

WinTester User Manual

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References

- [1] BS EN ISO 9001:2008: Quality Management Systems - Requirements.
- [2] TickIt Guide to Software Quality Management System Construction and Certification.
- [3] SSL/1706 – Requirements Specification for the Windows Version of Tester.
- [4] SSL/1707 – Functional Specification for the Windows Version of Tester.

1 Introduction

The Windows version of Tester (WinTester) was designed to replace the original DOS-based TESTER program which does not operate reliably on the Windows operating system. It has been designed to allow Maintenance contractors to use WinTester at the roadside to find and diagnose faults. The functions incorporated allow the operator to acquire full status information and test results for any connected NMCS2 device. It can also be used to perform acceptance testing. Such testing includes the ability to perform long duration, high intensity soak tests, tests for every type of message and tests to ensure that the device does not respond to illegal or corrupted messages or to packets addressed to other devices.

Due to the lack of real-time processing in the Windows operating system it is highly recommended that all other programs are closed whilst using WinTester. It may also be necessary to disable any memory resident applications such as anti-virus software which are likely to perform regular scheduled operations. This is especially important if time critical soak testing is being performed.

Please note Free Text entry is only permitted for users with Super User status whereas all other users are limited to predefined text entry. The Super User status can only be acquired by contacting SSL who will give a Super User password to authorised personnel only. The examples in this document have assumed that the user has Super User status.

Although Windows based, the program can be used without the necessity to use a mouse pointer or multiple key combinations to carry out any functions.

This document can be viewed at any time from within the WinTester program using Adobe® Acrobat® Reader, if installed.

WinTester currently incorporates the following modes of operation:

Serial Control Mode:

Enables the operator to manually set and acquire status information from an NMCS2 sign via an RS232/485 serial link. The mode supports command sequencing enabling the operator to set or test various sign types including EMI, EMS, VMS, MS3, MS4 and EMI94xx.

Mode supports recording facilities provided by WinTester and can save all transactions to file to be replayed on demand. All transactions are also decoded and can be saved to a separate file, which cannot be replayed.

Diagnostic Mode:

Enables the operator to automatically execute any of the available functions for the configured sign type. Each diagnostic function may require additional configuration parameters. These parameters cannot be statically defined by the application as in Serial Control Mode (see section 5) and will have to be defined at runtime. The diagnostic scripts will display appropriate dialogs to set parameters as they are required.

Mode supports recording facilities provided by WinTester and can save all transactions to file to be replayed on demand. All transactions are also decoded and can be saved to a separate file, which cannot be replayed.

Test Mode:

Enables the operator to automatically execute any of the available tests for the configured sign type. Each test function may require additional configuration parameters. These parameters cannot be statically defined by the application as in Serial Control Mode (see section 5) and will have to be defined at runtime. The test scripts will display appropriate dialogs to set parameters as they are required.

Mode supports recording facilities provided by WinTester and can save all transactions to file to be replayed on demand. All transactions are also decoded and can be saved to a separate file, which cannot be replayed.

RS485 Monitor Mode:

Enables the operator to monitor an RS485 link. All monitored exchanges shall be logged and decoded. Current status and statistics shall be updated continuously and can be displayed on demand.

Mode supports recording facilities provided by WinTester and can save all transactions to file to be replayed on demand. All transactions are also decoded and can be saved to a separate file, which cannot be replayed.

Serial Script Mode:

Enables the operator to execute a serial-based WinTester script file. Serial script files can be used to perform acceptance tests, via an RS232/485 serial link and provide automated reports. Serial script files must not contain the keyword TESTER IP.

Mode supports recording facilities provided by WinTester and can save all transactions to file to be replayed on demand. All transactions are also decoded and can be saved to a separate file, which cannot be replayed.

Replay Mode:

Enables the operator to import a recorded trace file and replay all recorded exchanges at a desired speed. All exchanges are decoded and update current status and statistics. No commands are ever transmitted in this mode.

LCC Simulation Mode:

Enables the operator to initialize a standard transponder using signal and non-signal site/device data. Mode supports configuration and transmission of NMCS2 HDLC messages.

Recording facilities can save all transactions to a file to be replayed on demand. All transactions are also decoded and can be saved to an application level log that is readable but cannot be replayed.

HDLC Monitor Mode:

Enables the operator to monitor a HDLC link. All monitored exchanges are logged and decoded. Current status and statistics shall be updated continuously and can be displayed on demand.

Recording facilities can save all transactions to a file to be replayed on demand. All transactions are also decoded and can be saved to an application level log that is readable but cannot be replayed.

IP Control Mode:

Enables the operator to manually set and acquire status information from an NMCS2 sign via a TCP/IP link. The mode supports command sequencing enabling the operator to set or test various sign types including EMI, EMS, VMS, MS3, MS4 and EMI94xx.

Recording facilities can save all transactions to a file to be replayed on demand. All transactions are also decoded and can be saved to application level log that is readable but cannot be replayed.

IP Script Mode:

Enables the operator to execute a TCP/IP based WinTester script file. IP script files can be used to perform acceptance tests, via a TCP/IP link and provide automated reports. IP script files must begin with the keyword TESTER IP.

Mode supports recording facilities provided by WinTester and can save all transactions to file to be replayed on demand. All transactions are also decoded and can be saved to a separate file, which cannot be replayed.

2 Installation

2.1 System Requirements

Minimum system requirements to run WinTester are:

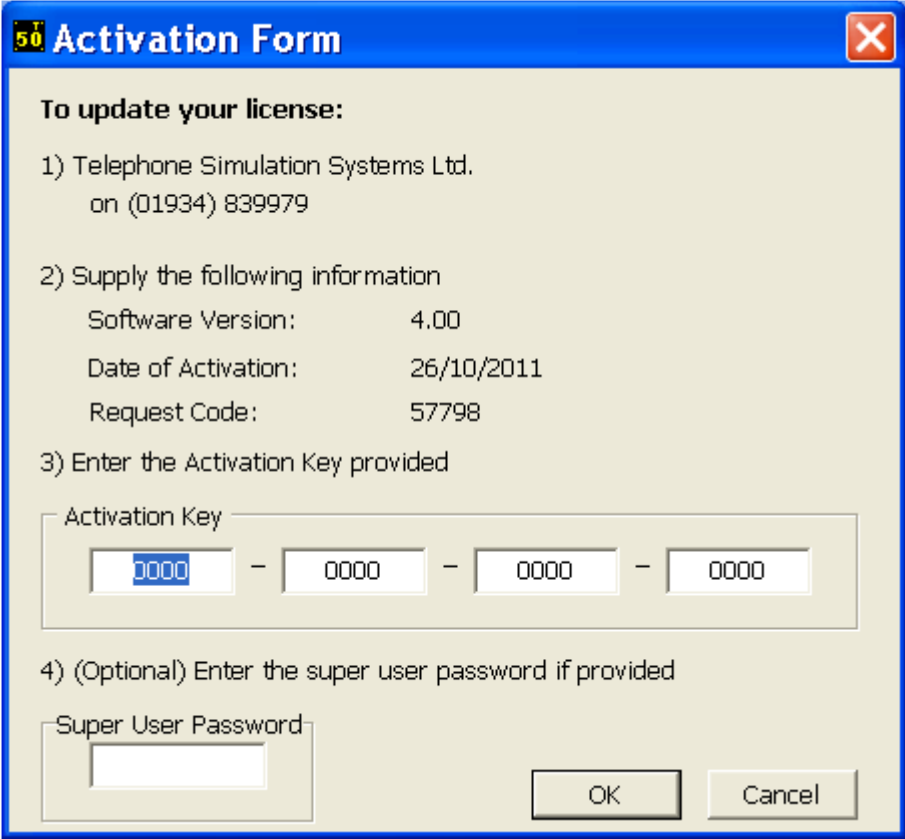
- Windows XP/Vista (Windows 95/98 is no longer supported)
- 256 MB RAM
- 200 MB Hard Disk space (may require additional space for log files)
- CD ROM Drive
- Standard RS232 COM port or USB/RS232/RS485 Adapter
- Ethernet Port
- PCMCIA Slot

2.2 Installation

Insert the WinTester installation CD and follow the on screen instructions.

2.3 Software Activation

WinTester will have to be activated on the first attempt to use it. A window similar to the following will be displayed:



The image shows a Windows-style dialog box titled "50 Activation Form". It contains the following text and controls:

- To update your license:**
- 1) Telephone Simulation Systems Ltd.
on (01934) 839979
- 2) Supply the following information
 - Software Version: 4.00
 - Date of Activation: 26/10/2011
 - Request Code: 57798
- 3) Enter the Activation Key provided
 - Activation Key: [0000] - [0000] - [0000] - [0000]
- 4) (Optional) Enter the super user password if provided
 - Super User Password: []
- Buttons: OK, Cancel

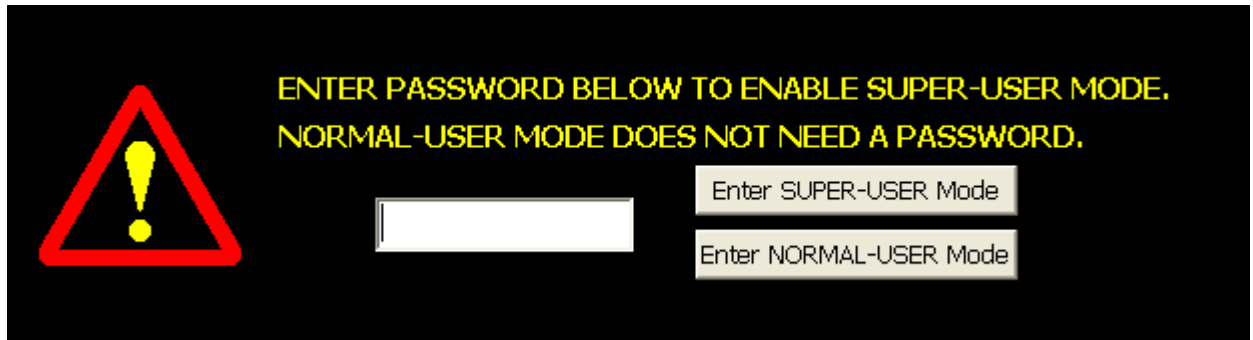
WinTester Activate Dialog

To activate WinTester telephone Simulation Systems Ltd and provide the activation date, request code and software version number. An activation key (serial number) will be supplied that will activate the software for a limited time period.

Whenever a request for WinTester V4.00 (or above) activation is requested then the SSL Help Desk will check with a list of “approved super users”. Only people / organisations on this approved super user list will be given a “super-user mode” password which the individual will need to remember. Users who wish to be added to the approved super user list should contact their HA Project Sponsor.

2.4 WinTester Startup

Whenever an activated WinTester with Super User availability is started up the following dialog is displayed giving the user the option to select the mode to be used.



WinTester Startup Dialog

For super user mode the password which was supplied when WinTester was activated must be entered.

Normal users will not see this box.

2.5 Equipment Requirements

The test set equipment required consists of:

- Standard cable type 1
- NMCS2 RS232/485 converter box (99-9340-06)
- RS485 lead
- Earth lead
- Null modem box
- PCMCIA Sealevel 3612 Synchronous Interface (optional)
- A RJ45 Ethernet Crossover cable to connect to an IP enabled signal or message sign.

A second type 1 cable is required to connect the null modem box to the maintenance (RS232) port of the driver under test. This should have a 25 way D type connector with connections as shown in 3.6.

If a hard copy of the test results is required a printer will be needed.

To use the WinTester program as an SSL CMI Engineer's terminal, a type 2 cable will be required. See Section 3.6 for details of this cable.

2.6 RS232/RS485 Converter

The RS232/485 converter is equipped with a 25 way D type connector for RS232, a 3-pin DIN connector for RS485 and a ground connection.

Supplied with the unit are an RS485 cable terminated by sub-miniature shrouded crocodile clips, and an earth bond cable with heavy duty battery clips.

The unit is powered by two 1.5V R20 'D' type batteries and is housed in a robust die-cast box. TX and RX LEDs are provided to indicate data flow and a battery check LED indicates the state of the batteries when the button is depressed.

If the LED is bright then the battery is good. A dim LED indicates that the battery is usable but has a limited life. If the LED is off then the unit is not powered and hence not usable.

The batteries can be changed by removing the lid. The correct polarity is indicated in the battery compartment. For the RS485 unit to operate DTR must be held high by the RS232 interface to which it is connected. If the unit is unplugged from this RS232 interface, or DTR is taken low the unit will power itself down to conserve battery power.

It is advised not to leave WinTester running while the unit is not being used as this will waste battery life.

A 140 ohm termination resistor is fitted internally across the RS485 interface.

A battery eliminator is a recommended optional extra.

2.7 Configuration

WinTester loads device configuration data from three different sources. A .cfg file is used to load and save octal address and device type information. An .ip file is used to load and save IP address & port number and device type information. To enable HDLC communications with one or more standard Transponders and associated slave devices outside.dat, device.sig and device.mss site data files need to be loaded in sequence. The files specify COBS, LCC and Transponder configurations so that WinTester can be run LCC Simulation Mode.

2.7.1 WINTESTER.INI

This file contains serial and link information. If not found on start-up, a new file is created with the following defaults:

Section [Serial]

Key	Range	Default
Mode	RS232, RS485, MODEM, IP	RS485
Port	1-255	1
BaudRate	All supported baud rates	2400
Parity	EVEN, MARK, NONE, ODD, SPACE	EVEN
StopBits	1, 1.5, 2	1
Name	Arbitrary String	<i>Not specified</i>
TestLocation	Arbitrary String	<i>Not specified</i>

Section [Timing]

Key	Range	Default
SerialRetries	0+	2
SerialReplyTimeout	30+	150
InterCharacterTimeout	6+	6
InterPacketDelay	1+	1
TurnAroundDelay	0+	7
StatusReplyDelay	30+	300
VMSStatusDelay	0+	5,000
SetAllAspectsInterDelay	0+	5,000
RequestTestResultsDelay	0+	200
EMITestSequenceDelay	0+	10
EMSTestSequenceDelay	0+	5,000
ModemLinkTimeout	0+	50
FastPollReplyTimout	1+	100
FastPollInterDelay	0+	10
HDLCTxTimeout	0+	750
HDLCRxTimeout	0+	450
IPRetries	0+	0
IPReplyTimeout	0+	10000
KeepAliveTimeout	0 - 300	0 (Off)

Section [Broadcasts]

FlasherSyncBroadcast	ON/OFF	ON
FlasherSyncBroadcastInterval	1+	60
FlasherSyncBroadcastDimBright	DIM/BRIGHT	DIM
LuminanceBroadcast	ON/OFF	OFF
LuminanceBroadcastInterval	1+	60
LuminanceBroadcastLevel	1-15 or 255	1
LuminanceBroadcastDimBright	DIM/BRIGHT	DIM
MulticastAddress	Arbitrary String	224.0.0.12:10002
IPBroadcastMethod	UDP/TCP	UDP

Section [Performance]

Key	Range	Default
TimerResolution	1 – 100	1
AppPriorityClass	IDLE_PRIORITY_CLASS NORMAL_PRIORITY_CLASS HIGH_PRIORITY_CLASS REALTIME_PRIORITY_CLASS	Highest
AppThreadPriority	THREAD_PRIORITY_IDLE THREAD_PRIORITY_LOWEST THREAD_PRIORITY_BELOW_NORMAL THREAD_PRIORITY_NORMAL THREAD_PRIORITY_ABOVE_NORMAL THREAD_PRIORITY_HIGHEST THREAD_PRIORITY_TIME_CRITICAL	Highest

Key	Range	Default
ScriptThreadPriority	As AppThreadPriority	High
CommsThreadPriority	As AppThreadPriority	Highest

The values can be viewed and changed from the User Interface (see Section 4.5) and saved on exit from the program.

2.7.2 WINTESTER.CSV

This comma separated value file contains all the device type and sign information needed for WinTester to function properly. If not found, an error is displayed and WinTester will not function as expected as it will not be possible to select a sign type.

2.7.3 CONFIG.CFG

This comma separated file contains information:

```
Device Type (String)
{
    VMS CIE Mode (Optional String – VMS CIE only),
    Device Address (Decimal – Serial Configuration only),
    EMI Type (Optional String – MS3 and MS4 only),
    EMI Address (Optional String – Serial Configuration for MS3 / MS4 only),
    Geographic Address (String),
    Serial Number (String)
} (? Number of configured signs)
```

2.7.4 CONFIG.IP

This comma separated file contains information:

```
Device Type (String)
{
    VMS CIE Mode (Optional String – VMS CIE only),
    IP and Port Address (String – IP Configuration only),
    EMI Type (Optional String – MS3 and MS4 only),
    EMI IP and Port Address (Optional String – IP Configuration for MS3 / MS4 only),
    Geographic Address (String),
    Serial Number (String)
} (? Number of configured signs)
```

2.7.5 Outstation Site Data File (OUTSITE.DAT)

Comments may be inserted into the file by placing an exclamation mark “!” in the left-most position of a line or the end of line. The file is formatted as ASCII comma separated value. Commas separate all tokens. Leading and trailing white space surrounding a token is ignored. The Outstation Site Data File is separated into four different sections.

2.7.5.1 ‘A’ Header Data (Indicator Type Data)

The Indicator Type Data is relevant to the Signal motorway devices only. Each set of indicator type data within the standard transponder outstation site data must contain an 'A' header code. The 'A' header is dependent upon the indicator type and must be in the range of 10h to 1Dh inclusive.

