

.1 This section includes the provisions to interface the traffic controller unit to the required networking devices (modem, switch, etc.).

.6 Malfunction Management Unit (MMU)

.1 This section includes the provision to connect and interface the MMU to the traffic controller cabinet and the traffic controller unit.

.2 The MMU compatibility programming card shall be programmed specifically for each intersection and shall remain with the MMU in operation.

Figure 16. Malfunction Monitor Unit (MMU)

.7 Synchronous Data Link Control (SDLC) Communications

.1 This section includes the sockets from SDLC Distribution Centre for connecting the following devices:

.1 Bus Interface Units (BIU)

.1 Load Switch Section (2 units)

.2 Detector Rack Section (1 unit per detector rack)

.2 MMU (Port 1)

.3 Controller Unit (Port 1)

Figure 17. ‘P6’ Cabinet SDLC Distribution Centre

303 FINISHING PROCEDURES

303.1 LABELLING

303.1.1 Labelling Standards

.1 Cabinet component labelling shall be done using a label maker, printing on adhesive tape with black lettering on a white background. Lettering shall be a minimum of 5mm high where possible.

.2 Cabinet field wire labelling shall be done using plastic cable tags, fastened to the applicable conductor(s). The identification of the applicable conductors shall be clearly written on the cable tag using a permanent marker (black ink).

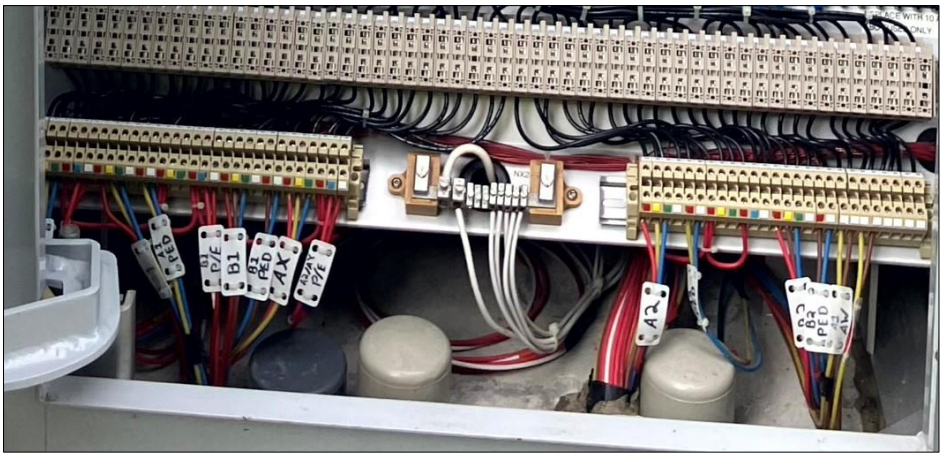

Figure 18. Typical field wire labelling

.3 Labels shall be used for identifying cabinet location, Pre-emption interface cards, Detector Unit cards, Load Switches, and unused sockets (TS1 cabinets only).

.4 The following sections will provide guidance on correct labelling for the applicable components.

303.1.2 Location and Drawing Standards

.1 The location, city and drawing number shall be labelled with 20mm tape on the inside of all doors as shown in Figure 20.

LOCATION: HIGHWAY 11 @ MAIN STREET, ABBOTSFORD
DRAWING: TE-23189-2

Figure 19. Typical Location Label

303.1.3 Pre-emption Cards and Inputs

.1 The labeling for the Pre-emption Card shall include the phase/movement and the pre-emption channel number, printed on a 20mm tape. See Figure 20.

Figure 20. Typical Pre-emption Card Label

303.1.4 Detector Unit Cards

.1 The labelling for the detector unit cards shall include the phase/movement for each channel, printed on a 10mm tape. See Figure 21.

Figure 21. Typical Detector unit Card Labeling

303.1.5 Load Switches

.1 The labelling for the load switches shall include the phase/movement for each load switch, printed on a 10mm tape.

.2 Any unused load switch sockets shall be labelled with an "X" as shown in Figure 22.

Figure 22. TS1 Typical Unused Load Switches and Flasher Socket Label

303.1.6 Unused Sockets

.1 The labelling for any unused sockets (TS1 cabinets) shall show an "X" See Figure 23.

