Remote Monitoring and Control of Traffic Control Equipment via a Telecommunications Network
Remote Monitoring and Control of Traffic Control Equipment via a Telecommunications Network

(This page left intentionally blank)
TR 2522 A

REMOTE MONITORING AND CONTROL OF TRAFFIC CONTROL EQUIPMENT VIA A TELECOMMUNICATIONS NETWORK

CONTENTS

Section
1 Introduction
2 Functional Requirements
3 Normative References
4 History

Appendix A Informative Guide
Remote Monitoring and Control of Traffic Control Equipment via a Telecommunications Network

(This page left intentionally blank)
1 INTRODUCTION

1.1 This specification covers the essential requirements for remote monitoring and control equipment for use with traffic control equipment via a dial-up connection.

1.2 This specification supersedes specification MCE 0152 and the previous approval process described therein.

1.3 As a statutory requirement equipment manufactured according to this specification must be approved before its use is permitted on the public highway.

1.4 Statutory Approval (Approval) shall be in accordance with the requirements for Self-Certification set out in TRG 0600.

1.5 Within this specification, “The Product” shall mean all components necessary to provide a complete operational system meeting the requirements of this specification and the Common Requirements defined in TRG 0600.

1.6 Guidance to potential users of a Product approved to this specification is given in Appendix A.

Implementation

1.7 This specification will be immediately implemented from the date of issue for all new approvals.

1.8 Equipment Approvals for this product issued under the previous procedures defined in TRG 0500 will remain valid and no retrospective action will be required providing the build state of that equipment remains unmodified.

Glossary of Terms

1.9 A comprehensive glossary of terms is given in Highways Agency document TA84 Code of Practice for Traffic Control and Information Systems for public highways.
2 FUNCTIONAL REQUIREMENTS

General

2.1 This specification defines the requirements of a Product to provide remote monitoring and control of traffic control equipment via a dial-up telecommunications network.

2.2 The Product shall be designed for connection to traffic signal controllers complying with TR 2500.

2.3 For the purposes of this Product specification remote monitoring and control systems are divided into two classes as follows:
   i) Monitoring and Control systems, which monitor traffic control equipment for faults, status and timings and, in addition, provide a means of remotely controlling traffic control equipment;
   ii) Monitoring-Only systems, which provide the monitoring facilities described in i) above, but which do not provide any means of influencing the operation of the traffic control equipment.

2.4 The Product shall comprise an InStation, which may be either a shared UTC computer, or a dedicated processor; a data transmission system via a dial-up telecommunications network; and an Outstation Monitoring and Control Unit (OMCU), or Outstation Monitoring Unit (OMU) at each outstation.

Performance

Instation Equipment

2.5 The instation equipment shall be capable of performing the following functions:
   a) Transmit information to the outstation to affect those control functions specified in the Works Specification accompanying the procurement contract. (See the NOTE following clause 2.23 (b)).
   b) Transmit to the outstation the necessary messages to gain access to the monitoring information specified in the Works Specification.
   c) Receive from the outstation information messages transmitted in response to a) and b) above.
   d) Provide a means of operator input of the specified control information, which shall take priority over automatically, generated control information.
   e) Provide a means of displaying the monitored information received from the outstations as specified in the Works Specification.
   f) Provide an alarm and fault report:
      i) to report the reception of outstation fault reports;
      ii) to report the system’s detection of an instation or data transmission fault.
g) Provide a non-volatile medium for the automatic recording of detected instation and outstation faults, together with the date and time of reporting of each fault. The capacity of this fault recording facility will be specified in the Works Specification.

**Outstation Monitoring and Control unit (OMCU)**

2.6 Traffic control equipment functions to be monitored by the OMCU shall be as defined in the Works Specification.

2.7 The OMCU shall monitor information presented at the controller interface and return all or selected information as specified in the Works Specification on demand from the instation.

2.8 Unless specified otherwise in the Works Specification, the OMCU shall be capable of returning selected information to the instation automatically by means of auto-dialling equipment. The information to be returned shall be specified in the Works Specification.