'A' Header Code
Indicator Type Code
Number of Rows (N)
{
 SAC (decimal),
 Drive Code,
 Adaption SAC (decimal)
} x N

2.7.5.2 'B' Header Data (Countdown Table)

There is only one set of Countdown Table data in the outstation site data and it is relevant to the Signal motorway devices only. The countdown table is common to all indicator types and the header must be 1Eh.

'B' Header Code
Number of Rows (N)
{
 SAC when countdown has completed (decimal),
 SAC during countdown (decimal)
} x N

2.7.5.3 'C' Header Data (Indicator Definition Data)

The Indicator Definition Data is relevant to the Signal motorway devices only. A set of Indicator Definition Data is provided for each indicator controlled by the standard transponder and must be in ascending numerical order. The header code must be 1Fh.

'C' Header Code
Number of Rows (N)
{
 Electronic Address, ,
 Highest Displayable Speed SAC,
 Indicator Type Header Code
} x N

2.7.5.4 'D' Header Data (Non-Signal Motorway Device Data)

The Non-Signal Motorway Device Data is relevant to all motorway devices other than the Signal motorway devices. A set of Non-Signal Motorway Device data is provided for each different type of motorway device that is attached to the standard transponder and must be in ascending numerical order according to the motorway device addresses. The 'D' header must be in the range of 20h to FFh inclusive. Some of the 'D' header is defined as below:

20h: Automatic Traffic Surveillance
28h: Lighting Control Subsystem
40h: MS Subsystem

44h: Reserved for NMCS1 VMS
 48h: Reserved for MET Subsystem
 61h: MIDAS Subsystem
 64h: Ambient Light Monitors

'D' Header Code
Number of Rows (N)
 {
 Electronic Address
 } x N

2.7.6 Signal Device Data File (DEVICE.SIG)

Comments may be inserted into the file by placing an exclamation mark “!” in the left-most position of a line or the end of line. The file is formatted as ASCII comma separated value. Commas separate all tokens. Leading and trailing white space surrounding a token is ignored. The electronic addresses included in headers ‘C’ of Outstation Site Data must be included in this file.

```
{
    Geographic address,
    Electronic address,
    Commissioned flag,
    Number of registered systems (N),
    {
        Registered subsystem code,
    } x N
    "Indicator type,
    In tidal Area flag,
    Tidal symbol A or B,
    Tidal secondary setting prohibit flag,
    Default Standard Aspect Code,
    Crucial Control Office count (C),
    {
        Crucial Control Office number,
    } x C
    Routine Control Office count (R),
    {
        Routine Control Office number,
    } x R
    Box Control Office count (B), (Mandatory, if Crucial/Routine CO count is non-zero)
    {
        Box Control Office number,
    } x B
    Preset Highest Displayable Speed SAC of indicator"
} x Number of Signals
```

2.7.7 Non-Signal Device Data File (DEVICE.MSS)

Comments may be inserted into the file by placing an exclamation mark “!” in the left-most position of a line or the end of line. The file is formatted as ASCII comma separated value. Commas separate all tokens. Leading and trailing white space surrounding a token is

ignored. The electronic addresses included in headers 'D' of Outstation Site Data must be included in this file.

```
{  
    Geographic address,  
    Electronic address,  
    Commissioned flag,  
    Number of registered subsystems (N),  
    {  
        Registered subsystem code,  
    } x N  
    "MS Type,  
    Strategic flag (unused) "  
} x Number of Message Signs
```

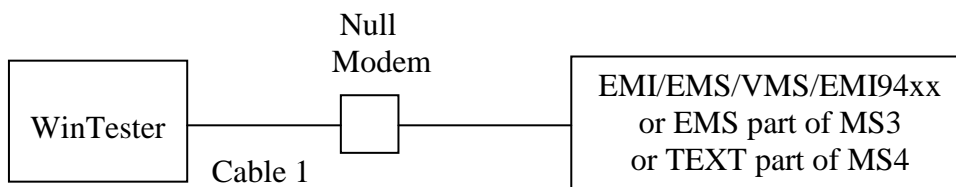

3 Communications mode

WinTester can be used with several different hardware configurations. The connection type is specified using the WinTester Configuration function (see Section 4.5). The various cable connections are specified in 3.6.

If the WinTester PC is connected directly to an EMS, EMI, VMS or EMI94xx driver care should be taken to ensure that the transponder is disconnected from the Device Control link.

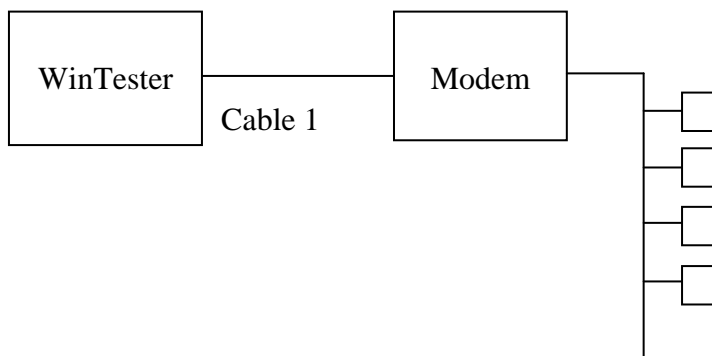
3.1 RS232 Connection

The WinTester PC can be connected to a single EMS/EMI or VMS driver via the maintenance (RS232) port of the driver. A type 1 cable, (described in section 3.6), is used to connect between the serial port of the test PC and the null modem. The null modem is then connected to the RS232 port of the driver under test using a second type 1 cable.



RS232 Connection via Null Modem

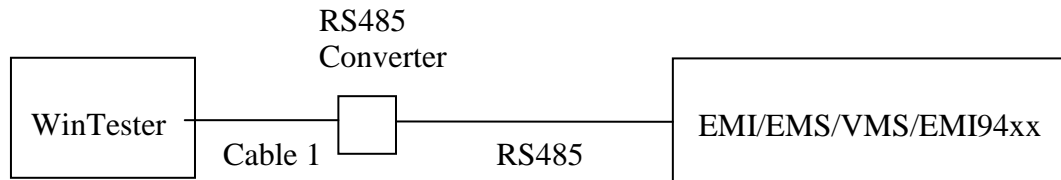
The WinTester PC can also be connected to a modem and then onto a modem link using cable type 1. The link may be single or multi-drop.



RS232 Connection via Modem

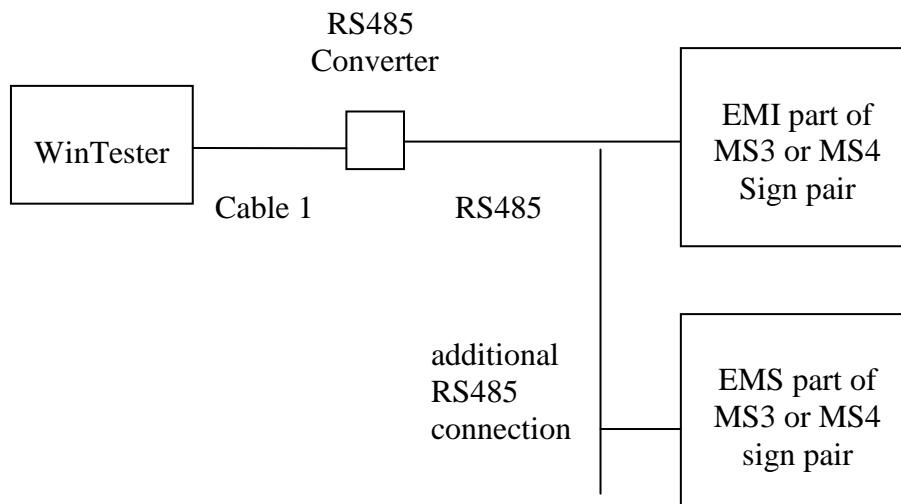
3.2 RS485 Connection

The WinTester PC can be connected to a single EMS/EMI, VMS or EMI94xx driver via RS485, using an RS485/RS232 converter unit.



RS232 Connection via Converter Box

Connection can be made to both parts of an MS3/MS4 sign pair using an RS485/RS232 converter box and an additional RS485 connection as shown below:

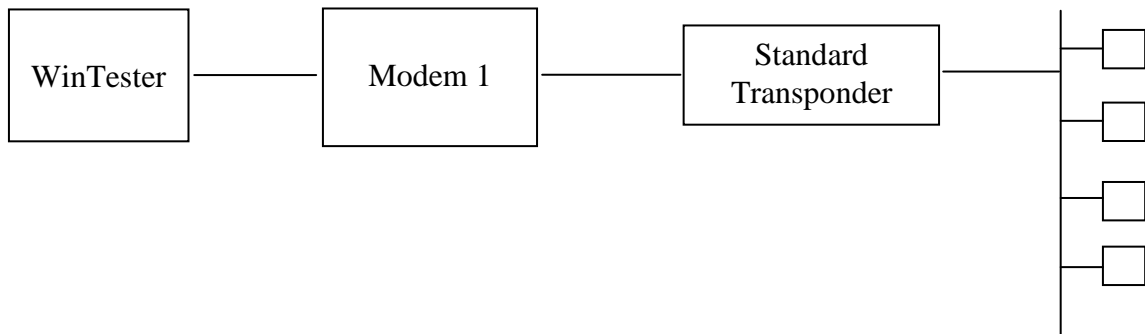


MS3/MS4 RS232 Connection via Converter Box

Connect the WinTester PC to the RS485 converter unit using a type 1 cable. Fix the red and black RS485 cables coming from the RS485 converter to the corresponding RS485 terminals of the device under test.

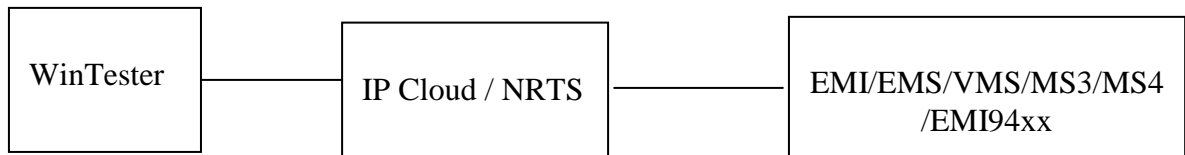
The earth bond cable should be connected to a suitable point on the sign or signal driver. If no communications are obtained or the data is garbled, try reversing the polarity of the two RS485 cables. Another symptom of reversed connection is that the RX LED of the converter box appears to be lit constantly.

3.3 HDLC Connection



Transponder Connection via RS232

3.4 IP Connection

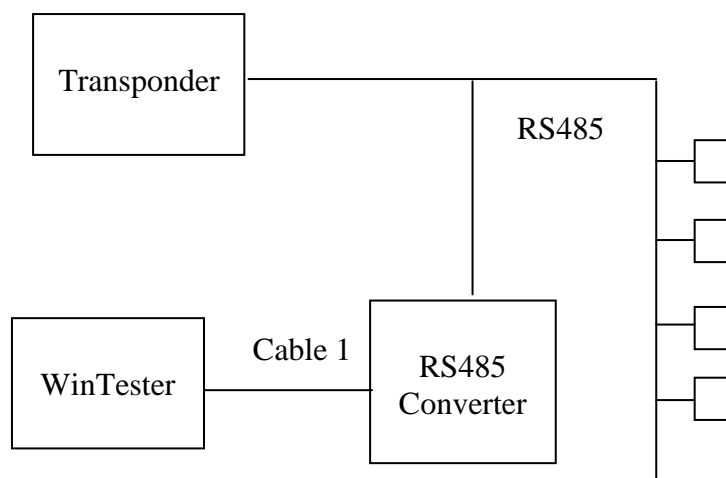


IP Connection

3.5 Other Configurations

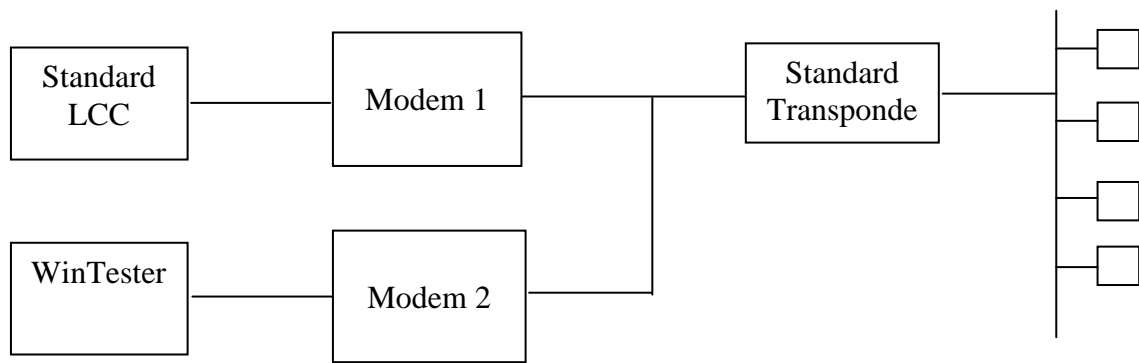
WinTester can be used as an RS485 monitor.

As shown below, the RS485 cable is connected to eavesdrop on the RS485 link.



RS485 Monitoring Connection

WinTester can also be used as an HDLC monitor.



RS232 HDLC Monitoring Connection

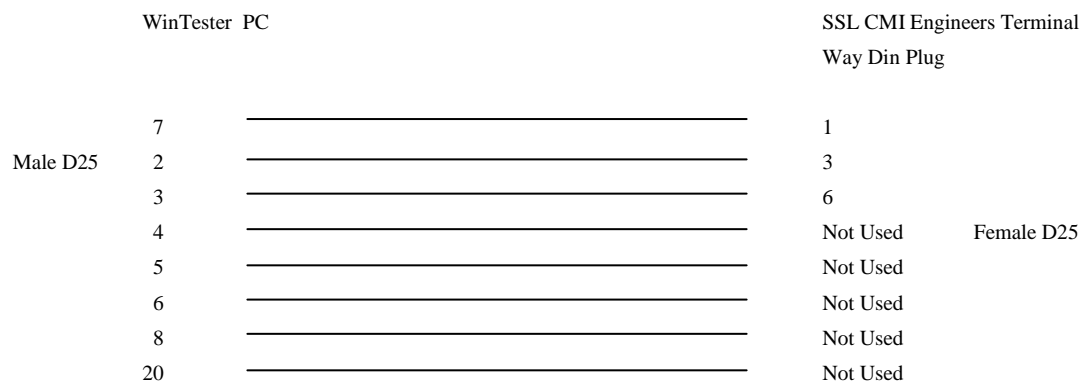
3.6 Cabling

There are two types of cable:

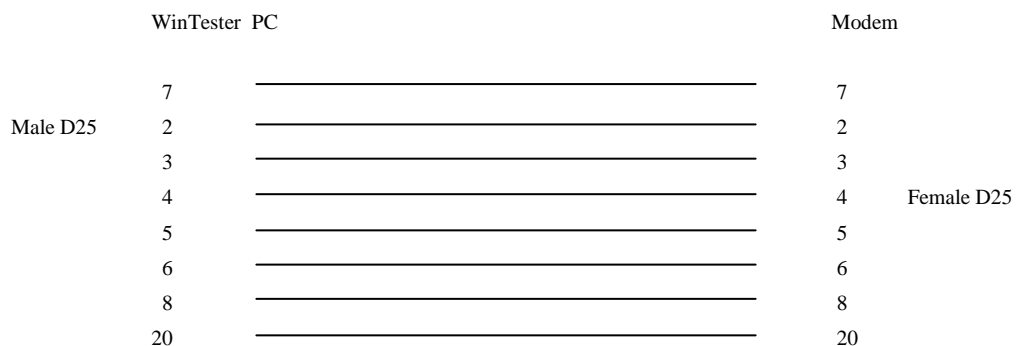
Cable 1 - a straight through male - female D25 RS232 Cable

Cable 2 - a special cable for the SSL CMI terminal port, which consists of a female D25 RS232 D Type connector, and an 8 way DIN plug.

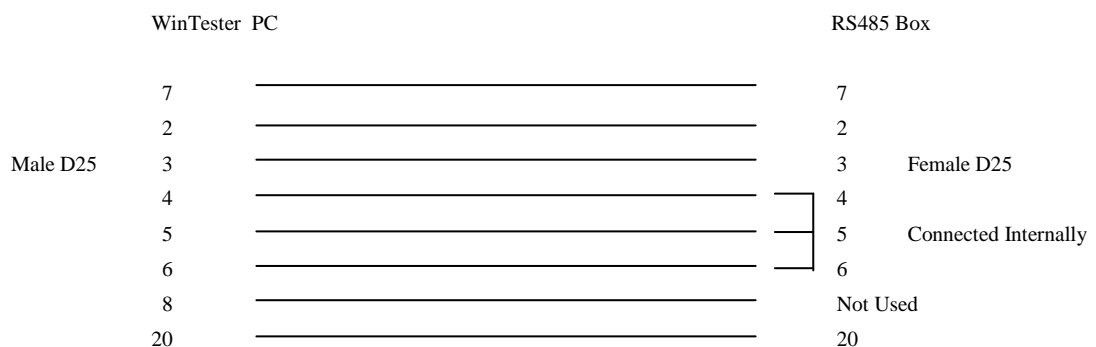
In some cases a Null Modem may be required, for example when connected directly to the RS232 port of an EMI or EMS driver. In that case two type one connectors will need to be employed.