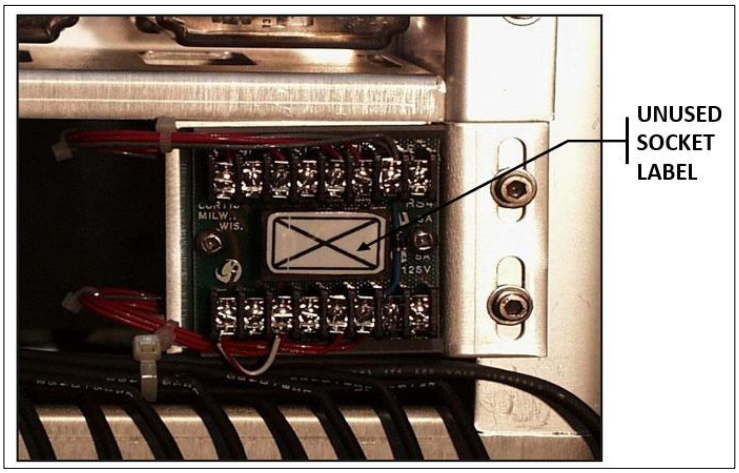

Figure 23. Typical TS1 unused Load Switch and Flasher Socket Label

304 TESTING

304.1 INTRODUCTION

.1 This section describes the processes for testing the Traffic Controller Unit and Traffic Controller Cabinet to ensure all programming and configurations functions according to the design documentations.

304.2 TESTING PROCEDURES FOR TS1 AND TS2 CABINET

304.2.1 General

.1 The field output terminals of the TS1 and TS2 Traffic Controller Cabinet shall be connected to a light board panel (with indicators for all output phases) to test the expected output displays.

304.2.2 Conflict Monitor Unit (CMU) Malfunction Management Unit (MMU)

.1 Verify the CMU or MMU dip switch settings are as per the configuration shown in the applicable traffic controller drawings.

.2 Verify the CMU or MMU compatibility card programming as per the required phase pairing shown in the applicable traffic controller drawing.

.3 Verify the correct operation of the CMU or MMU by applying 120 Volts to the traffic cabinet field output terminals of the non-activated circuits (yellow, green, walk) to simulate an unexpected output and confirm the fault is detected by the CMU or MMU.

304.2.3 Intersection Flash Manual flash control switch

.1 Verify the intersection Flash operation by placing the main circuit breaker in the traffic controller cabinet in the "On" position and all remaining circuit breakers in the "Off" or "Flash" position to simulate a signal flash condition. Confirm the resulting output displays (flashing) are in accordance with the requirements detailed in the Signal Timing Sheet.

.2 Verify the correct start-up operation of the traffic controller cabinet by placing all circuit breakers in the "On" position and the cabinet internal flash switch to the "3-Colour" position. For TS1 cabinets, verify the "INH" (Inhibit) indicator LED on the Veh/Ped input modifier card is active when the Traffic Controller Cabinet is energized. Observe and

confirm the traffic controller unit is cycling through all phases while the intersection output remains in flash.

.3 Verify the correct operation of the police door switch by placing the switch in the "Flash" position to confirm the intersection flash operations and to the "3-Colour" position to return the intersection to 3-Colour operation. For TS1 cabinets, verify the "INH" indicator LED on the Veh/Ped input modifier card turns on momentarily followed by the traffic controller cycling sequence while the field output displays a flashing condition. Once the traffic controller unit has successfully cycled through all phases, the FOP (Full Operation Point) indicator LED on the Veh/Ped input modifier card will turn on, followed by the "EN" (Enable) indicator LED. At this point, the intersection will display the phase movements in accordance with the Signal Timing Sheet.

.4 Verify the correct operation of the Advance Warning System by confirming the delay time applied by the traffic controller unit matches the delay time settings on the Advance Warning Card (TS1 only) when the highway movement phase is cycled to the cross-street movement phase. For Econolite Cobalt (TS2) controllers, confirm the Trailing Green Time in the applicable overlap phase(s) program settings matches the Advanced Warning Flasher time in the issued STS.

304.2.4 Full Operation Point (FOP)

.1 Verify the correct operation of the FOP function (TS1 only) by switching the traffic cabinet operation from "Flash" operation to "3-Colour" operation and confirm the correct indication and operation as described in Section 304.2.3.3.

.2 If the traffic intersection is required to flash in all-red, verify the correct operation All-Red Timer (ART) by confirming the jumper connection has been installed in the traffic cabinet back panel and observe the first red interval is held for 3 seconds before cycling to 3-Colour operation. If the traffic intersection is not required to flash in all-red, the ART jumper connection is not required, and the traffic signal display will advance from flashing red/yellow to 3-Colour operation. For TS2 cabinets, the ART is programmed to the traffic controller unit.