2.9 The control functions of the OMCU shall be as defined in the Works Specification.

2.10 Monitoring and control information exchanged between OMCU and controller via an interface as defined in TR 2523 or by another approved method.

2.11 Where specified in the Works Specification the OMCU shall incorporate a Master Time Clock System (MTCS), which shall provide the facilities necessary to operate a controller to specification TR 2500 in a cableless linking mode, where timetable and plan timings may be transmitted from the instation to the OMCU for storage and subsequent implementation.

2.12 Where the facility in 2.11 above is provided, the OMCU shall also include the facility to monitor controller stage greens and check for compliance with stages demanded by the MTCS. Failure to comply shall cause the signal controller to revert to local control.

**Data Transmission System**

2.13 The Data Transmission system shall incorporate an error checking facility, which shall be described in detail in the manufacturer's or supplier's product specification. The detection, at the instation or outstation, of any data transmission error, which the system is incapable of correcting automatically, shall activate the alarm described in clause 2.5 (f) (ii) and record the event in accordance with clause 2.5 (g).

2.14 No implementation of control data shall take place until the data has been verified by the error detection system.

2.15 Adequate safeguards shall be provided to minimise the possibility of unauthorised control of equipment, e.g. the use of access codes.

2.16 The Data Transmission System between the Instation and the OMCU shall be one of the following:
PSTN or GPRS Network

2.17 The Instation data transmission equipment shall include at least one auto-dialling unit and each outstation shall be provided with an auto-answering unit.

2.18 Where specified in the Works Specification the instation shall also include an auto-answering facility and each outstation shall be provided with an auto-dialling facility.

2.19 All equipment shall be approved by BABT for connection to a PSTN or GPRS network.

2.20 All transmission equipment shall operate in accordance with the current issue of British Standards specifications BS6305, 6317, 6320, 6789, BS EN 41003 for the use of equipment connected to a PSTN or GPRS network.

Digital IP Network

2.21 The digital IP network between the Instation and the OMCU shall be point-to-point configured connection using Wide Area Networking (WAN) technologies.

2.22 A permanently established virtual circuit (PVC) shall be provided between the Instation and the OMCU.

Controller/OMCU Interface

2.23 The system connection to signal controllers to specification TR 2500 shall be by any of the means described below, or a combination of these means:

   a) By means of the interface described in TR 2523, or other approved serial interface.
   b) By means of direct connections to the controller.

NOTE: Certain control facilities available at this interface are not suitable for remote operation because their safe use requires the presence of an Engineer on site. For signal controllers to TR 2500 it is not possible to remotely use commands requiring access Level 3 or higher as defined in TR 2523.

Construction

2.24 The OMCU and outstation data transmission equipment shall be designed for mounting as follows:

   a) As ancillary equipment within an existing traffic signal controller case.
   b) Within a freestanding equipment case manufactured from suitable material to provide mechanical protection for the equipment in the intended environment. The housing shall be designed to maintain the mechanical, environmental and the EMC protection for a minimum of 15 years, with suitable maintenance.

Equipment Interconnection

2.25 The outputs of the Product are isolated from earth and the power supplies.

2.26 The output is protected from accidental reversal of the current flow.

2.27 The wiring form or cable between the outstation equipment and traffic control equipment shall be terminated at some convenient point within the equipment case. The terminal provided for the wiring from the traffic control equipment shall be capable of easy disconnection and of approved design.
NOTE: Screw terminals that entail a direct contact between the retaining screw and the terminated wire will not be acceptable.

**Electrical Requirements**

2.28 All equipment shall be suitable for operation in accordance with this specification when connected to the UK mains supply.

2.29 All wiring, termination, earthing and labelling shall be in accordance with BS 7671.

**Environmental Testing**

2.30 The equipment shall be tested by an approved body to ensure that the following environmental performance requirements as specified in TR 2130C in the following areas have been satisfied:

- Dry Heat
- Change of Cold Temperature
- Damp Heat Cyclic
- Solar Radiation
- Water Penetration (to IP ratings in clause 2.31)
- Drop and Topple
- Bump
- Vibration transportation
- Vibration, random, Operational

2.31 The equipment case housing the outstation equipment is to BS EN 60529 IP 55 or better.

**Reliability**

2.33 Where possible, failure of the OMCU shall cause all control signals to be inhibited in such a manner as to cause the controller to assume its fallback mode automatically.