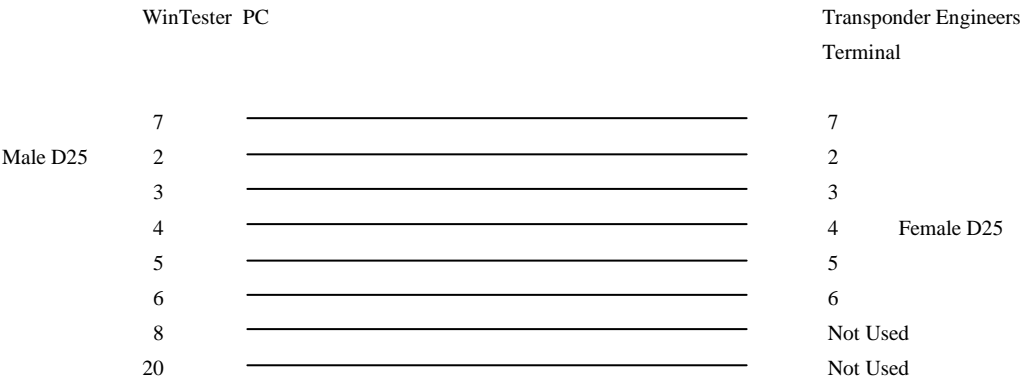
WinTester – SSL CMI Terminal via Cable Type 2



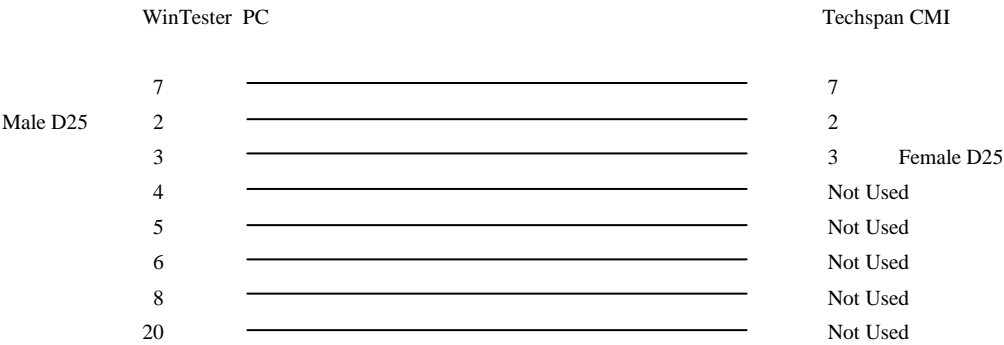
WinTester PC to Modem – via Cable Type 1



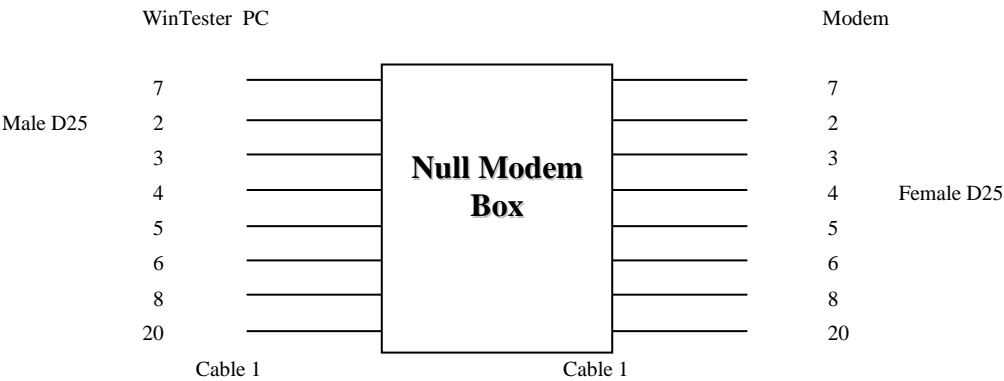
WinTester PC to RS485 Interface Unit – via Cable Type 1



WinTester PC to Transponder – via Cable Type 1



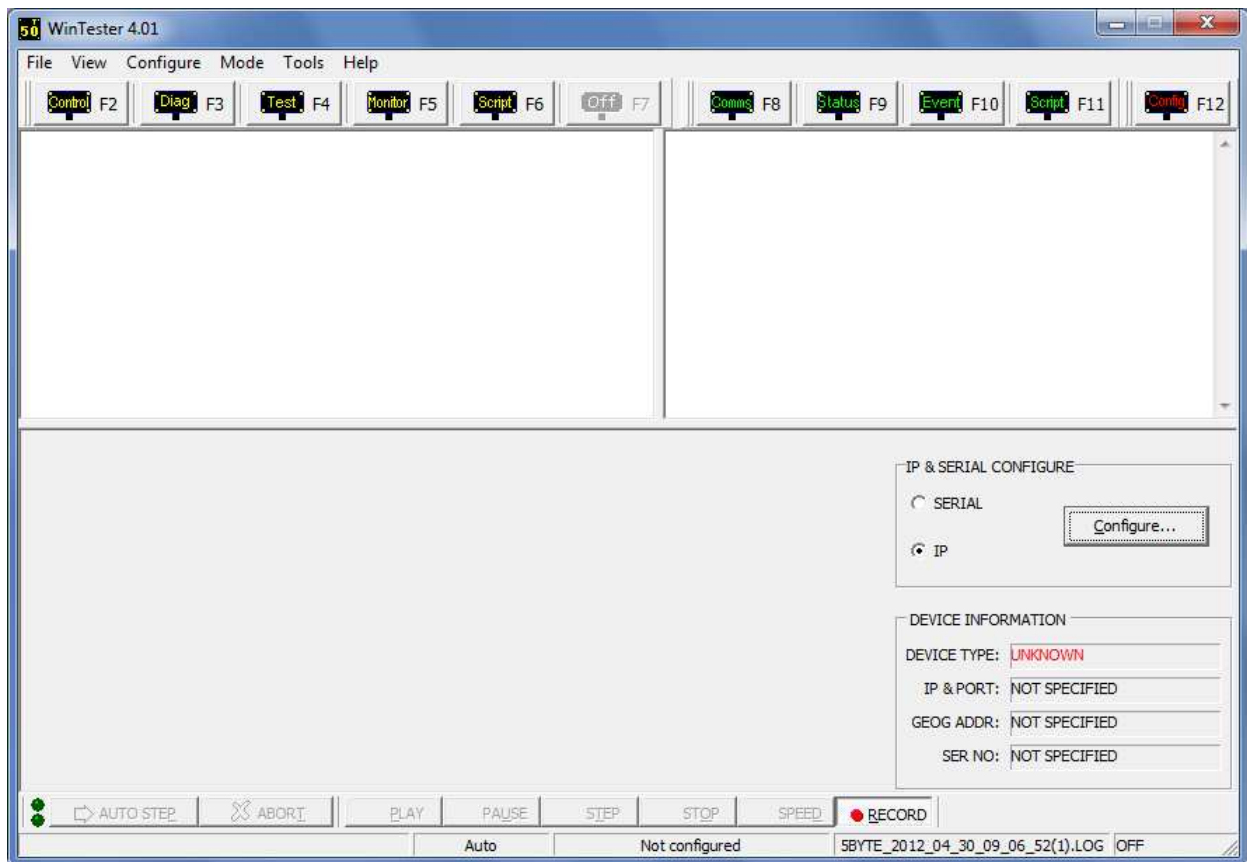
WinTester PC to Techspan CMI – via Cable Type 1



WinTester PC to Modem – via Cable Type 1

4 User Interface

Run the WinTester application to display the main window in Off Mode (see Section 12 for further information on Off Mode).



User Interface in Off Mode

4.1 IP & Serial Configure

Clicking the 'Conf' button opens a 'Device Configuration' form. Device types and their corresponding addresses can be entered in the appropriate fields. If a dual address sign type is selected, extra fields for specifying the matrix indicator component of the sign are enabled.

Further information on sign configuration can be found in section 4.5.4.

The image shows a 'Sign Configuration' dialog box with the following fields and values:

- F2 Sign Type: Not Configured (dropdown)
- F3 Electronic Address: Hex 01, Oct 001
- F4 Configured IP & Port: (empty dropdown)
- F5 IP & Port: NOT SPECIFIED
- F6 Geographic Address: NOT SPECIFIED
- F7 Serial Number: NOT SPECIFIED
- F8 CIE Mode: DECODE (dropdown)
- F9 MS3/MS4 (EMI) Type: EMI442 (dropdown)
- F10 MS3/MS4 (EMI) Address: Hex 02, Oct 002
- F11 MS3/MS4 (EMI) IP & Port: NOT SPECIFIED
- F12 Link: IP (radio button), Serial (radio button, selected)

Buttons at the bottom: OK, Cancel, Apply.

Device Configuration Form

4.2 Modes of Operation

WinTester provides several modes of operation which can be accessed via buttons on the main screen, the Mode menu option or specific key presses as follows:

- Serial Control Mode (key press F2 and select “Transponder – SIGN Link”) – see section 5
- IP Control Mode (key press F2 and select “Subsystem – SIGN IP Link”) – see section 7
- Diagnostic Mode (key press F3)
- Test Mode (key press F4)
- RS485 Monitor Mode (key press F5 and select “Transponder – SIGN Link”) – see section 10
- Serial Script Mode (key press F6 and select “Transponder – SIGN Link”) – see section 8
- IP Script Mode (key press F6 and select “Subsystem – SIGN IP Link”) – see section 9
- Replay/Off Mode (key press F7) – see section 12
- LCC Simulation Mode (key press F2 and select “LCC – Transponder Link”. Note that this option will only be available after the relevant data has been loaded) – see section 6
- HDLc Monitor Mode (key press F5 and select “LCC – Transponder Link”) – see section 11

4.3 Replay Controls

The replay controls provide the facility to record and replay communications between WinTester and any attached devices. Recording can be performed in any mode (see section 12.1.1) but replaying a trace log can only be achieved from the Replay/Off Mode – see Section 12.1.

4.4 Logging

The log window shows the packets transmitted and received by WinTester. All log entries contain the following information:

- Generation timestamp (to 10 ms precision, provided Operating System supports this precision)
- Direction (RX for received packets, TX for transmitted packets)
- Sequence of data bytes transmitted or received (hexadecimal)
- The message received or transmitted by the transponder
- Parity error(s) detected in received packet
- Framing error(s) detected in received packet
- CRC error(s) detected in received packet
- Illegal Control Field detected in received packet
- Illegal Data Bytes detected in received packet
- Short packet error(s)
- For valid messages, plain English decoding

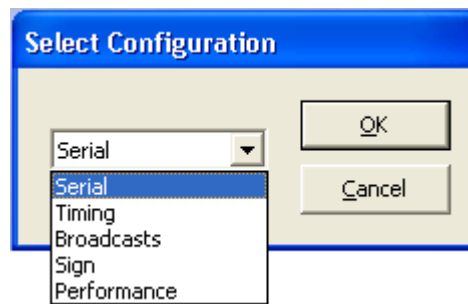
A log window also shows the HDLC messages transmitted and received by WinTester. All log entries contain the following information:

- Generation timestamp (to 10 ms precision, provided Operating System supports this precision)
- Direction (RX for received messages, TX for transmitted messages)
- “Transponder” and its address or “Broadcast” if it is a broadcast message
- The message received or transmitted by the transponder
- Framing error detected in message
- Sequence of data bytes transmitted or received (hexadecimal)
- For valid messages, plain English decoding
- For invalid messages, notify that it is an invalid message

The left hand logger contains a maximum of 2,000 log entries. The right hand logger window shows the selected log entry decoded if appropriate according to the data bytes received.

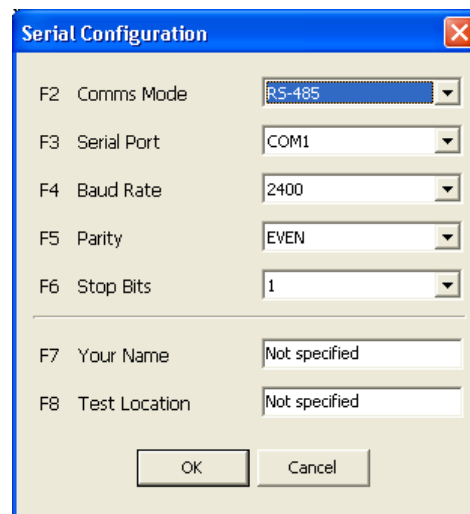
4.5 WinTester Configuration

The currently defined settings can be viewed from WinTester by selecting the red Config button, the “Configure” menu option or by pressing the F12 function key. This function allows changes to be made to high level, test session parameters. On exit from WinTester, the settings can be saved if required for use when WinTester is next run. The configuration data is stored in file “WINTESTER.INI” in root directory.

*Configuration – Section Selection*

4.5.1 Serial

Displays the serial port settings and general user information. Select a field or press function keys F2 to F8 to change the displayed settings.

*Configuration – Serial*

4.5.2 Timing

Allows changes to the following settings (using the function keys F2 to F12 and A to J):

- a) Serial retries (key press F2) – number of times to retransmit the message when an expected reply is not received.
- b) Serial Reply timeout (key press F3) – how long to wait for a reply (in ms).
- c) Inter character timeout (key press F4) – time between transmission of characters (in ms).
- d) Inter packet delay (key press F5) – time between transmission of packets (in ms).
- e) Turnaround delay (key press F6) – consecutive RS485 packet transmissions following a valid response (in ms).
- f) Request status delay (key press F7) – how long to wait (in ms) for a status reply message.
- g) VMS status delay (key press F8) – how long to wait (in ms) for a VMS status reply.
- h) Set all aspects inter delay (key press F9) – time (in ms) between STATUS REPLY and SET command (see Section 5.11).
- i) Request test result delay (key press F10) – time (in ms) for a test result.
- j) EMI test sequence delay (key press F11) – time (in ms) for EMI between TEST RESULT and TEST command (see Section 5.13).
- k) EMS test sequence delay (key press F12) – time (in ms) between transmission of commands during Test Sequence (see Section 5.17) (also applies to MS4).
- l) Modem Timeout (key press A) – how long to wait for a modem reply (in ms).

- m) Fast poll reply timeout (key press B) – how long to wait (in ms) for a reply during fast poll sequence in serial mode.
- n) Fast poll inter delay (key press C) – time between transmission of commands during fast poll sequence (in ms) in serial mode.
- o) HDLC Tx Timeout (key press D) – maximum time (in ms) allowed for transmitting a complete HDLC frame.
- p) HDLC Rx Timeout (key press E) – maximum time (in ms) allowed for receiving a complete HDLC frame.
- q) IP retries (key press F) – number of times to retransmit the message when an expected reply is not received.
- r) IP Reply timeout (key press G) – how long to wait for a reply (in ms).
- s) KeepAlive Timeout (key press H) – the period, in seconds, between Status Request messages, sent to verify that each connected host is still operational.
- t) IP Fast poll reply timeout (key press I) – how long to wait (in ms) for a reply during fast poll sequence in IP mode.
- u) IP Fast poll inter delay (key press J) – time between transmission of commands during fast poll sequence (in ms) in IP mode.

The image shows a 'Timing Configuration' dialog box with two columns of settings. Each setting consists of a label, a key press identifier, and a numerical value in a spin box. The settings are as follows:

Label	Key Press	Value	Unit
F2 Serial Retries		2	
F3 Serial Reply Timeout		100	ms
F4 Inter Character Timeout		6	ms
F5 Inter Packet Delay		1	ms
F6 Turnaround Delay		7	ms
F7 Request Status Delay		300	ms
F8 VMS Status Delay		5000	ms
F9 Set All Aspects Inter Delay		5000	ms
F10 Request Test Result Delay		200	ms
F11 EMI Test Sequence Delay		10	ms
F12 EMS Test Sequence Delay		5000	ms
A Modem Timeout		50	ms
B Fast Poll Reply Timeout		100	ms
C Fast Poll Inter Delay		10	ms
D HDLC Tx Timeout		750	ms
E HDLC Rx Timeout		450	ms
F IP Retries		0	
G IP Reply Timeout		10000	ms
H KeepAlive Timeout		300	s
I IP Fast Poll Reply Timeout		20000	ms
J IP Fast Poll Inter Delay		100	ms

At the bottom of the dialog are 'OK' and 'Cancel' buttons.

Configuration – Timing

4.5.3 Broadcasts

Allows changes to the following settings (using the function keys F2 to F8):

- a) Flasher Sync Broadcast (key press F2) – to enable or disable (ON or OFF) automatic Flasher Synchronisation commands.
- b) Flasher Sync Interval (key press F3) – time (in s) between automatic Flasher Synchronisation Broadcast commands (when enabled).
- c) Flasher Sync (Dim/Bright) (key press F4) – dim/bright setting used for data byte 1 of Flasher Synchronisation Broadcast command.
- d) Luminance Broadcast (key press F5) – to enable or disable (ON or OFF) automatic Luminance Broadcast commands.

- e) Luminance Broadcast Interval (key press F6) – time (in s) between automatic Luminance Broadcast commands (when enabled).
- f) Luminance Broadcast Level (key press F7) – ambient light level (1-15 or 255) used for data byte 2 setting of Luminance Broadcast command.
- g) Luminance Broadcast (Dim/Bright) (key press F8) – dim/bright setting used for data byte 1 of Luminance Broadcast command.
- h) IP Broadcast Transmission Method (UDP/TCP) (key press F9) – the broadcast messages are sent via a UDP multicast address or TCP/IP connection.
- i) Multicast IP Address & Port Number (key press F10) – IP Address and Port Number for the UDP multicast.