.3 If the traffic intersection is required to flash in all-red, verify the correct operation of the ART by confirming the jumper connection has been installed in the traffic cabinet back panel and observe the first red interval is held for 3 seconds before cycling to 3-Colour operation. If the traffic intersection is not required to flash in all-red, the ART jumper connection

is not required, and the traffic signal display will advance from flashing red/yellow to 3-Colour operation. For TS2 cabinets, the ART is programmed to the traffic controller unit and no external wiring is required.

304.2.5 Controller Unit Programming

.1 Verify the correct programming of the traffic controller unit by comparing the timings and operating details in the STS and LAS with the programmed values and settings in the traffic controller unit. This verification shall be completed by a different technician who was not responsible for the initial programming.

304.2.6 Advance Warning

.1 Verify the operation of the Advance Warning System by:

1. Confirming the Advance Warning field outputs are active with the correct phases in accordance with the STS.
2. Confirming the Advance Warning pre-termination intervals are in accordance with the STS.
3. Confirming the Advance Warning Card indication LEDs (TS1 only) are ON when the Advance Warning is ON.
4. Confirming the cascading Advance Warning (if used) is operating in accordance with the STS.

.2 Verify the operation of the Pedestrian Call System by:

1. Confirming a pedestrian call by pressing the applicable pedestrian phase pushbuttons on the PED/VEH card (TS1 only) and simulate for the correct pedestrian input actuation and servicing on the Traffic Controller Unit.
2. Confirming a pedestrian call by placing a jumper connection between the field terminals for each pedestrian pushbutton and checking the correct pedestrian input actuation and servicing on the Traffic Controller Unit.
3. Simulating a pedestrian call by actuating the applicable pedestrian phase switch on the Testing Panel (TS2 only) and confirming the correct pedestrian input actuation and servicing on the Traffic Controller Unit.

304.2.7 Cabinet PED/VEH Simulator (TS1) and Test Switch Panel (TS2)

.1 Verify the operation of the PED/VEH Card (TS1 only) by pressing the vehicle and pedestrian phase pushbutton to simulate the corresponding calls. Confirm the input is correctly actuated and serviced in accordance with the issued STS

.2 Verify the operation of the Test Switch Panel (TS2 only) by toggling the vehicle, pedestrian, and Pre-Emption (if applicable) switches to simulate the corresponding calls. Confirm the input is correctly actuated and serviced in accordance with the issued STS.

304.2.8 Manual Control Switch and Interval Advance Pushbutton

.1 Verify the “Manual” function of the Traffic Controller Cabinet by placing the auto/manual switch to the "Manual" position. Confirm the Traffic Controller Unit has stopped its cycling process.

.2 While in the 'Manual' mode of operation, verify the sequencing of Traffic Controller Unit program by pressing the Interval Advance pushbutton. Confirm the Traffic Controller Unit successfully and correctly cycles to the next sequence, while also confirming the correct timing (i.e., yellow, and red clearance times) are displayed. Continue verifying all remaining programmed sequences using the Interval Advance pushbutton and confirm the correct operation for each cycle in accordance with the issued STS.

.3 Verify the “Auto” function of the Traffic Controller Cabinet by placing the auto/manual switch in the "Auto" position. Confirm the Traffic Controller Unit returns to the programmed cycling operation in accordance with the issued STS.

.4 The auto/manual switch shall be in the "Auto" position for normal operating condition.

304.2.9 Pre-emption

.1 Verify the configuration of the TEC-DPE3 Pre-emptor Card (TS1 only) by confirming the DIP switches are set according to the Traffic Controller Drawings.

.2 Verify the operation of the TEC-DPE3 Pre-emptor Card by:

.1 Placing the 'Local/Remote' switch to the 'Local'' position, followed by pushing the 'Test' button to simulate a Pre-emption call. Confirm the correct Pre-empt input is actuated, and pre-emption phase is serviced on the Traffic Controller Unit and field indications/devices, in accordance with the issued STS.

.2 Placing the 'Local/Remote' switch to the 'Remote' position, followed by pushing the 'Test' button to simulate a Pre-emption call. Confirm the correct Pre-empt input is actuated, and pre-emption phase is serviced on the Traffic Controller Unit and field indications/devices, in accordance with the issued STS.

.3 Verify the operation of the Pre-emption field terminals (TS1 only) by:

.1 Installing a jumper connection between the pre-empt field terminals.