2.34 The reliability of the OMCU shall be such that it has an average failure rate of no more than 1 failure in 4 years with a life expectancy of 15 years.

**Failure Modes**

2.32 Any detected failure of the instation or data transmission equipment shall result in termination of transmission of control data.
3 NORMATIVE REFERENCES

3.1 Where undated references are listed, the latest issue of the publication applies.

**British Standards**

3.2 The British Standards Institution, London, publishes British Standards.

**Contact:**  +44 (0) 1344 404 429  
**WEB:**  http://www.bsonline.bsi-global.com

- **BS 6305: 1992** Requirements for apparatus for connection to public switched telephone networks
- **BS 6317: 1992** Requirements for the connection of apparatus to a single exchange line of the PSTN
- **BS 6320: 1992** Specification for modems for connection to PSTN
- **BS 7671** Requirements for electrical installations. IEE Wiring Regulations. Sixteenth edition
- **BS 6789 Pt 1: 1984** Requirements for added facilities on telephones and modems for connection to British Telecommunications PSTN
- **BS 6789-3.1: 1985** Requirements for auto-calling facilities
- **BS 6789-3.2: 1987** Requirements for auto-answering and auto-clearing facilities
- **BS 7987** Road Traffic Signal Systems
- **BS EN 41003** Safety requirements for equipment to be connected to telecommunications networks
- **BS EN 50293** Electromagnetic Compatibility - Road Traffic Signal Systems
- **BS EN 60529** Degrees of protection by enclosures (IP Code)

**Specifications**

3.3 The Highways Agency publishes National Approval Specifications.

**Contact:**  +44 (0) 117 372 8270  
**WEB:**  http://www.tssplansregistry.org/homepage.htm

- **TR 2130** Environmental Tests for Motorway Communications Equipment and Portable and Permanent Traffic Control Equipment
- **TR 2500** Traffic Signal Controller
- **TR 2523** Traffic Control Equipment Interfacing Specification
Other Publications

3.4 Other publications can be obtained from the Stationary Office.

Contact: +44 (0)20 7242 6393
WEB: http://www.tso.co.uk/

MCHW Volume 1 Specification for Highways Works

# 4 HISTORY

MCE 0152 A July 1986
TR 2522 A October 2005

Approval of this document for publication is given by the undersigned

<table>
<thead>
<tr>
<th>Traffic Signals and Road Lighting Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zone 2/17E</td>
</tr>
<tr>
<td>Temple Quay House</td>
</tr>
<tr>
<td>2 The Square</td>
</tr>
<tr>
<td>Temple Quay</td>
</tr>
<tr>
<td>Bristol</td>
</tr>
<tr>
<td>BS1 6HA</td>
</tr>
</tbody>
</table>

Mike Smith
Team Manager
Traffic Signals and Road Lighting Safety
APPENDIX A  INFORMATIVE GUIDE

General

A1 This Appendix is an informative guide to Highways Authorities who wish to purchase / hire and use remote monitoring and control equipment that has been declared conformant to this specification. Prospective purchasers/hirers should ensure that the procurement contract addresses the following issues.

Works Specification

A2 The purchaser should define the following requirements that relate to a specific scheme in the form of a Works specification:

- A list of the control functions to be provided for the interchange;
- A list of the monitoring functions to be provided for the interchange;
- The capacity of the Fault recording facility to be provided;
- The requirements for the Master Time Clock System if required;
- The scheme specific telecommunication provisions and requirements.

Marking and Labelling

A3 The purchase contract should call for the outstation equipment to be fitted with a label displaying an emblem as defined by the purchaser together with the following information:

- The HA specification to which it is approved;
- The electrical supply requirements of the equipment.