The image shows a 'Broadcast Configuration' dialog box with the following settings:

Function Key	Setting
F2 Flasher Sync Broadcast (On/Off)	ON
F3 Flasher Sync Interval (s)	1
F4 Flasher Sync (Dim/Bright)	BRIGHT
F5 Luminance Broadcast (On/Off)	ON
F6 Luminance Broadcast Interval (s)	1
F7 Luminance Broadcast Level	13
F8 Luminance Broadcast (Dim/Bright)	DIM
F9 IP Broadcast Transmission Method	udp
F10 Multicast IP Address & Port Number	224.0.0.12:10002

Buttons: OK, Cancel

Configuration – Broadcast

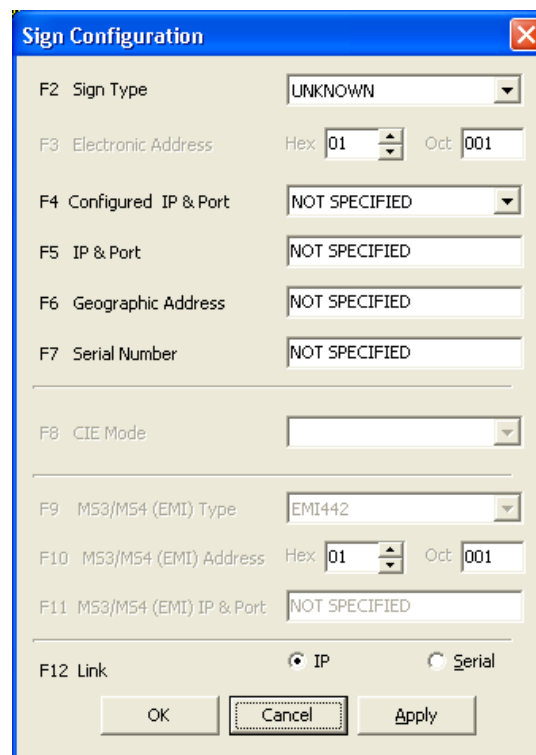
4.5.4 Sign Configuration

Select or change a sign type.

Note that F12 (selection of IP Link or Serial Link) is only enabled for OFF Mode. In Serial Control Mode and Serial Script Mode, F12 is disabled and Serial Link is selected by default. In IP Control Mode and IP Script Mode, F12 is disabled and IP Link is selected by default.

If IP Link is selected, only function keys F2 (Sign Type), and F4 to F7 (Configured IP & Port, IP & Port, Geographic Address, Serial Number) will be enabled. If Serial Link is selected, only function keys F2 to F3 (Sign Type, Electronic Address), and F6 to F7 (Geographic Address, Serial Number) will be enabled.

If Sign Type is VMS_CIE, then function key F8 will be enabled to allow selection for the CIE mode. If Sign Type is MS3_2x16, MS3_3x18 or MS4 and IP Link is selected, then function key F9 and F11 will be enabled to allow configuration for the EMI part of the MS3/MS4 sign. If Sign Type is MS3_2x16, MS3_3x18 or MS4 and Serial Link is selected, then function key F9 and F10 will be enabled to allow configuration for the EMI part of the MS3/MS4 sign. The EMI types will include EMI442, EMI443, EMI444, EMI445, EMI446 and EMI447. The EMI address will not be allowed to have the same electronic address / IP address as that of the MS3/MS4 Sign.



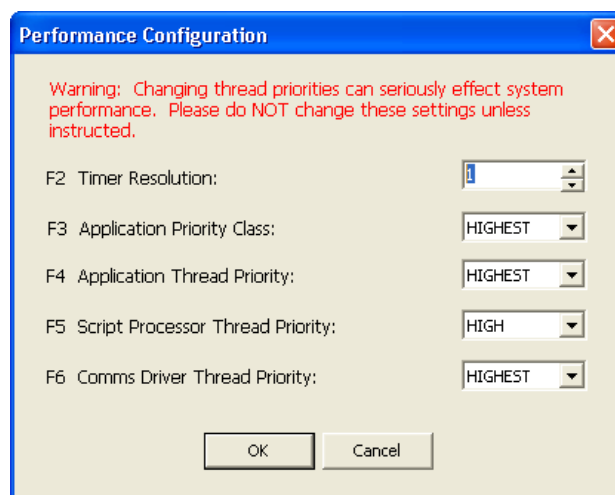
The Sign Configuration dialog box contains the following fields and controls:

- F2 Sign Type: UNKNOWN (dropdown)
- F3 Electronic Address: Hex 01, Oct 001 (spinners)
- F4 Configured IP & Port: NOT SPECIFIED (dropdown)
- F5 IP & Port: NOT SPECIFIED (text box)
- F6 Geographic Address: NOT SPECIFIED (text box)
- F7 Serial Number: NOT SPECIFIED (text box)
- F8 CIE Mode: (dropdown)
- F9 M53/M54 (EMI) Type: EMI442 (dropdown)
- F10 M53/M54 (EMI) Address: Hex 01, Oct 001 (spinners)
- F11 M53/M54 (EMI) IP & Port: NOT SPECIFIED (text box)
- F12 Link: IP (selected radio button), Serial (radio button)
- Buttons: OK, Cancel, Apply

Configuration – Sign

4.5.5 Performance

Select or change the system performance:



The Performance Configuration dialog box contains the following fields and controls:

- Warning: Changing thread priorities can seriously effect system performance. Please do NOT change these settings unless instructed.
- F2 Timer Resolution: 1 (spinners)
- F3 Application Priority Class: HIGHEST (dropdown)
- F4 Application Thread Priority: HIGHEST (dropdown)
- F5 Script Processor Thread Priority: HIGH (dropdown)
- F6 Comms Driver Thread Priority: HIGHEST (dropdown)
- Buttons: OK, Cancel

Configuration – Performance

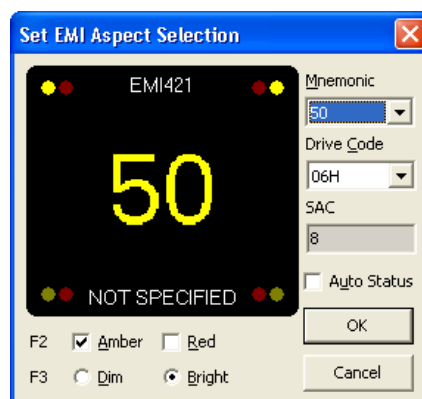
4.6 Sign / Signal Settings

4.6.1 Set Standard Aspect

Select the Set Standard Aspect function to select an aspect ready for transmission to the selected address.

Only Drive Codes valid for the selected sign type will be made available. Both the Drive Code and Mnemonic can be selected; the SAC and graphical representation of the aspect will be updated to reflect the selection. Select the OK button to set the selected aspect or

select Cancel to abandon the function. Check Auto Status to send a STATUS REQUEST following the aspect is set.



EMI Aspect Selection

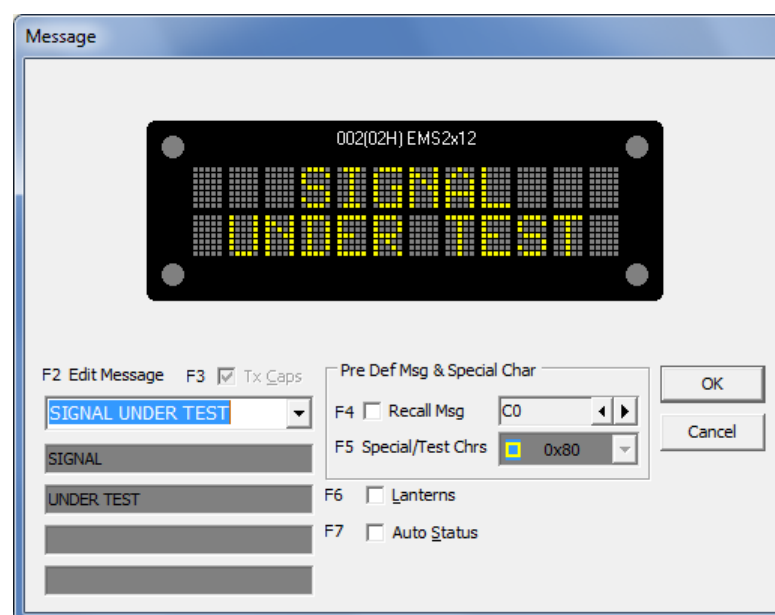
4.6.2 EMS Set Message

Select the Set Message function to select a text message ready for transmission to the selected address.

If Super User mode is active, type the required message into the edit box, special characters and test pattern can be inserted using two hexadecimal codes preceded with a '#' character or can be selected from the drop-down list. Otherwise a default test message must be selected.

A pre-defined text message can be selected in the range of 0xC0 to 0xEF while Recall Msg is checked.

The text message entered or selected will be displayed using a graphical representation of the message sign. Select the OK button to set the selected message or select Cancel to abandon the function. Check Auto Status to send a STATUS REQUEST after the message is set.



EMS Message Entry (Normal User)

4.6.3 VMS Set Face

Select the Set Face function to select a face code ready for transmission to the selected address.

Selecting a Face or Drive Code will automatically update the graphical representation. The VMS face displayed will not match the actual sign due to the differences between each VMS sign.

Select the OK button to set the selected face or select Cancel button to abandon the function. Check Auto Status to send a STATUS REQUEST after the face code is set.



VMS Face Code Selection

4.6.4 MS3 Set Sign

Select the Set Sign function to select an aspect and/or a text message ready for transmission to the selected addresses.

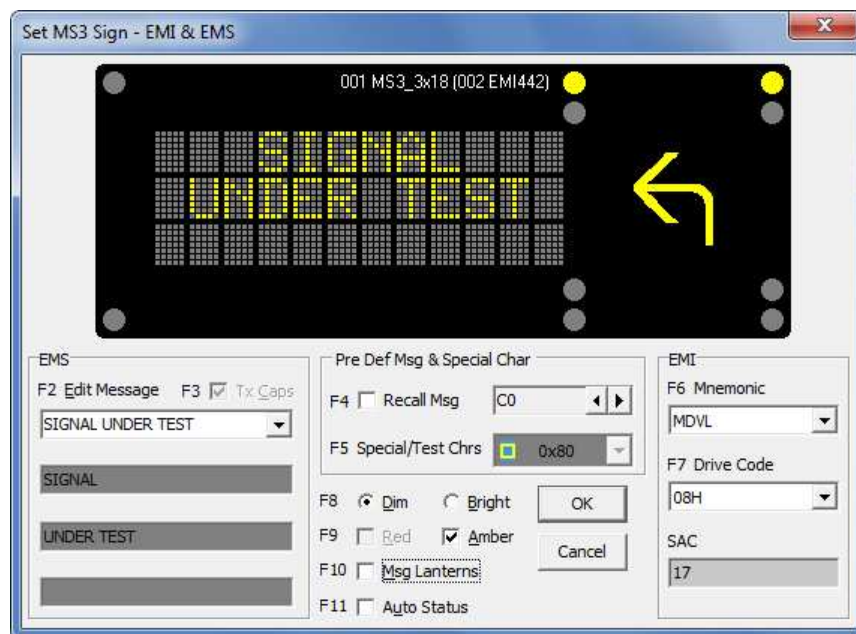
Only Drive Codes valid for the selected sign type will be made available. Both the Drive Code and Mnemonic can be selected; the SAC and graphical representation of the aspect will be updated to reflect the selection.

If Super User mode is active, type the required message into the edit box, special characters and test patterns can be inserted using two hexadecimal codes, preceded by a '#' character or can be selected from the drop-down list. Otherwise a default test message must be selected.

A pre-defined text message can be selected in the range of 0xC0 to 0xEF while Recall Msg is checked.

The text message entered or selected will be displayed using a graphical representation of the MS3 sign.

Select the OK button to set the message and/or aspect or select Cancel to abandon the function. Check Auto Status to send a STATUS REQUEST to the EMS and/or the EMI addresses after the message and/or aspect are set.



MS3 Message Entry and Aspect Selection (Normal User)

4.6.5 MS4 Set Sign

Select the Set Sign function to select an aspect and/or a text message including pictogram ready for transmission to the selected addresses.

Only Drive Codes valid for the selected sign type will be made available. Both the Drive Code and Mnemonic can be selected; the SAC and graphical representation of the aspect will be updated to reflect the selection.

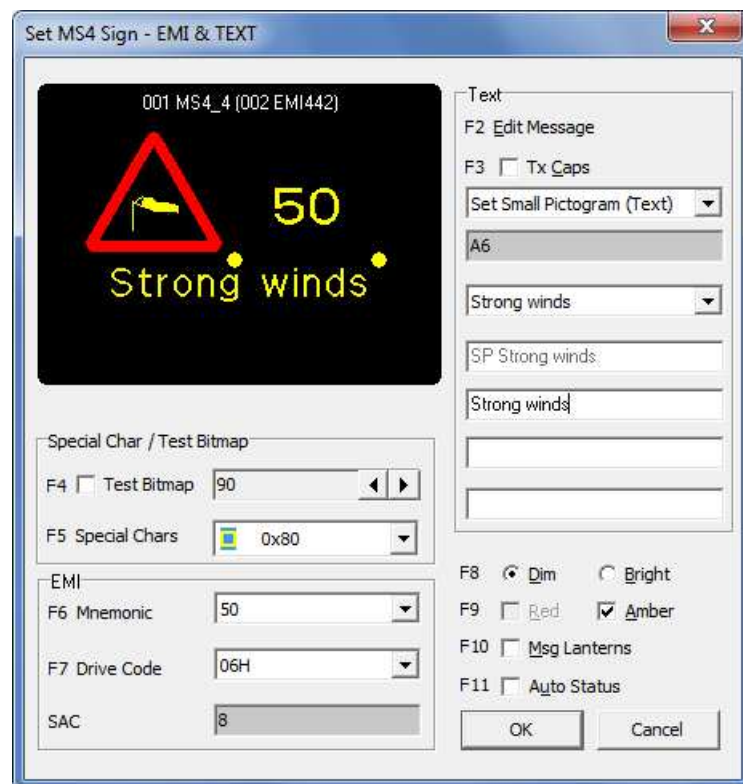
If Super User mode is active, type the required message into the edit box, special characters and test bitmaps can be inserted using two hexadecimal codes proceeded with a '#' character or can be selected from the drop-down list. Otherwise a default test message must be selected.

A pictogram can be set by selecting from the drop-down list. The message indicating the Pictogram will be displayed in the first message box. The size of the pictogram will be decided automatically according to user setting.

A test bitmap can also be set by checking the Test Bitmaps check box and using the associated left and right arrow buttons to select one of the test bitmaps for display. Note that this option is available for all user types.

The text message entered or selected will be displayed using a graphical representation of the MS4 sign.

Only a valid message combination can be sent out, otherwise OK button is disabled. Select the OK button to set the message and/or aspect or select Cancel to abandon the function. Check Auto Status to send a STATUS REQUEST to the EMS and/or the EMI addresses after the message and/or aspect are set.



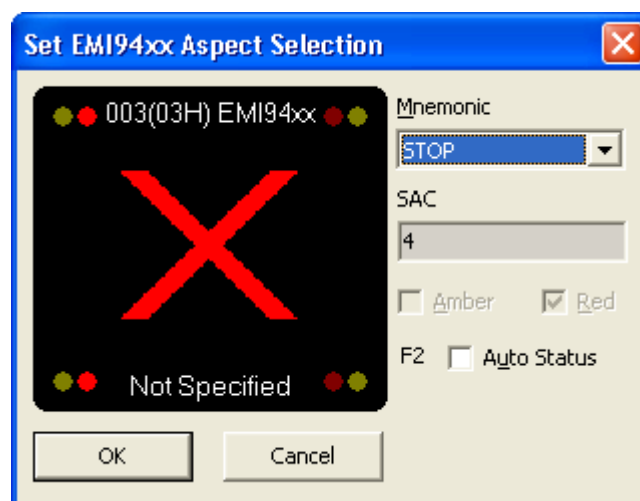
MS4 Message/Pictogram Entry and Aspect Selection (Super User)

4.6.6 EMI94xx Set Standard Aspect

Select the Set Standard Aspect function to select an aspect ready for transmission to the selected address.

Mnemonics for all available aspects can be selected for setting a standard aspect, the SAC and graphical representation of the aspect will be updated to reflect the selection. Lantern display, appropriate to the selected aspect, will be set automatically.

Select the OK button to set the aspect or select Cancel to abandon the function. Check Auto Status to send a STATUS REQUEST to the EMI94xx address after the aspect is set.