.2 Placing the 'Local/Remote' switch on the TEC-DPE3 Pre-emptor Card to the ''Remote'' position, followed by removal of the jumper connection previously installed.

.3 Confirming the correct Pre-empt input is actuated, and pre-emption phase is serviced on the Traffic Controller Unit and field indications/devices, in accordance with the issued STS.

304.2.10 Detector Unit Inputs

.1 Verify the operation of the Detector Cards installed by connecting a test loop to the field terminals to simulate vehicle calls. Confirm the detector input is actuated on the Traffic Controller Unit in accordance with the design LAS.

304.2.11 Flash Control Circuit General

.1 Verify the operation of the Flash Control Circuit by:

.1 Simulating a fault condition and confirming the CMU or MMU places the Traffic Controller Cabinet and Controller Unit in a flash state.

.2 Returning the Traffic Controller Cabinet and Controller Unit to normal operation by pressing the ''Reset'' button on the CMU or

MMU. Confirm the Traffic Controller Cabinet resumes normal operation at its programmed FOP.

304.2.12 Labelling

.1 Verify the correct labelling of the following:

.1 Location and drawing number on the inside "Front" cabinet door.

.2 TEC-DPE3 Pre-emption Card (TS1 only)

.3 Detector Unit Cards (i.e., A1/A1, A2/A2, etc.)

.4 Load Switches (TS1 only)

.5 Safety information (one label on each door)

304.2.13 Traffic Controller Unit Communication Ports

.1 Verify the connectivity of the Traffic Controller Unit by connecting the TEC4 communications cable to a laptop and the communications connector, accessed from the police door (TS1 only) of the Traffic Controller Cabinet. Confirm the Traffic Controller Unit can be connected to the laptop, using the LMSystem software (see Appendix 300B).

304.2.14 Heater and Fan

.1 Verify the operation of the Traffic Controller Cabinet heater and fan by adjusting the temperature setpoint, and confirming the heater and fan are responding accordingly. For normal operating conditions, the temperature setpoints heating and cooling shall be -7°C (20°F) and 33°C (90°F) respectively.

304.2.15 Operation Checks

.1 With the Traffic Controller Cabinet in 3-colour operation, verify the following:

.1 The status indicator LED outputs on the CMU or MMU matches the load switch LED indicators during normal operation, as the Traffic Controller Unit cycles through each phase.

.2 The status indicator LED outputs on the CMU or MMU matches the field outputs of the Traffic Controller Cabinet (using a light board tester) as the Traffic Controller Unit cycles through each phase.

.2 Verify the operation of the Traffic Controller Cabinet internal light and light switches.

1. For TS1 cabinets, the light and light switches are located at the top of the cabinet.

2. For TS2 cabinets, the light strip is located at the top of the cabinet and light switch located on the top right door flange of the right cabinet door.

.3 Verify the operation of the cabinet power supply by confirming the output levels of the 24VDC and 12VAC terminals.

.4 Verify the operation of the 120VAC GFCI receptacles by confirming the output levels of each receptacle.

.5 Verify the overall condition of the Traffic Controller Cabinet and confirm all mechanics of the cabinet (doors, tables, handles, etc.) functions as designed.

304.2.16 Data Capture

.1 The programming of the Traffic Controller Unit is not covered in this manual.

.2 Refer to the LMD 8000 Programming Guide, and the Cobalt Programming Guide for detailed programming information.

.3 When LMD8000 programming is complete, produce a Controller Unit Program Data Capture using the TCCSS program. Instructions for using the TCCSS software are contained in Appendix 300C. The Controller Unit Program Data Capture produced must be from the Traffic Controller Unit that is to be installed in the traffic controller cabinet.

.4 When Econolite Cobalt programming is complete, save the Traffic Controller Unit .cfg file to a USB or SD Card memory device. This .cfg must be stored in a file system folder that clearly specifies the intersection name and the STS date of the program.

.5 A peer review of the program must be completed before installation.

.6 All current and superseded controller programming must be kept by the Electrical Maintenance Contractor and be available upon request by the Ministry.

.7 Install the Traffic Controller Unit in the cabinet and record the date and time of installation. A digital copy of the Traffic Signal Record (TSR) form shall be sent to the Ministry each time a new timing plan has been implemented or when a traffic controller is installed. This form is included in Appendix 500A.

304.2.17 Design Changes During Assembly Construction and Testing

.1 If the issued STS results in Traffic Controller programming issues during the Testing Process, the EMC Technician shall notify ITS Ops and request a new STS be issued with the corrections required.