EMI94xx Aspect Selection

4.7 Communication Statistics

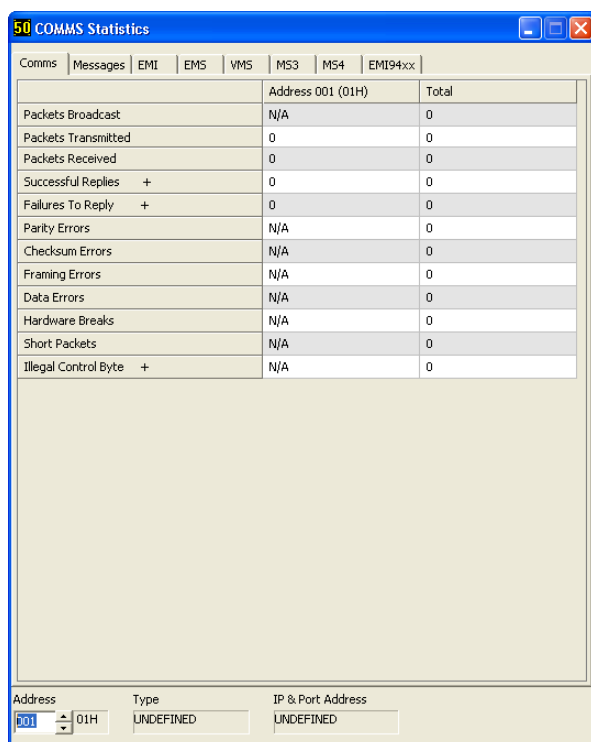
Selecting “View | Communication Statistics” or pressing the F8 key will display a statistics dialog. Only statistics relevant to the current operational mode will be displayed, except in OFF/Replay Mode, which is determined by the previously selected operational mode.

In Serial Control Mode, Diagnostic Mode, Test Mode, RS485 Monitor Mode and Serial Script Mode the COMMS Statistics dialog will be displayed, as shown below, listing all serial communication related statistics.

Communications statistics can be viewed for each address in the range 001 to 376 (octal) as well as a running total, in the right hand column. The Packets Broadcast field of COMMS Statistics does NOT support individual addresses.

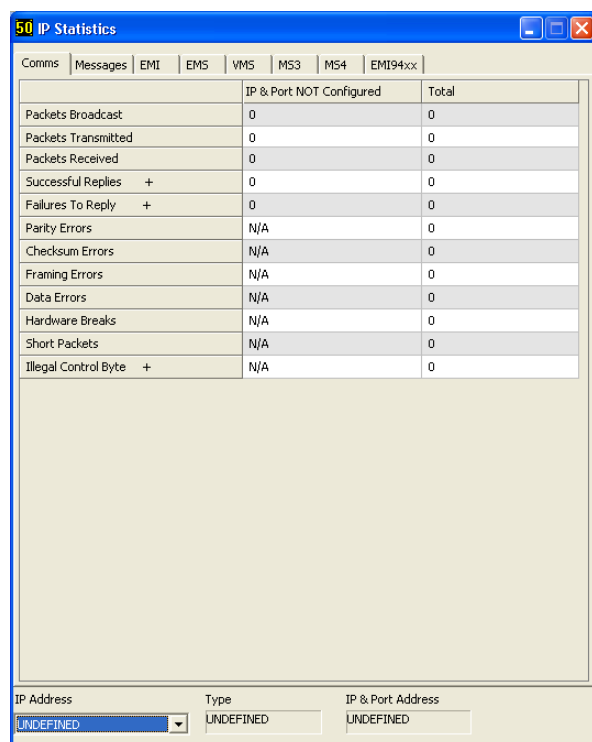
IP Control and IP Script Modes will display the IP Statistics dialog, listing all IP communication related statistics. Communications statistics can be viewed for each configured IP address including a running total. The Packets Broadcast field of IP Statistics supports individual IP addresses. If no device has been configured, the first column heading will display “IP & Port NOT Configured”; otherwise it will display the selected IP address.

LCC Simulation Mode and HDLC Monitor Mode will display the LCC – Transponder Statistics dialog, listing all HDLC frame related statistics.



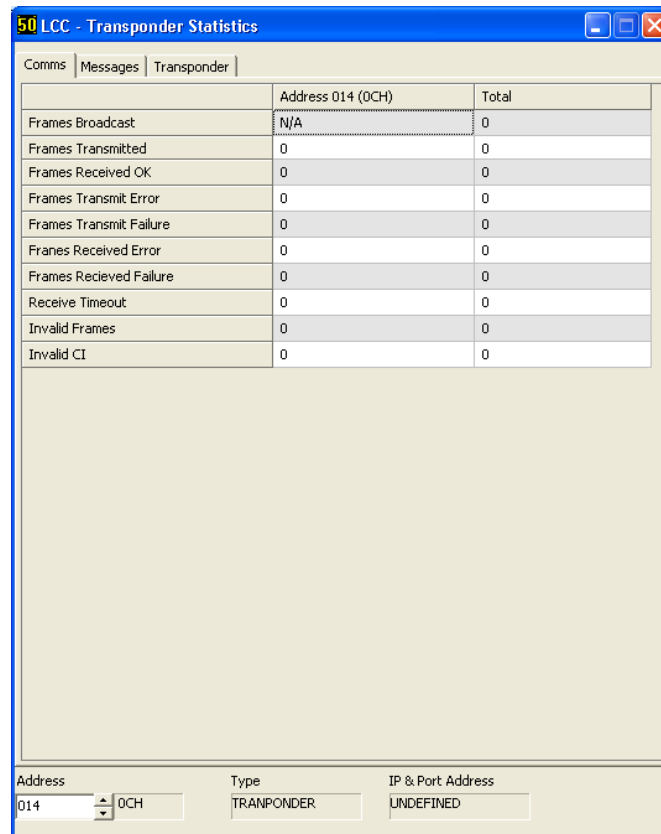
	Address 001 (01H)	Total
Packets Broadcast	N/A	0
Packets Transmitted	0	0
Packets Received	0	0
Successful Replies +	0	0
Failures To Reply +	0	0
Parity Errors	N/A	0
Checksum Errors	N/A	0
Framing Errors	N/A	0
Data Errors	N/A	0
Hardware Breaks	N/A	0
Short Packets	N/A	0
Illegal Control Byte +	N/A	0

Address: 001 Type: 01H IP & Port Address: UNDEFINED



	IP & Port NOT Configured	Total
Packets Broadcast	0	0
Packets Transmitted	0	0
Packets Received	0	0
Successful Replies +	0	0
Failures To Reply +	0	0
Parity Errors	N/A	0
Checksum Errors	N/A	0
Framing Errors	N/A	0
Data Errors	N/A	0
Hardware Breaks	N/A	0
Short Packets	N/A	0
Illegal Control Byte +	N/A	0

IP Address: UNDEFINED Type: UNDEFINED IP & Port Address: UNDEFINED



	Address 014 (OCH)	Total
Frames Broadcast	N/A	0
Frames Transmitted	0	0
Frames Received OK	0	0
Frames Transmit Error	0	0
Frames Transmit Failure	0	0
Frames Received Error	0	0
Frames Received Failure	0	0
Receive Timeout	0	0
Invalid Frames	0	0
Invalid CI	0	0

Address: 014 Type: OCH IP & Port Address: UNDEFINED

Statistics – Communication

To display statistics relating to a different address, change the address in the Address / IP Address field on the Statistic Form.

Test Failure (EMI, MS3 and MS4 Pages), Successful Replies, Failures to Reply and Illegal Control Byte statistics shall display additional information that will be accessible by clicking on the “+” symbol or pressing the return key.

4.7.1 Message Statistics

To view the number of messages sent/received, select the Messages page.

In serial and IP communication modes, this page lists all messages with a valid Control Field (CF) that have been transmitted or received in the current test session.

In IP communication modes, Flasher Synchronisation and Luminance Broadcast Messages are displayed for individual addresses.

In LCC Simulation Mode and HDLC Monitor Mode this page lists all messages with a valid Control Information (CI).

50 COMMS Statistics

Comms Messages EMI EMS VMS MS3 MS4 EMI94xx

	Address 001 (01H)	Total
Set Commands	0	0
Acknowledgements	0	0
Status Requests	0	0
Status Replies	0	0
Test Commands	0	0
Test Result Requests	0	0
Test Results	0	0
Flasher Synch Broadcasts	N/A	0
Luminance Broadcasts	N/A	0
Incomplete Multi-Messages	0	0
Complete Multi-Messages	0	0
Device Modification Requests	0	0
Device Modification Replies	0	0

Address: 001 01H Type: UNDEFINED IP & Port Address: UNDEFINED

50 IP Statistics

Comms Messages EMI EMS VMS MS3 MS4 EMI94xx

	IP & Port NOT Configured	Total
Set Commands	0	0
Acknowledgements	0	0
Status Requests	0	0
Status Replies	0	0
Test Commands	0	0
Test Result Requests	0	0
Test Results	0	0
Flasher Synch Broadcasts	0	0
Luminance Broadcasts	0	0
Incomplete Multi-Messages	0	0
Complete Multi-Messages	0	0
Device Modification Requests	0	0
Device Modification Replies	0	0

IP Address: UNDEFINED Type: UNDEFINED IP & Port Address: UNDEFINED

50 LCC - Transponder Statistics

Comms Messages Transponder

	Address 014 (0CH)	Total
Update Time	N/A	0
Request Fault Report	0	0
Fault Report Incomplete	0	0
Fault Report Complete	0	0
Station Status Request	0	0
Station Status Data	0	0
Device s/w Request Incomplete	0	0
Device s/w Request Complete	0	0
Device s/w Reply Incomplete	0	0
Device s/w Reply Complete	0	0
Test Devices Incomplete	0	0
Test Devices Complete	0	0
Test Results Incomplete	0	0
Test Results Complete	0	0
Reset	0	0
Site Data Incomplete	0	0
Site Data Complete	0	0
Message Reject	0	0
Set Devices Incomplete	0	0
Set Devices Complete	0	0
Request Device Status Data Incomplete	0	0
Request Device Status Data Complete	0	0
Device Status Data Incomplete	0	0
Device Status Data Complete	0	0
Dim Signals	N/A	0

Address: 014 0CH Type: TRANSPONDER IP & Port Address: UNDEFINED

Statistics – Messages

4.7.2 EMI/EMS/VMS/MS3/MS4/EMI94xx/Transponder Fault Statistics

To view the number of recorded failures for a specific sign, select the EMI, EMS, VMS, MS3, MS4 or EMI94xx tab page. To view Transponder specific failures, select the Transponder tab page.

50 COMMS Statistics

Comms Messages EMI EMS VMS MS3 MS4 EMI94xx

	Address 001 (01H)	Total
Amber Lanterns not as Set	0	0
Red Lanterns not as Set	0	0
Dim/Bright Inverted	0	0
Aspects not as Requested	0	0
Lamp Failures	0	0
Flasher Synch Failures	0	0
Heater Failures	0	0
Amber Lantern Test Failures	0	0
Red Lantern Test Failures	0	0
Aspect Test Failures +	0	0

Address: 001, Type: EMI407, IP & Port Address: UNDEFINED

Statistics – EMI

50 IP Statistics

Comms Messages EMI EMS VMS MS3 MS4 EMI94xx

	192.168.0.78:10002	Total
Lantern Status Failures	0	0
Pixel Failures	0	0
Message Failures	0	0
CRC Errors	0	0
Power Status Failures	0	0
Lantern Test Failures	0	0
Luminance Failures	0	0
Temperature Alarm	0	0
Watchdog Resets	0	0
Fibre Optics Failures	0	0
Power Test Failures	0	0
Internal Comms Failures	0	0
Heater Failures	0	0

IP Address: 192.168.0.78:10002, Type: EMS2x12, IP & Port Address: 192.168.0.78:10002

Statistics – EMS

50 LCC - Transponder Statistics

Comms Messages Transponder

	Address 014 (0CH)	Total
Unobtainable	0	0
Mains Failed	0	0
Battery Charger Fault	0	0
Fan Failure	0	0
Line Hogging	0	0
Heater Failed	0	0

Address: 014, Type: TRANSPONDER, IP & Port Address: UNDEFINED

Statistics – TRANSPONDER

4.8 Status

The Sign/Link Status can be viewed by selecting the Status button, the “View | Device Status” menu option or by pressing the F9 function key. The status data shown will depend upon the current device type selected. If an EMI sign type has been selected, the status will display the EMI Status Sign Info page (4.8.2) by default or the Message List page (4.8.1) by choice. If the device type hasn't been configured, the status will correspond to undefined sign type (4.8.1). To display status relating to a different address (i.e. in Serial Control Mode), change the address in the Address field on the Status Form. If a transponder has been selected (i.e. in LCC simulation mode), the status information on the master LCC, selected Transponders and associated slave signs will all be displayed.

If in IP Mode, all the configured IP addresses will be added to the IP Address combo box and the one selected shall be displayed in a string format. The IP and Port address of the selected device will be shown; otherwise, it will be displayed as UNDEFINED. To display status relating to a different IP address, change the IP address in the IP Address field on the Status Form. An extra LED will be displayed in this mode, showing the connectivity of the device. A green LED indicates the device is connected, while a red LED indicates it is disconnected.

4.8.1 Undefined Sign Type/Message List

The message list is automatically displayed for all addresses with UNDEFINED sign types. To display the message list for a configured address select the Message List radio button.

The display provides the latest recorded DB1 and DB2 values in binary and hexadecimal and the timestamp of the transmitted and received messages for the currently selected address. It also provides full decoding of broadcast messages. If no data is available for the specified message, the corresponding cell displays “UNKNOWN”

50 CMI450 Status Form

MESSAGE	DB1 (BIN)	DB1 (HEX)	DB2 (BIN)	DB2 (HEX)	TIMESTAMP
SET COMMAND	00000000	00	00110010	32	09:35:55.12
ACKNOWLEDGEMENT	11111111	FF	11101101	ED	09:36:07.49
STATUS REQUEST	00000000	00	00000000	00	09:35:55.46
STATUS REPLY	00000000	00	00110010	32	09:35:55.47
TEST COMMAND	00000000	00	00010010	12	09:36:07.47
REQ TEST RESULT	00000000	00	00000000	00	09:36:07.69
TEST RESULT	00000000	00	00000000	00	09:36:07.72
MUL MSG INCOMPLETE	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
MUL MSG COMPLETE	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
DEV MOD REQUEST	00000000	00	00000000	00	09:36:22.30
DEV MOD REPLY	01100011	63	00000001	01	09:36:22.33
FLASHER SYNC	00000000	00	00000000	00	09:36:36.99
LUMINANCE	00000000	00	00000100	04	09:36:37.02

LUMINANCE LEVEL	LUMINANCE DIM/BRIGHT	SYNC DIM/BRIGHT
4	DIM	DIM

Address: 001 01H Type: CMI450 IP & Port Address: UNDEFINED

☒ MESSAGE LIST ☐ SIGN INFO

Status – Message List in Serial Control Mode (CMI450)

50 EMI407 Status Form IP

MESSAGE

MESSAGE	DB1 (BIN)	DB1 (HEX)	DB2 (BIN)	DB2 (HEX)	TIMESTAMP
SET COMMAND	00000000	00	00100001	21	12:56:49.29
ACKNOWLEDGEMENT	11111111	FF	11011110	DE	12:56:49.32
STATUS REQUEST	00000000	00	00000000	00	12:56:50.65
STATUS REPLY	00000000	00	00100001	21	12:56:50.71
TEST COMMAND	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
REQ TEST RESULT	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
TEST RESULT	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
MUL MSG INCOMPLETE	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
MUL MSG COMPLETE	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
DEV MOD REQUEST	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
DEV MOD REPLY	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN	UNKNOWN
FLAHSER SYNC	00000000	00	00000000	00	12:56:59.81
LUMINANCE	00000001	01	00000100	04	12:57:04.67

LUMINANCE LEVEL	LUMINANCE DIM/BRIGHT	SYNC DIM/BRIGHT
4	BRIGHT	DIM

IP Address: 192.168.0.78:10002 Type: EMI407 IP & Port Address: 192.168.0.78:10002 CONNECTED MESSAGE LIST SIGN INFO

Status – Message List in IP Control Mode (EMI407)

4.8.2 EMI Status Sign Info

The display provides the current status of the EMI device in plain English together with graphical views of the current aspect setting. When on, amber lanterns flash from top to bottom, alternating every 400ms. When on, red lanterns flash from right to left, alternating every 400ms.

A graphical representation of Set Result and Test Result is provided, where a tick indicates a pass, cross a failure, question mark an unknown and an hourglass an in-progress state. Specific LEDs will light up to indicate any detected failures in the latest Status Reply. The LED Status Data Expired indicates whether the Status data is out of date and that a new Status Request command is needed.

50 CMI450 Status Form

SET COMMAND

001 (01H) CMI450

ASPECT: 40R (12H)

DIM/BRIGHT: BRIGHT

AMBER LANTERNS: OFF

RED LANTERNS: OFF

Not Specified

STATUS REPLY

001 (01H) CMI450

ASPECT: 40R (12H)

DIM/BRIGHT: BRIGHT

AMBER LANTERNS: OFF

RED LANTERNS: OFF

Not Specified

ASPECT NOT AS SET
LANTERNS NOT AS SET
DIM/BRIGHT INVERTED
STATUS DATA EXPIRED

LAMP FAILURE
FLASHER SYNC FAILURE
HEATER FAILURE

TEST & SET RESULTS

	SET RESULT (D/B)	TEST RESULT
OFF	??	?
NR	??	?
STOP	??	?
20	??	?
30	??	?
40	??	?
50	??	?
60	??	?
LDR	??	?
LDL	??	?
MDVL	??	?
FOG	??	?
20R	??	?
30R	??	?

BROADCASTS & SOFTWARE MODIFICATION

LUMINANCE LEVEL: 4

STORES TYPE CODE: UNKNOWN

LUM DIM/BRIGHT: DIM

SOFTWARE MOD: UNKNOWN

SYNC DIM/BRIGHT: DIM

Address: 001 01H Type: CMI450 IP & Port Address: UNDEFINED

MESSAGE LIST SIGN INFO

Status – EMI Status Sign Info in Serial Control Mode

50 EMI407 Status Form IP

SET COMMAND

EMI407

Not Specified

ASPECT: TTT (01H)

DIM/BRIGHT: BRIGHT

AMBER LANTERNS: OFF

RED LANTERNS: NOT PRESENT

STATUS REPLY

EMI407

Not Specified

ASPECT: TTT (01H)

DIM/BRIGHT: BRIGHT

AMBER LANTERNS: OFF

RED LANTERNS: NOT PRESENT

ASPECT NOT AS SET
 LANTERNS NOT AS SET
 DIM/BRIGHT INVERTED
 STATUS DATA EXPIRED
 LAMP FAILURE
 FLASHER SYNC FAILURE
 HEATER FAILURE

TEST & SET RESULTS

	SET RESULT (D/B)	TEST RESULT
OFF	??	?
RE	??	?
TTT	??	?
20	??	?
30	??	?
40	??	?
50	??	?
60	??	?
70	??	?
80	??	?
TT1	??	?
T11	??	?
1TT	??	?
11T	??	?

BROADCASTS & SOFTWARE MODIFICATION

LUMINANCE LEVEL: 4

STORES TYPE CODE: UNKNOWN

LUM DIM/BRIGHT: BRIGHT

SOFTWARE MOD: UNKNOWN

SYNC DIM/BRIGHT: DIM

IP Address: 192.168.0.78:10002 Type: EMI407 IP & Port Address: 192.168.0.78:10002

CONNECTED MESSAGE LIST SIGN INFO

Status – EMI Status Sign Info in IP Control Mode

4.8.3 EMS Status Sign Info

The display provides the current status of the EMS device in plain English together with a graphical view of the current message setting. Characters are displayed in a matrix format and each line is centred on the display to mimic the EMS display. When on, amber lanterns flash from top to bottom, alternating every 400ms.

Specific LEDs will light up to indicate any detected failures in the latest Status Reply. The LED Status Data Expired indicates whether the Status data is out of date and that a new Status Request command is needed. Status Reply CRC is displayed in hexadecimal.

A graphical representation of Test Results is provided, where a tick indicates a pass, cross a failure, question mark an unknown and an hourglass an in-progress state. If a Test was passed or is unknown the corresponding Result Failure will display 'NONE', otherwise a list of all detected faults will be displayed.

50 EMS3x18 Status Form

MULTI MESSAGE COMMAND

002(02H) EMS3x18

Not Specified

MULTI MESSAGE CRC: 0C3C CALCULATED CRC: 0C3C MESSAGE LANTERNS: OFF

TEST RESULTS

	TEST RESULT	RESULT FAILURE
TEST 1	?	NONE
TEST 2 STAGE 1	?	NONE
TEST 2 STAGE 2	?	NONE
TEST 2 STAGE 3	?	NONE
TEST 2 STAGE 4	?	NONE
TEST 2 STAGE 5	?	NONE
TEST 2 STAGE 6	?	NONE

Address: 002 Type: EMS3x18 IP & Port Address: UNDEFINED

MESSAGE LIST SIGN INFO

STATUS REPLY

- ☒ LANTERN FAILURE
- ☒ PIXEL FAILURE
- ☒ MESSAGE FAILURE
- ☒ POWER FAILURE
- ☒ CRC FAILURE
- ☒ STATUS DATA EXPIRED

CRC: 0C3C

SOFTWARE MOD: UNKNOWN

BROADCASTS

LUMINANCE LEVEL: 4

LUM DIM/BRIGHT: DIM

SYNC DIM/BRIGHT: DIM

Status – EMS Status Sign Info in Serial Control Mode

50 EMS3x18 Status Form IP

MULTI MESSAGE COMMAND

EMS3x18

Not Specified

MULTI MESSAGE CRC: 075C CALCULATED CRC: 075C MESSAGE LANTERNS: OFF

TEST RESULTS

	TEST RESULT	RESULT FAILURE
TEST 1	✓	NONE
TEST 2 STAGE 1	✗
TEST 2 STAGE 2	?	NONE
TEST 2 STAGE 3	?	NONE
TEST 2 STAGE 4	?	NONE
TEST 2 STAGE 5	?	NONE
TEST 2 STAGE 6	?	NONE

IP Address: 192.168.0.78:10002 Type: EMS3x18 IP & Port Address: 192.168.0.78:10002

CONNECTED MESSAGE LIST SIGN INFO

STATUS REPLY

- ☒ LANTERN FAILURE
- ☒ PIXEL FAILURE
- ☒ MESSAGE FAILURE
- ☒ POWER FAILURE
- ☒ CRC FAILURE
- ☒ STATUS DATA EXPIRED

CRC: 075C

SOFTWARE MOD: UNKNOWN

BROADCASTS

LUMINANCE LEVEL: 9

LUM DIM/BRIGHT: BRIGHT

SYNC DIM/BRIGHT: UNKNOWN

Status – EMS Status Sign Info in IP Control Mode

4.8.4 VMS Status Sign Info

The display provides the current status of the VMS device in plain English together with a graphical view of the current face code setting. If the VMS protocol is multi-message, the Multi Message CRC and Status Reply CRC will also be displayed. When on, amber lanterns flash from top to bottom, alternating every 400ms.

A graphical representation of Set Face results is provided, where a tick indicates a pass, cross a failure, question mark an unknown and an hourglass an in-progress state. Specific LEDs will light up to indicate any failures detected in the Status Reply. The LED Status Data Expired indicates whether the Status data is out of date and that a new Status Request command is needed.

50 TR2095 Status Form

SET COMMAND

004(04H) TR2095

FACE CODE: 8

DIM/BRIGHT: N/A

MSG LANTERNS: OFF

Not Specified

STATUS REPLY

004(04H) TR2095

Not Specified

STATUS DATA EXPIRED

SYNC FAILURE

FLASHER FAULT

DATA FAILURE

HEATER FAILURE

FACE FAILURE

LIGHTING FAILURE

DIMMER FAULT

MAINTENANCE MODE

SET FACE RESULTS

FACE	SET RESULT
FACE 00	?
FACE 01	?
FACE 02	?
FACE 03	?
FACE 04	?
FACE 05	?
FACE 06	?
FACE 07	?
FACE 08	✓
FACE 09	?
FACE 10	?
FACE 11	?
FACE 12	?
FACE 13	?

BROADCASTS & SOFTWARE MODIFICATION

LUMINANCE LEVEL: 4

LUM DIM/BRIGHT: DIM

SYNC DIM/BRIGHT: DIM

STORES TYPE CODE: UNKNOWN

SOFTWARE MOD: UNKNOWN

Address: 004 04H

Type: TR2095

IP & Port Address: UNDEFINED

☐ MESSAGE LIST ☒ SIGN INFO

Status – VMS Status Sign Info in Serial Control Mode

Status – VMS Status Sign Info in IP Control Mode

4.8.5 MS3 Status Sign Info

On the MS3 Set/Status tab page, the display provides the current status of the MS3 device in plain English together with a graphical view of the current aspect and message setting. Characters are displayed in a matrix format. If operating in **text only mode**, each line is centred on the MS3 device and when on, amber lanterns on the left and right flash from top to bottom, alternating every 400ms. Red lanterns cannot be turned on in this mode. If operating in **normal mode**, each line is centred on the left of the MS3 mimic and the aspect is displayed on the right. If operating in **signal only mode**, only the aspect is displayed on the right. For the latter two operational modes, both amber and red lanterns can be turned on. When on, amber lanterns in the middle and on the right flash from top to bottom, alternating every 400ms. When on, red lanterns in the middle and on the right flash from right to left, alternating every 400ms.

This page also provides a graphical representation of Status Reply. Specific LEDs will light up to indicate any failures detected in the Status Reply. The LED Status Data Expired indicates whether the Status data is out of date and that a new Status Request command is needed. Status Reply CRC is displayed in hexadecimal.

On MS3 Set/Status Results tab page, a graphical representation of Set Result and Test Result for the EMI part of the MS3 mimic is provided, where a tick indicates a pass, cross a failure, question mark an unknown and an hourglass an in-progress state

A graphical representation of Test Results for the EMS part of the MS3 mimic is also provided, where a tick indicates a pass, cross a failure, question mark an unknown and an hourglass an in-progress state. If a Test was passed or is unknown the corresponding Result Failure will display 'NONE', otherwise a list of all detected faults will be displayed.

50 MS3_3x18 Status Form

MS3 SET/STATUS | MS3 SET/TEST RESULTS

SET

MS3_3x18 (EMI445)

123456789012
TESTING IN
PROGRESS

50

Not Specified

ASPECT: 50 (06H)

DIM/BRIGHT: DIM

AMB LANTERNS: ON

RED LANTERNS: OFF

MULTI MSG CRC: 0530

CALCULATED CRC: 0530

MSG LANTERNS: OFF

STATUS REPLY

☒ LANTERN FAILURE
☒ PIXEL FAILURE
☒ MESSAGE FAILURE
☒ POWER FAILURE
☒ CRC FAILURE

☒ ASPECT NOT AS SET
☒ LANTERNS NOT AS SET
☒ DIM/BRIGHT INVERTED
☒ FLASHER SYNC FAILURE
☒ STATUS DATA EXPIRED

☒ HEATER FAILURE
☒ LAMP FAILURE

ASPECT: 50 (06H)

DIM/BRIGHT: DIM

AMB LANTERNS: ON

RED LANTERNS: OFF

CRC: 0530

BROADCASTS & SOFTWARE MODIFICATION

LUMINANCE LEVEL: 04

LUM DIM/BRIGHT: DIM

SYNC DIM/BRIGHT: DIM

STORES TYPE CODE: UNKNOWN

SOFTWARE MOD: UNKNOWN

Address: 001 01H

Type: MS3_3x18 (EMS)

IP & Port Address: UNDEFINED

☐ MESSAGE LIST
 ☒ SIGN INFO

Status – MS3 Status Sign Info in Serial Control Mode

50 MS3_3x18 Status Form IP

MS3 SET/STATUS | MS3 SET/TEST RESULTS

SET

MS3_3x18 (EMI442)

123456789012
TESTING IN
PROGRESS

Not Specified

ASPECT: MDVL (08H)

DIM/BRIGHT: DIM

AMB LANTERNS: ON

RED LANTERNS: NOT PRESENT

MULTI MSG CRC: 0530

CALCULATED CRC: 0530

MSG LANTERNS: ON

STATUS REPLY

☒ LANTERN FAILURE
☒ PIXEL FAILURE
☒ MESSAGE FAILURE
☒ POWER FAILURE
☒ CRC FAILURE

☒ ASPECT NOT AS SET
☒ LANTERNS NOT AS SET
☒ DIM/BRIGHT INVERTED
☒ FLASHER SYNC FAILURE
☒ STATUS DATA EXPIRED

☒ HEATER FAILURE
☒ LAMP FAILURE

ASPECT: MDVL (08H)

DIM/BRIGHT: DIM

AMB LANTERNS: ON

RED LANTERNS: NOT PRESENT

CRC: 0530

BROADCASTS & SOFTWARE MODIFICATION

LUMINANCE LEVEL: N/A

LUM DIM/BRIGHT: UNKNOWN

SYNC DIM/BRIGHT: UNKNOWN

STORES TYPE CODE: UNKNOWN

SOFTWARE MOD: UNKNOWN

IP Address: 192.168.0.78:10001

Type: MS3_3x18 (EMS)

IP & Port Address: 192.168.0.78:10001

☒ CONNECTED
 ☐ MESSAGE LIST
 ☒ SIGN INFO

Status – MS3 Status Sign Info in IP Control Mode

4.8.6 MS4 Status Sign Info

On the MS4 Set/Status tab page, the display provides the current status of the MS4 device in hexadecimal, decimal, binary and plain English together with a graphical view of the current aspect, pictogram and message setting.

This page also provides a graphical representation of Status Reply. Certain LEDs will light up to indicate the detailed failure of the latest Status Reply. The LED Status Data Expired indicates whether the Status data is out of date so that a new Status Request command is needed. Status Reply CRC is displayed in hexadecimal.

On MS4 Set/Test Results tab page, a graphical representation of Set Result and Test Result for the EMI part of the MS4 mimic is provided, where a tick indicates a pass, cross a failure, question mark an unknown and an hourglass an in-progress state

A graphical representation of Test Results for the MS4 Multi-Message subsystem part of the MS4 mimic is also provided, where a tick indicates a pass, cross a failure, question mark an unknown and an hourglass an in-progress state. If a Test was passed or is unknown the corresponding Result Failure will display 'NONE', otherwise a list of all detected faults will be displayed.

The screenshot shows the 'MS4 Status Form' window with the following sections:

- MS4 SET/STATUS** (selected tab):
 - SET**: A central display area showing 'MS4 (EMI442)', a red triangle with a yellow car icon, the number '30', and the text 'Slow Down' and 'Not Specified'.
 - ASPECT**: 30 (04H)
 - DIM/BRIGHT**: DIM
 - AMB LANTERNS**: ON
 - RED LANTERNS**: NOT PRESENT
 - MULTI MSG CRC**: 0130
 - CALCULATED CRC**: 0130
 - MSG LANTERNS**: ON
- STATUS REPLY**:
 - LANTERN FAILURE**: (red dot)
 - PIXEL FAILURE**: (red dot)
 - MESSAGE FAILURE**: (red dot)
 - POWER FAILURE**: (red dot)
 - CRC FAILURE**: (red dot)
 - ASPECT NOT AS SET**: (red dot)
 - LANTERNS NOT AS SET**: (red dot)
 - DIM/BRIGHT INVERTED**: (red dot)
 - FLASHER SYNC FAILURE**: (red dot)
 - STATUS DATA EXPIRED**: (red dot)
 - HEATER FAILURE**: (red dot)
 - LAMP FAILURE**: (red dot)
 - CRC**: 00B5
 - ASPECT**: T1 (0CH)
 - DIM/BRIGHT**: DIM
 - AMB LANTERNS**: ON
 - RED LANTERNS**: NOT PRESENT
- BROADCASTS & SOFTWARE MODIFICATION**:
 - LUMINANCE LEVEL**: N/A
 - LUM DIM/BRIGHT**: UNKNOWN
 - SYNC DIM/BRIGHT**: UNKNOWN
 - STORES TYPE CODE**: UNKNOWN
 - SOFTWARE MOD**: UNKNOWN
- Address**: 001, **Type**: MS4 (MS4), **IP & Port Address**: UNDEFINED
- MESSAGE LIST** (radio button) and **SIGN INFO** (radio button, selected)

Status – MS4 Status Sign Info in Serial Control Mode

Status – MS4 Status Sign Info in IP Control Mode


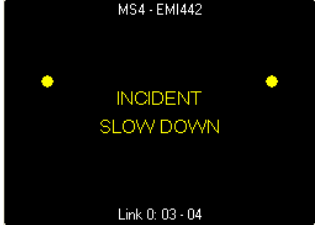





The MS4 is capable of working in one of seven Modes of operation. The Mode defines what the MS4 is capable of displaying on the Display Panel. The Modes are as follows:-

- Operation Mode A: EMI Aspect only. Text and Pictogram settings are inhibited.
- Operation Mode B: Text settings only. EMI and Pictogram settings are inhibited.
- Operation Mode C: Text settings with Pictograms enabled. EMI inhibited.
- Operation Mode D: EMI Aspect and Text Settings enabled. Pictogram settings are inhibited.
- Operation Mode E: EMI Aspect, Text Settings and Pictograms are all enabled.
- Operation Mode F: Pictograms only. EMI Aspect and Text Settings are inhibited.
- Operation Mode G: Pictograms and EMI Aspect allowed. Text Settings are inhibited.

Mode	Pictogram	Text	EMI	Display Examples (See Below)
A	Inhibited	Inhibited	Allowed	Ex 1 only
B	Inhibited	Allowed	Inhibited	Ex 2 only
C	Allowed	Allowed	Inhibited	Ex 2, 3 & 5
D	Inhibited	Allowed	Allowed	Ex 1, 2 & 4
E	Allowed	Allowed	Allowed	Ex 1, 2, 3, 4, 5, 6 & 7
F	Allowed	Inhibited	Inhibited	Ex 3 only
G	Allowed	Inhibited	Allowed	Ex 1, 3 & 6

MS4 Operation Modes.

In all operational modes, either amber or red flashers (lanterns) can be turned on. When flashers are on, amber flashers must switch from top to bottom, alternating every 800ms; red flashers must switch from right to left, alternating every 800ms. The setting of flashers is configurable as follows but the default is for flashers for option 1 only.

Flasher Option	Display
1 – EMI Aspect Only	 <p>MS4 - EMI442</p> <p>Link 0: 01 - 02</p>
2 – Text Only	 <p>MS4 - EMI442</p> <p>Link 0: 03 - 04</p>
3 – Pictogram Only	 <p>MS4 - EMI442</p> <p>Link 0: 05 - 06</p>
4 – EMI Aspect and Text	 <p>MS4 - EMI442</p> <p>Link 0: 01 - 02</p>
5 – Pictogram and Text	 <p>MS4 - EMI442</p> <p>Link 0: 03 - 04</p>
6 – EMI Aspect and Pictogram	 <p>MS4 - EMI442</p> <p>Link 0: 05 - 06</p>
7 – EMI Aspect, Pictogram and Text	 <p>MS4 - EMI442</p> <p>Link 0: 07 - 08</p>

MS4 Mimic Examples with Flasher Configurations

Note that in the above WinTester dialogs the amber lanterns are shown with the EMI aspect. However the default MS4 lantern configuration is to only show lanterns when an EMI aspect is displayed in isolation.