304.2.18 Final Documentation

.1 Verify and confirm all information in the design documents are up to date, capturing all changes (if any) made to the Traffic Controller Unit programming or the Traffic Controller Cabinet configuration during the programming and testing process.

.2 Verify and confirm the following documents is made available and included in the Traffic Controller Cabinet documentation pouch:

.1 Loop Assignment Sheet

.2 Construction Document

.3 Issued STS

.4 Full Size Traffic Controller Drawing

.5 Full Size Signal Intersection Site Plan

.6 Traffic Controller Unit Programming Data Capture

.3 Once the Traffic Controller Unit and Traffic Controller Cabinet has been fully tested, a signed copy of the Traffic Controller Cabinet Construction Document shall be included in the document pouch.

BRITISH COLUMBIA

Ministry of Transportation and Infrastructure

TRAFFIC CONTROLLER DESIGN MANUAL

Appendix 300A

TRAFFIC CONTROLLER CONSTRUCTION CONSUMABLES

(Removed)

Electrical and ITS Engineering

July 2024

BRITISH COLUMBIA

Ministry of Transportation and Infrastructure

TRAFFIC CONTROLLER DESIGN MANUAL

Appendix 300B

DOSBOX

INSTRUCTIONS

Transportation System and Road Safety Engineering

July 2024

DOSBox version 0.74

Description - an open-source DOS emulator, which can run most DOS software on current 64-bit operating systems. DOSBox is available for a variety of OS' (Linux, Mac OS X, Windows, etc.) and can be downloaded free at https://www.dosbox.com/.

Setup Procedure

1. Install the DOSBox application and create a new folder in the local drive which DOSBox was installed.
2. Copy all files for the DOS application to run to the new folder created in the previous step.
3. Once DOSBox is installed, start the application and two separate windows will appear (see below). All commands and instructions will be entered in the main window.

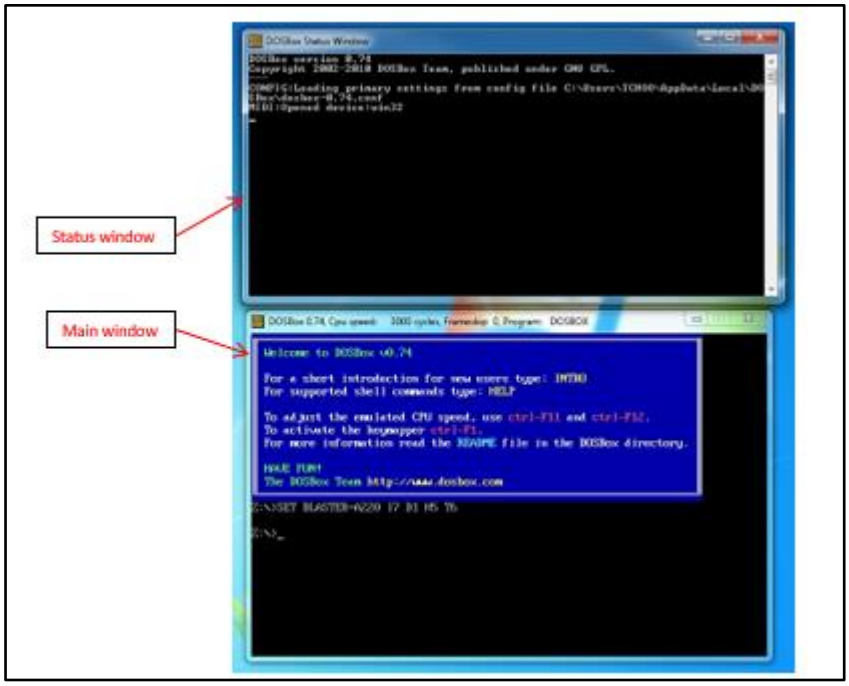

Figure 24. DOSBox start-up screens

4. In order to access the folder/directory where the DOS applications are stored, your local drive must first be mounted using DOSBox. This procedure must be entered each time DOSBox is started.