4.8.7 EMI94xx Status Sign Info

The display provides the current status of the EMI94xx device in hexadecimal, decimal, binary and plain English together with a graphical view of the current aspect. When on, amber lanterns flash from top to bottom, alternating every 400ms. When on, red lanterns flash from right to left, alternating every 400ms.

A graphical representation of Set Result & Test Result is provided, where a tick indicates a pass, cross a failure, question mark an unknown and an hourglass an in-progress state. Specific LEDs will light up to indicate any detected failures in the latest Status Reply. The LED Status Data Expired indicates whether the Status data is out of date and that a new Status Request command is needed.

50 EMI94xx Status Form

SET COMMAND

003(03H) EMI94xx

ASPECT: 60

AMBER LANTERNS: ON

RED LANTERNS: OFF

Not Specified

STATUS REPLY

003(03H) EMI94xx

ASPECT: 50 (08H)

AMBER LANTERNS: ON

RED LANTERNS: OFF

DIM/BRIGHT: DIM

Not Specified

ASPECT NOT AS SET
ADAPTION
FLASHER SYNCH FAILURE
AMBER FAILURE
STATUS/TEST DATA EXPIRED

SET CORRECTLY
FAULTY
RED FAILURE
HEATER FAILURE

SET & TEST RESULTS

	SET RESULT	TEST RESULT
OFF	?	?
NR	?	?
RE	?	?
STOP	?	?
20	?	?
30	?	?
40	?	?
50	✓	?
60	⌚	?
70	?	?
LDR	?	?
REDX	?	?
LDL	?	?
MDVL	?	?

BROADCASTS & SOFTWARE MODIFICATION

LUMINANCE LEVEL: 04

LUM DIM/BRIGHT: DIM

SYNC DIM/BRIGHT: DIM

STORES TYPE CODE: UNKNOWN

SOFTWARE MOD: UNKNOWN

Address: 003 03H Type: EMI94xx IP & Port Address: UNDEFINED

MESSAGE LIST SIGN INFO

Status – EMI94xx Status Sign Info in Serial Control Mode

50 EMI94xx Status Form IP

SET COMMAND

EMI94xx

ASPECT: TT

AMBER LANTERNS: OFF

RED LANTERNS: ON

NOT SPECIFIED

STATUS REPLY

EMI94xx

ASPECT: TT (38H)

AMBER LANTERNS: OFF

RED LANTERNS: ON

DIM/BRIGHT: DIM

NOT SPECIFIED

ASPECT NOT AS SET
 ADAPTION
 FLASHER SYNCH FAILURE
 AMBER FAILURE
 STATUS/TEST DATA EXPIRED
 SET CORRECTLY
 FAULTY
 RED FAILURE
 HEATER FAILURE

SET & TEST RESULTS

	SET RESULT	TEST RESULT
OFF	✓	?
NR	?	?
RE	?	?
STOP	?	?
20	?	?
30	?	?
40	?	?
50	?	?
60	✓	?
70	?	?
LDR	?	?
REDX	?	?
LDL	?	?
MDVL	?	?

BROADCASTS & SOFTWARE MODIFICATION

LUMINANCE LEVEL: 04

STORES TYPE CODE: UNKNOWN

LUM DIM/BRIGHT: DIM

SOFTWARE MOD: UNKNOWN

SYNC DIM/BRIGHT: DIM

IP Address: 10.57.0.2:10002 Type: EMI94xx IP & Port Address: 10.57.0.2:10002

CONNECTED MESSAGE LIST SIGN INFO

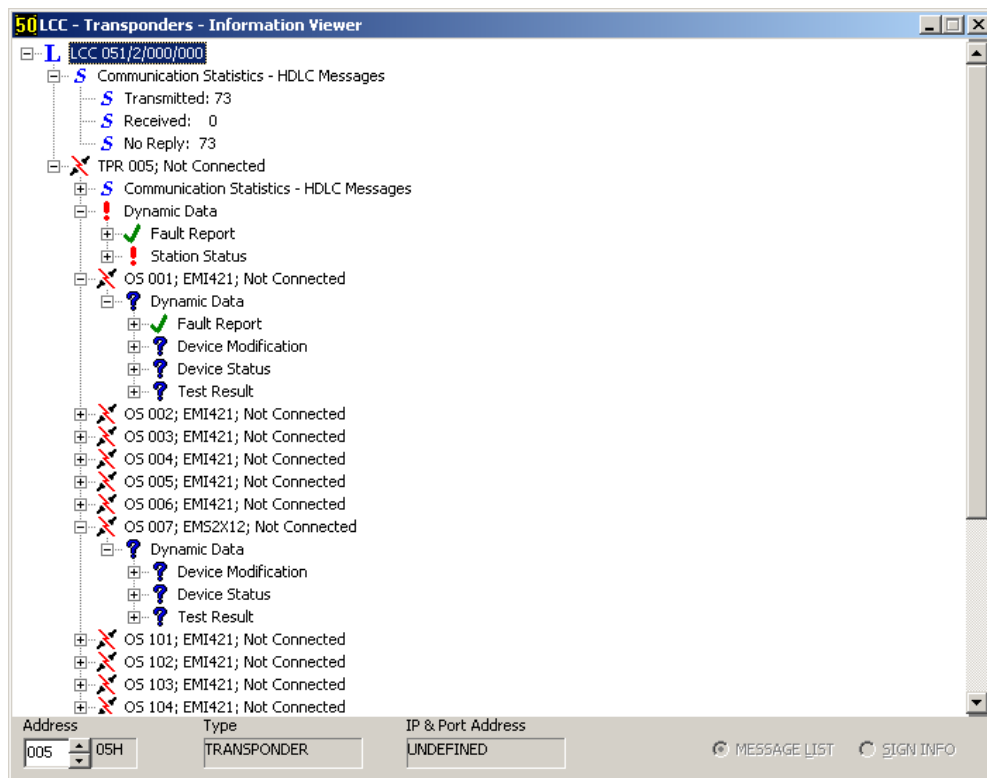
Status – EMI94xx Status Sign Info in IP Control Mode

4.8.8 Broadcasts & Software Modification

Each of the above Status forms has a section displaying information about the latest Device Modification Request and Device Modification Reply commands and the latest Luminance and Flasher Synchronisation commands broadcast.

4.8.9 Information Viewer

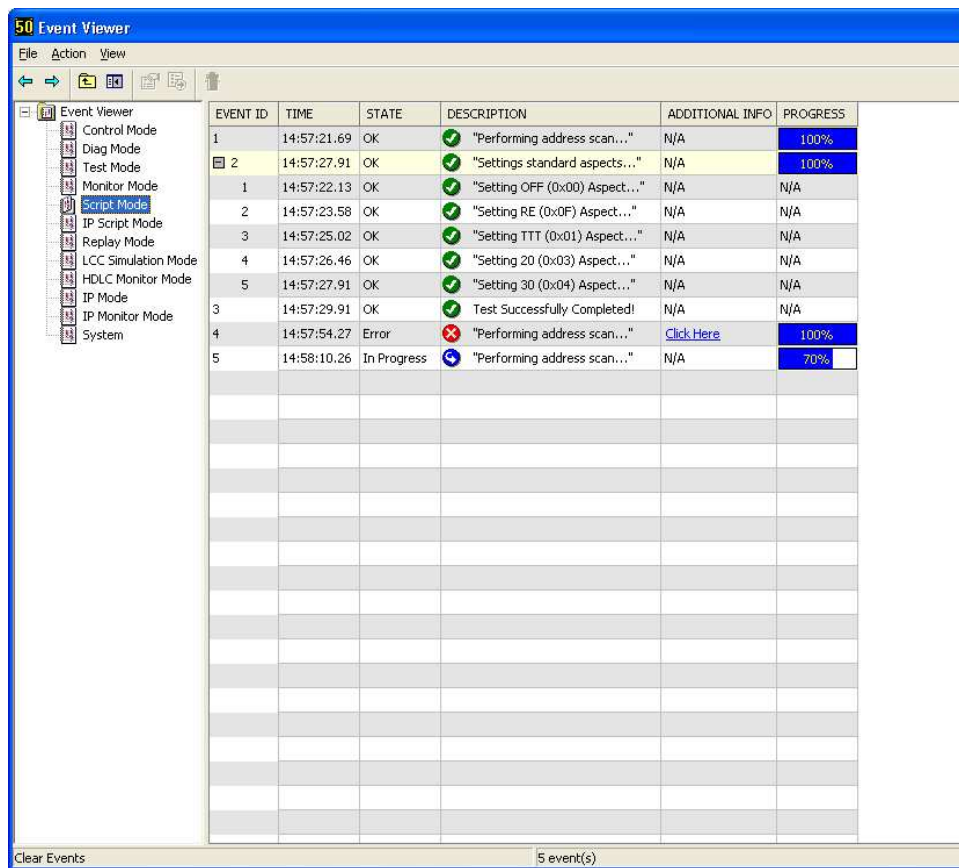
It displays all the information in a tree structure. The root of the tree is the selected LCC. All the transponders being polling and all the devices connected to them are displayed as branch nodes. Statistics are displayed for both the LCC and the transponders. Dynamic Data is displayed for both the transponders and devices connected to them. For transponders, Dynamic Data includes Fault Report and Station Status. For EMI, Dynamic Data includes Fault Report, Device Modification, Device Status and Test Result. For EMS, Dynamics Data includes Device Modification, Device Status and Test Result. State icons are used to indicate the connectivity of the transponders and their associated devices. Icons are also used to indicate whether a certain test has passed, failed or is currently unknown. If one of the device test branches has failed, its parent branch will indicate a failure. If all of the status branches are unknown, the parent branch will also be displayed as unknown. Only when all the test/status branches have passed will the parent branch reflect an overall pass state.



Status – LCC – Transponders Information Viewer

4.9 Event

The events and sub events of different operational modes can be viewed by selecting “View | Event Viewer” or by pressing the F10 key. Each event and sub event will have an event ID, timestamp, state and description. When present the additional info field will provide a hyperlink to a text file or web address providing further explanation of the event. If present the Progress field will display the progress of the event or overall operation.

*Event Viewer*

4.9.1 Show/Hide Columns

All the columns (except Event ID) can be shown/hidden by selecting/deselecting the corresponding column name from the “View” menu. The column names are also available from a pop-up menu that can be invoked by right clicking on the event list.

4.9.2 Show/Hide Event Tree

The event tree can be shown/hidden by selecting “View | Show/Hide Event Tree” or by selecting the same option from the pop-up menu. All columns and the event tree are displayed by default.

4.9.3 Show/Hide Sub Events

It is possible to hide all the sub events by selecting “View | Contract All”. Selecting “View | Expand All” will once again display sub events. Sub events are displayed by default.

4.9.4 Navigation

Previous Event and Next Event from the “Action” menu option, the same pop-up menu can be used to navigate between different events. The “Up a Level” button can be used to jump to a sub event’s parent event.

4.9.5 Clear

Select “Action | Clear Events” to clear the event list.”

4.10 Data Configuration

The Configuration data stored in the configuration “WinTester.csv” file can be viewed from WinTester by selecting the “View | Information” menu option. The Information pages display data for Standard Aspect Codes, Aspects, Pictograms, Matrix Indicators, Message Signs, Variable Message Signs, MS3, MS4 and Intelligent Indicator (EMI94xx). The data cannot be changed from within WinTester.

Information		
Standard Aspect Codes	Aspects	Pictogram
SAC	Mnemonic	Name
1	OFF	Off
2	NR	National Restriction
3	RE	Restriction End
4	STOP	Stop
5	20	Advisory 20
6	30	Advisory 30
7	40	Advisory 40
8	50	Advisory 50
9	60	Advisory 60
10	70	Advisory 70
11	80	Advisory 80
12	100	Advisory 100
13	120	Advisory 120
14	LDR	Lane Divert Right
15	X	Lane Close
16	LDL	Lane Divert Left
17	MDVL	Motorway Divert Left
18	TWAY	Two Way Traffic
19	1(L)	Arrow to Left (Obsolete)

View Information – Standard Aspect Codes

4.10.1 Aspects

Select the Aspects page of Information data to view the set of all aspect bitmaps. This includes the SAC, SAC Mnemonic, Aspect Mnemonic, bitmap filename and graphical representation of the aspect.

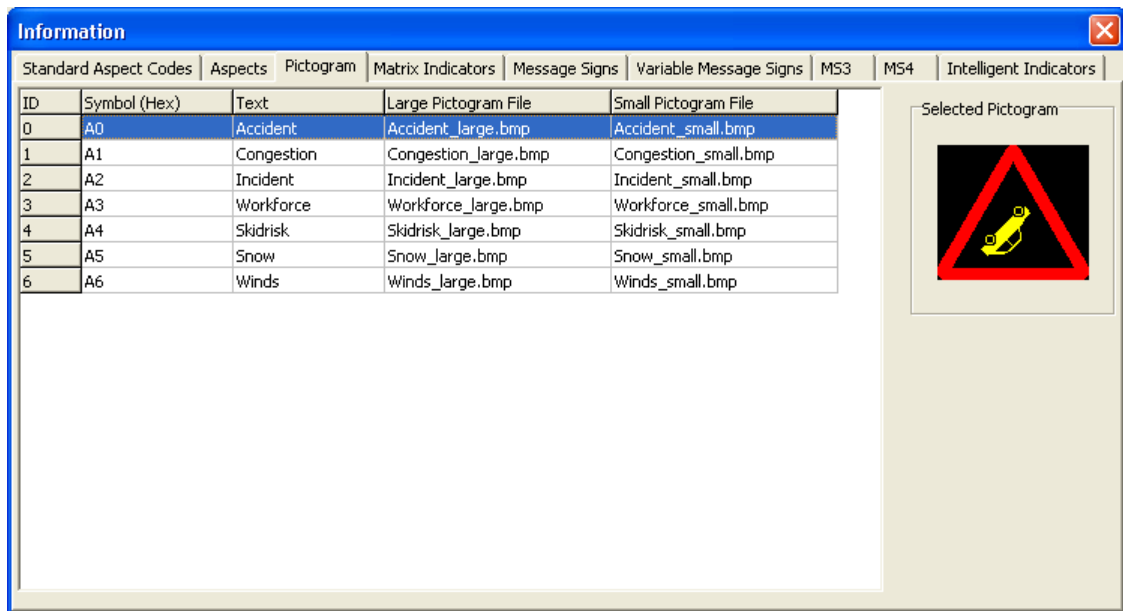
Note that that this page displays all possible aspects and not aspects specific to a particular sign type.

Information				
Standard Aspect Codes	Aspects	Pictogram	Matrix Indicators	Message Signs
ID	SAC	SAC Mnemonic	Aspect Mnemonic	File
0	1	OFF	OFF	off.bmp
1	2	NR	NR	nr.bmp
2	3	RE	RE	re.bmp
3	4	STOP	STOP	redx.bmp
4	5	20	20	20.bmp
5	6	30	30	30.bmp
6	7	40	40	40.bmp
7	8	50	50	50.bmp
8	9	60	60	60.bmp
9	10	70	70	70.bmp
10	11	80	80	80.bmp
11	12	100	100	100.bmp
12	13	120	120	120.bmp
13	14	LDR	LDR	ldr.bmp
14	15	X	REDX	redx.bmp
15	15	X	X	tidalx.bmp
16	16	LDL	LDL	ldl.bmp
17	17	MDVL	MDVL	mdvl.bmp
18	18	TWAY	TWAY	tway.bmp

View Information – Aspects

4.10.2 Pictograms

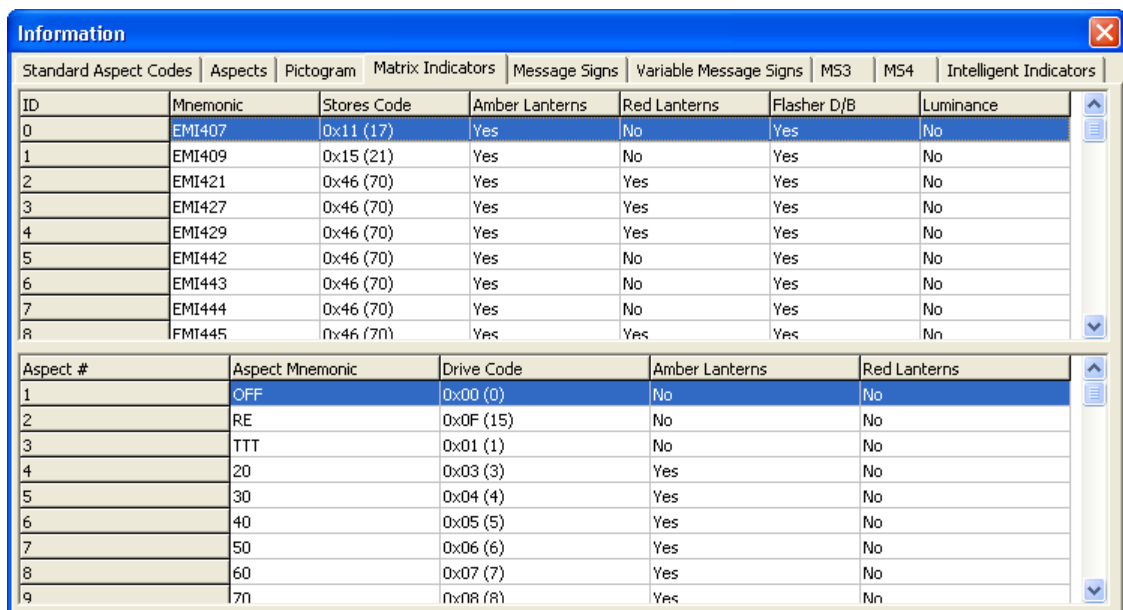
Select the Pictograms page of Information data to view the set of all pictogram bitmaps. This includes the Symbol in Hexadecimal, Text Mnemonic, Large Pictogram bitmap file names, Small Pictogram bitmap file names and graphical representation of the Pictogram.