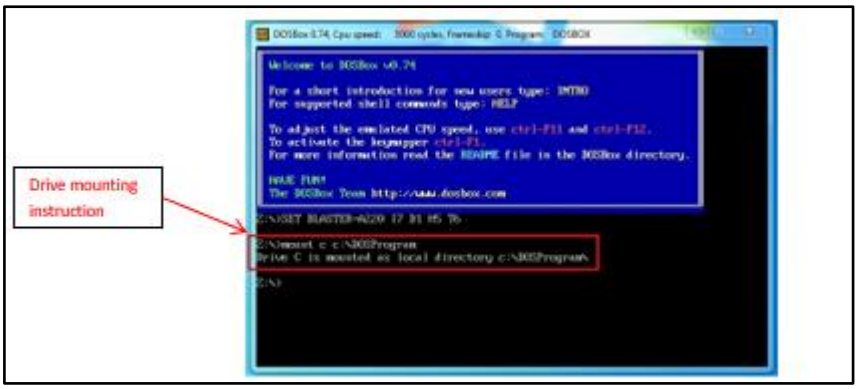

Figure 25. Local drive mounting

5. Once mounted, the DOS application folder, subfolders and applications can now be accessed.

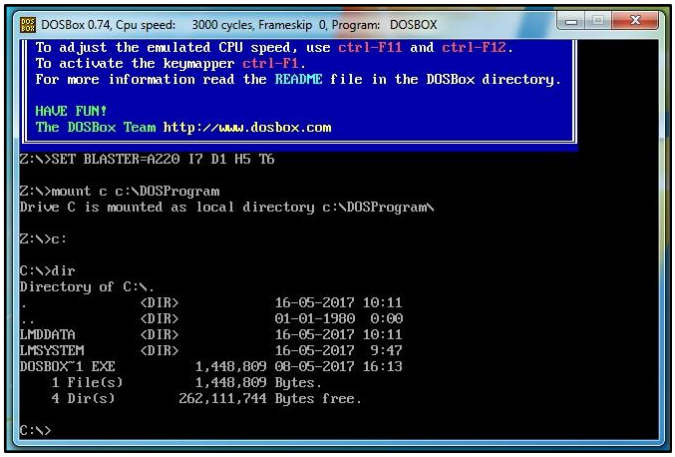

Figure 26. Folder/application access in DOSBox

Automatic Drive Mounting Procedure

1. In the start menu, search for the DOSBox 0.74 Options application in the DOSBox - Options folder. Select and open the DOSBox 0.74 Options file to access the DOSBox Configuration file.

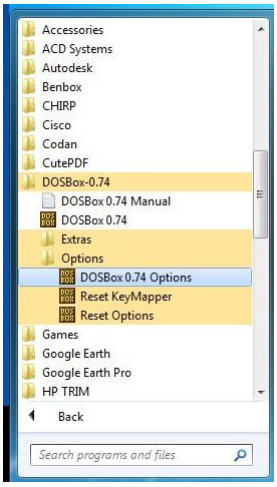

Figure 27. DOSBox0.74 Options

2. The DOSBox configuration file is opened in notepad format. This configuration file stores all configuration and setting information for the DOSBox application.

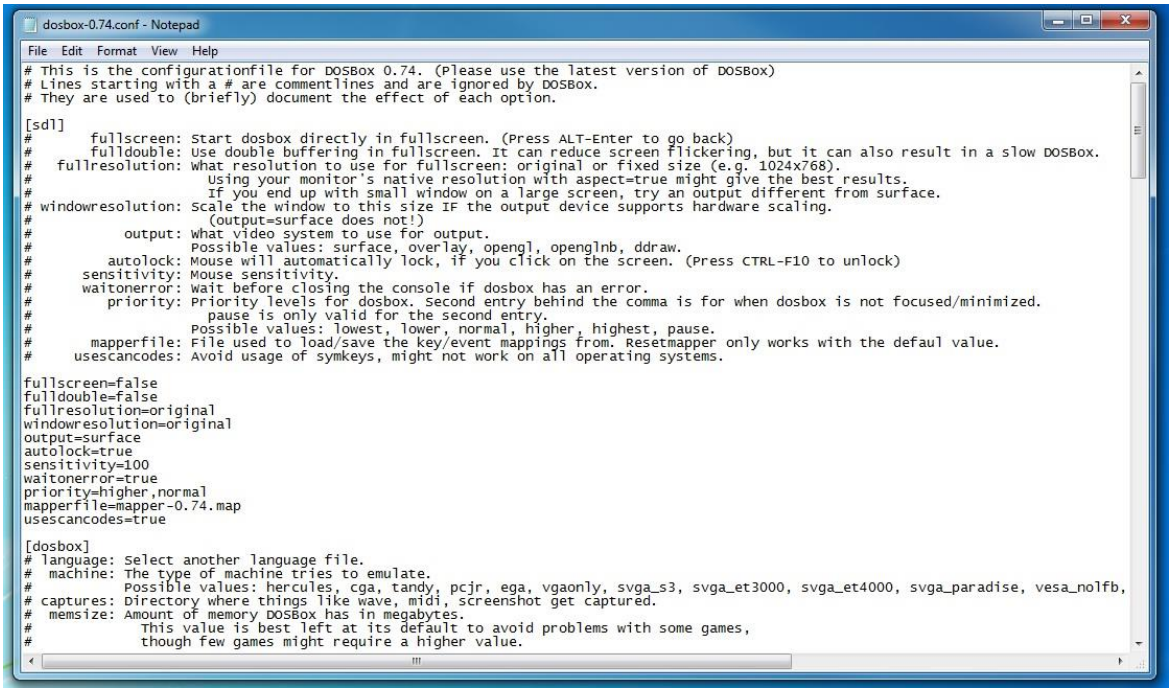

Figure 28. DOSBox configuration information & instruction file

3. Scroll down to locate the “autoexec” section and enter the mounting instruction (mount c c:*folder_name*) as shown below.

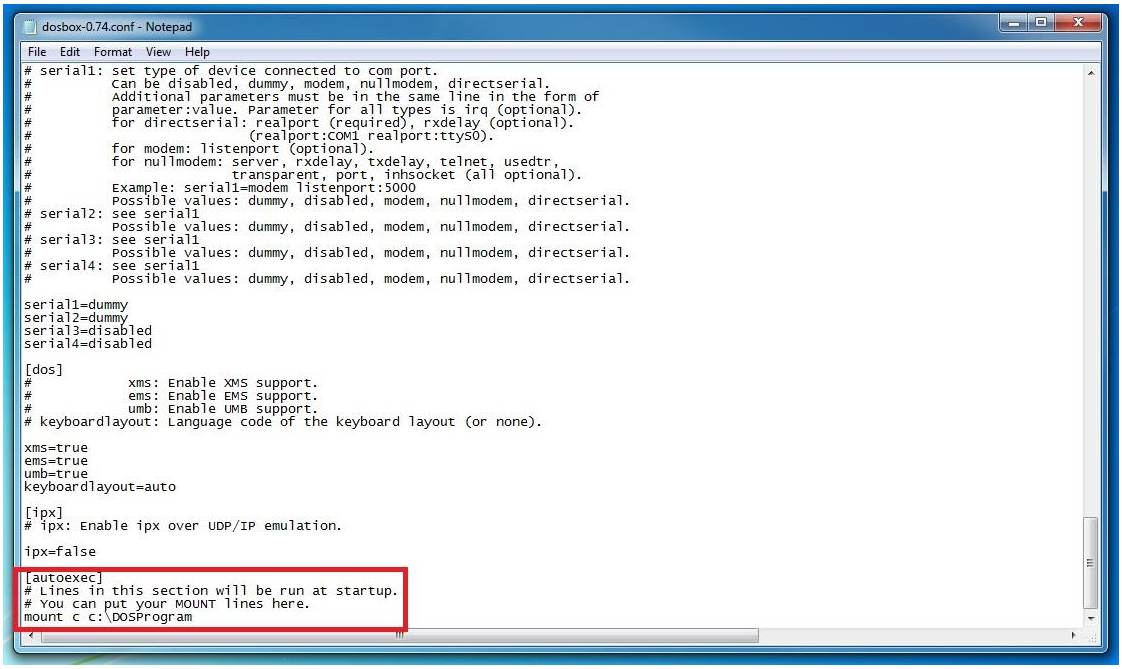

Figure 29. Autoexec instruction

4. Save the file and launch the DOSBox application. You will now see that the selected drive and folder has been mounted automatically from the instructions entered in the previous step.

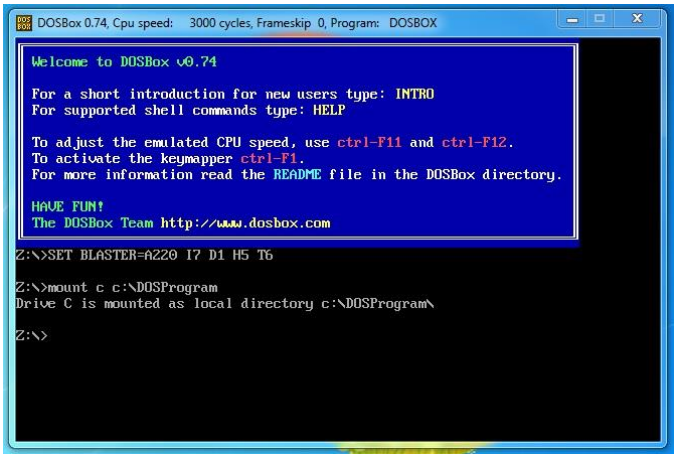

Figure 30. DOSBox start-up with autoexec

Communication Setup Procedure

1. Open the DOSBox configuration file by selecting the DOSBox0.74 Options file found in the start menu.
2. Scroll down the configuration file to locate the serial communication setting section. A general description/instruction can be found to enable communication port access using DOSBox.

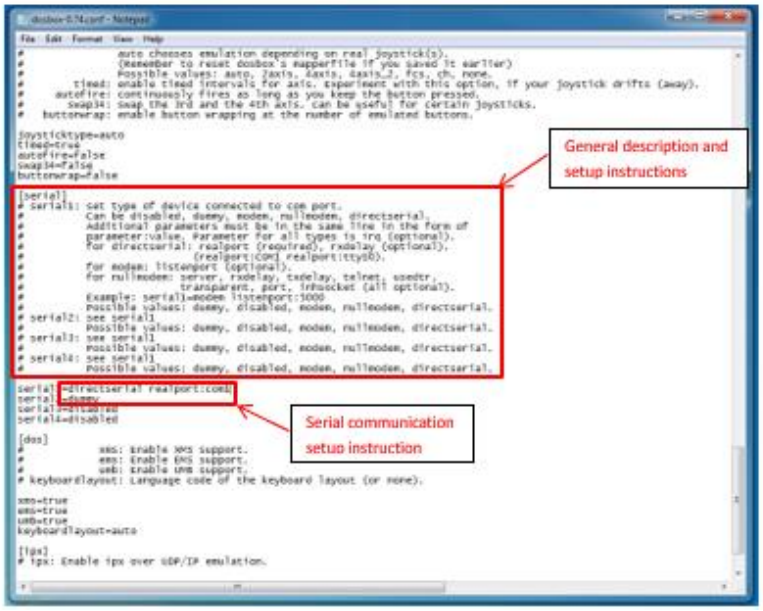

Figure 31. Serial Communication

3. The serial communication port number (i.e., COM1, COM2, etc.) for the workstation must be correct. If using a USB-to-Serial adaptor, enter the communication port number in which the adaptor is installed in the system device manager.

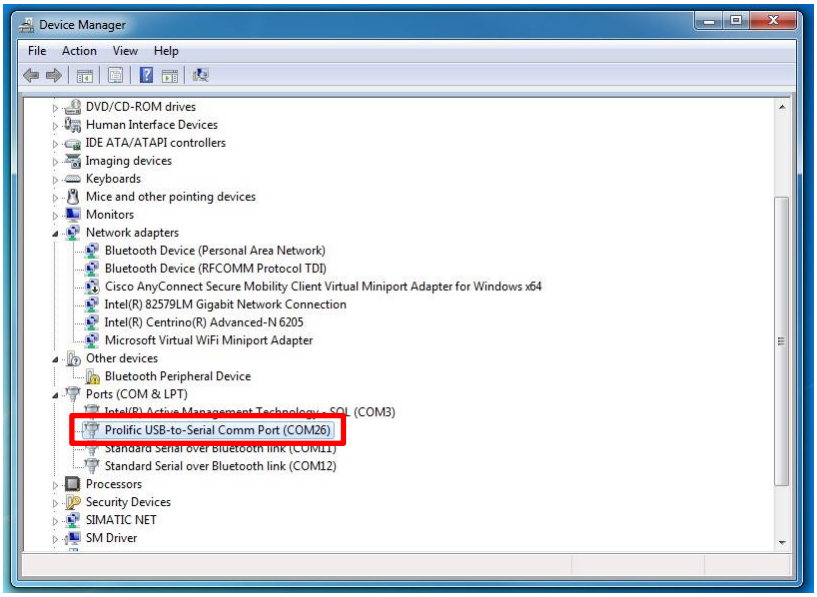

Figure 32. USB-to-Serial Communication port number

Notes:

- The maximum data transfer rate the LMSystem software is limited to 1200 baud. The default setting when installing a USB-to-Serial adaptor is 9600 baud and will need to be adjusted to match LMSystem.
- The maximum data transfer rate for the TCCSS software is 9600 baud.

- Compatibility issues regarding different USB-to-Serial adaptors exist which may prevent communication to the LMD controllers to be established. In the event of such case, insert a different USB-to-Serial adaptor (from a different manufacturer) while following the steps above.