View Information – Pictograms

4.10.3 Matrix Indicators

Select the Matrix Indicators page of Information data to view the set of Matrix Indicator types. This includes the Mnemonic, Stores Code, Amber and Red lantern availability and whether it supports luminance broadcasts and flasher synchronisation. In addition, the aspects supported by each Matrix Indicator can be viewed.



View Information – Matrix Indicators

When a Matrix Indicator type is selected with the mouse or down arrow key, the aspect fields are updated with the aspects supported by the selected type.

4.10.4 Message Signs

Select the Message Signs page of Information data to view the set of available Message Sign types. This includes the Mnemonic, Stores Code, number of lines supported, number of characters per line (width), number of supported Test 2 stages and whether the sign type supports flasher synchronisation/luminance broadcasts, lantern overrides and pictograms.

4.10.5 Variable Message Signs

Select the Variable Message Signs page of Information data to view the set of available Variable Message Sign types. This includes the Mnemonic, Stores Code, protocol, lanterns and whether the sign type supports flasher synchronisation/luminance broadcasts and lantern overrides.

4.10.6 MS3 Signs

Select the MS3 page of Information data to view the set of available MS3 Sign types. This includes the Mnemonic, Stores Code, number of lines supported, number of characters per line (width), number of reduced characters per line (when an aspect is displayed), number of supported Test 2 stages and pictograms.

4.10.7 MS4 Signs

Select the MS4 page of Information data to view the MS4 Sign type. This includes the Mnemonic, Stores Code, Flasher Synchronous Dim/Bright support, Luminance Broadcast support, Luminance Handling support, number of supported Test 2 stages and pictograms.

4.10.8 Intelligent Indicators (EMI94xx Signs)

Select the Intelligent Indicators page of Information data to view the set of Intelligent Indicator types. This includes the Mnemonic, Stores Code, whether the sign type supports flasher synchronisation and luminance broadcasts, default countdown delay in seconds and number of lanes supported.

4.11 About

System Information can be viewed from WinTester by selecting the “Help | About...” menu option. The System Information pages display program information including Program version (inc Issue Number), Copyright notice (Crown Copyright), Web/Email support hyperlinks, Build timestamp, Operating System version, Timer capabilities (nominal frequency of high resolution timer, if available) and License Information.

4.11.1 Serial Ports

Select the Serial Ports page of System Information data to view data relating to the current serial ports. Different port settings can be viewed by selecting the required port. If a port is unavailable, the page will be updated with ‘INACCESSIBLE’.

4.12 Script

The currently selected Script file can be viewed from WinTester by selecting the Script button, the “View | Script Viewer” menu option or by pressing the F11 function key. This function is described in detail in section 8.

4.13 File Menu

The File menu provides the following options:

4.13.1 Open COBS data

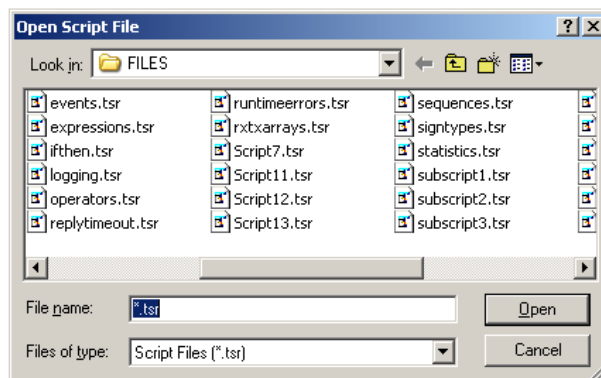
When the “File | Open COBS Data” menu option or keys ALT ‘f’, ‘o’ are selected, a standard Windows File Open box will be displayed with a list of available data files. Select a file and select the Open button to set the outstation site data (2.7.5) specified within the data file. A progress form will be displayed to show the loading progress of the file selected. When it is loaded, the progress form will be closed. The same process will be repeated for the loading of signal (2.7.6) and non-signal (2.7.7) device data files.

4.13.2 Open Configuration

When the “File | Open Configuration” menu option or keys ALT ‘f’, ‘p’ are selected, a standard Windows File Open box will be displayed with a list of available configuration files. Select a file and select the Open button to set the devices specified within the configuration file. Choose a “.cfg” file (2.7.3) to specify devices without IP and Port addresses, and choose an “.ip” file (2.7.4) to specify devices with IP and Port addresses.

4.13.3 Open Script

When the “File | Open Script” menu option or keys ALT ‘f’, ‘n’ are selected, a standard Windows File Open box will be displayed with a list of available script files.



Open Script

Select a script file and select the Open button to open a script file ready for use in WinTester’s Script Mode (see section 8). Select Cancel to abandon the function.

4.13.4 Open Log File

When the “File | Open Log...” menu option or keys ALT ‘f’, ‘l’ are selected, a standard Windows File Open box will be displayed with a list of available log files. Select a log file and click the Open button to open a log file ready for use with the Replay buttons in Replay/OFF mode (see section 12.1). Select Cancel to abandon the function.

4.13.5 Close COBS Data

This menu option will only be available if all the COBS data files have been loaded correctly. When the “File | Close COBS Data” menu option or keys ALT ‘f’, ‘c’ are selected, all data obtained by the previously opened files are cleared.

4.13.6 Close Configuration

This menu option will only be available if a configuration file has been opened. When the “File | Close Configuration” menu option or keys ALT ‘f’, ‘s’ are selected, all parameters set by the previously opened file are cleared.

4.13.7 Close Script

This menu option will only be available if a script file has been opened. Select the “File | Close Script” menu option or keys ALT ‘f’, ‘i’ to close the currently selected script file.

4.13.8 Close Log File

This menu option will only be available if a log file has been opened. Select the “File | Close Log” menu option or keys ALT ‘f’, ‘g’ to close the currently selected log file.

4.13.9 Save Configuration

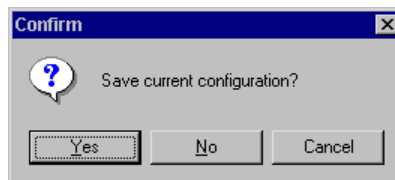
When the “File | Save Configuration” menu option or keys ALT ‘f’, ‘a’ are selected, a standard Windows File Save As.. box will be displayed to save the currently selected device information. Select a file and select the Save button to store the device data. Select Cancel to abandon the function.

4.13.10 Explorer

Select the “File | Explorer” menu option or keys ALT ‘f’, ‘e’ to open the WinTester root directory in Windows Explorer.

4.13.11 Exit

When the “File | Exit” menu option or keys ALT ‘f’, ‘x’ are selected or the user hits the escape key at the main form, a request to save the currently selected device data is displayed.



Save Configuration

Select Yes to save and exit; No to exit without saving and Cancel to continue running WinTester.

NOTE: This confirmation is only displayed when sign configuration changes have been detected.

4.14 View Menu

The View menu option provides the following options:

4.14.1 Communication Statistics

Select the Communication Statistics menu option to view statistics for each address in the range 000 to 376 (octal) and the running total of each configured IP address and the running total. See Section 4.6.5 for a full description of this function.

4.14.2 Device Status

Select the Device Status menu option to view the status of the device connected to WinTester. See Section 4.8 for a full description of this function.

4.14.3 Event Viewer

Select the Event Viewer menu option to view the events and sub events in different operational mode. See Section 4.9 for a full description of this function.

4.14.4 Script Viewer

Select the Script Viewer menu option to view the currently selected Script file. See Section 8.1 for a full description of this function.

4.14.5 Information

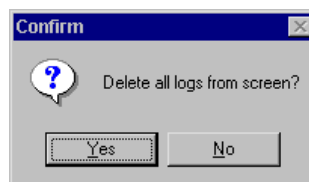
Select the Information menu option to view configuration data stored in the “WinTester.csv” file. See Section 4.10 for a full description of this function.

4.14.6 Auto Scroll

Select the Auto Scroll menu option to enable or disable automatic scrolling of the logger window. When selected, the latest log entry is always highlighted and can be viewed in the logger window. When deselected, the currently highlighted log remains in view in the logger window even when new log entries are being added which in some cases will be out of view.

4.14.7 Clear Logs

Select the Clear Logs menu option to clear the logger window. A confirmation box will be displayed:



Clear Log Screen

Select Yes to clear the display or No to abandon the action.

4.14.8 Refresh Logs

Select the Refresh Logs menu option to refresh the logger window.

4.14.9 Reset All

Select the Reset All menu option to Reset Statistics, Status Data, Sign Configuration and Event Viewer.

4.14.10 Reset Statistics

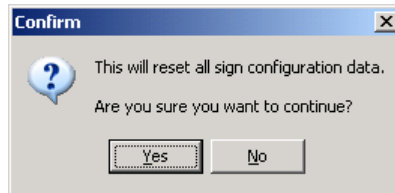
Select the Reset Statistics menu option to reset all the tab pages on the Statistics Form (see Section 4.6.5).

4.14.11 Reset Status Data

Select the Reset Status Data menu option to reset WinTester's device status. When the Device Status (see Section 4.8) is next viewed, all fields will be unknown until new commands (such as Status Reply, Device Modification Reply, etc) have been received.

4.14.12 Reset Sign Configuration

Select the Reset Sign Configuration menu option to clear WinTester's address/sign type configuration parameters.



Reset Sign Configuration

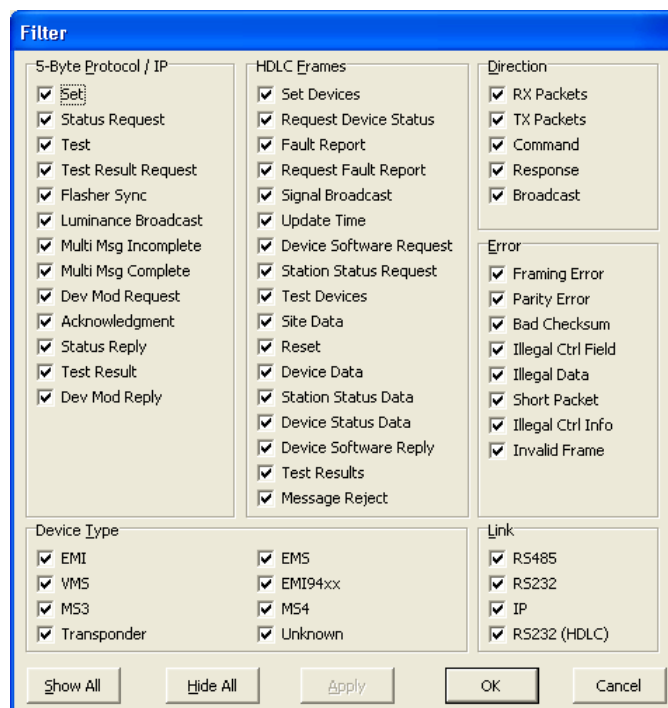
Select Yes to clear the address/sign type configuration parameters or No to abandon the action.

4.14.13 Reset Event Viewer

Select the Reset Event Viewer menu option to reset all the events on the Event Viewer Form (see Section 4.9).

4.14.14 Filter

Select the Filter menu option to display the Filter types:



Filter Options

Select any field to enable/disable the log type. Select the Show All button to enable all log types and select the Hide All button to disable all log types.

When the Apply button is selected, the logger window will be updated according to the filter options selected and the Filter options box will remain on the screen.

When the OK button is selected, the logger window will be updated according to the filter options selected and the Filter options box will be removed from the screen.

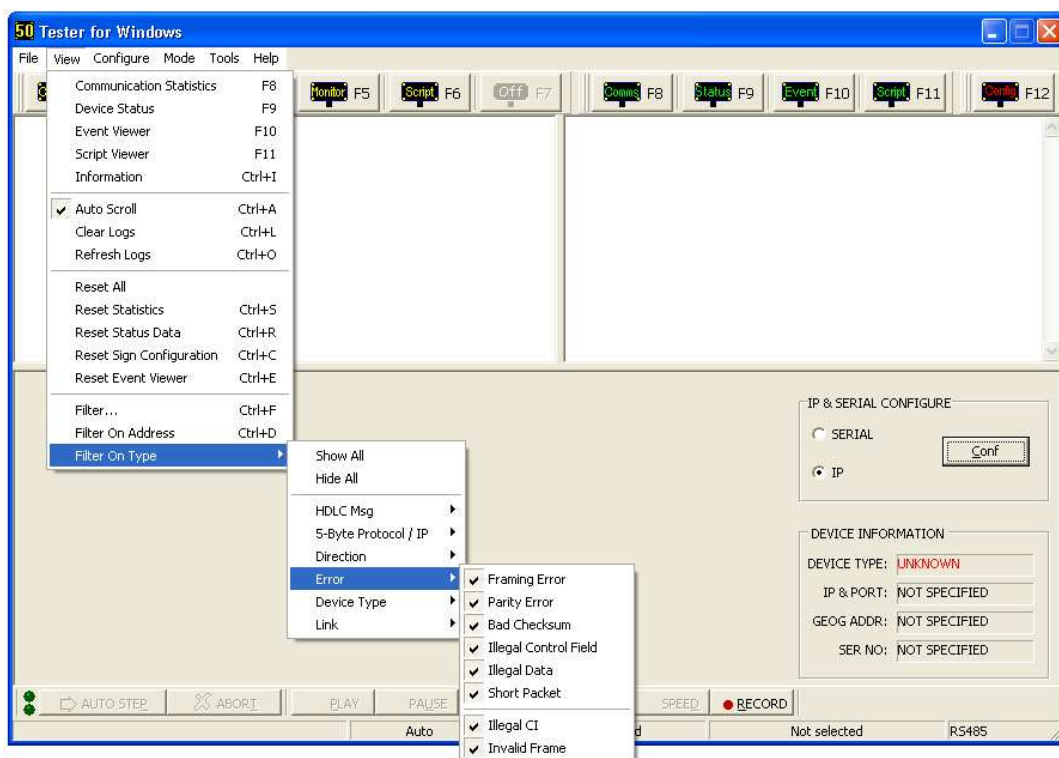
When the Cancel button is selected, no updates will be made to the logger window (since the last Apply action) and the Filter options box will be removed from the screen.

4.14.15 Filter on Address

Select the Filter on Address menu option to update the logger window with logs for the currently selected address or IP address only. Select the Filter on Address menu option again to update the logger window with logs for all addresses and all configured IP addresses. Note any log filtering (see Section 4.14.14) will still apply when this function is selected.

4.14.16 Filter on Type

Use the Filter on Type menu option to perform log filtering as in Section 4.14.14 but without the need to display a separate Filter options box.



Filter On Type Menu Option

4.15 Configure Menu

The Configure menu option provides the following options:

4.15.1 Serial

Displays the serial communication form (see Section 4.5.1)

4.15.2 Timing

Displays the timing communication form (see Section 4.5.2)

4.15.3 Broadcast

Displays the broadcast communication form (see Section 4.5.3)

4.15.4 Sign

Displays the sign communication form (see Section 4.5.4)

4.15.5 Performance

Displays the performance communication form (see Section 4.5.5)

4.16 Mode Menu

The Mode menu option provides the following options. Note that the option for the current mode will not be available; e.g. if WinTester is currently displaying Script mode, the Script Mode menu option will be unavailable.

4.16.1 Basic Control Mode

Select the Basic Control Mode menu option to access WinTester's Serial Control Mode (Transponder – SIGN Link) or LCC Simulation Mode (LCC – Transponder Link) or IP Control Mode (Subsystem – SIGN IP Link). See Section 5 for a full description of Serial Control Mode, Section 6 for a full description of LCC Simulation Mode and Section 7 for a full description of IP Control Mode. LCC Simulation Mode will only be available for selection when the relevant COBS data has been loaded correctly.

4.16.2 Diagnostic Mode

Select the Diagnostic Mode menu option to access WinTester's Diagnostic Mode.

4.16.3 Test Mode

Select the Test Mode menu option to access WinTester's Test Mode.

4.16.4 Monitor Mode

Select the Monitor Mode menu option to access WinTester's RS485 Monitor Mode (Transponder – SIGN Link) or HDLC Monitor Mode (LCC – Transponder Link). See Section 10 for a full description of RS485 Monitor Mode and Section 11 for a full description of HDLC Monitor Mode.

4.16.5 Script Mode

Select Script Mode menu option to access WinTester's Serial Script Mode (Transponder – SIGN Link) or IP Script Mode (Subsystem – SIGN IP Link). See Section 8 for a full description of Serial Script Mode and Section 9 for a full description of IP Script Mode.

4.16.6 Play, Pause, Step, Stop, Speed, Record

The Recording/Replay fields allow WinTester communications to be stored and replayed. See Section 12.1 for a full description of their use. Note that the Play, Pause, Step, Stop and Speed menu options will only be available if the current mode is OFF/Replay mode.

4.16.7 Auto/Single Step

This option is only available in Serial and IP Control Modes. The function allows tests to be carried out by either single stepping through each command sequence or automatic advance of command sequences. See section 5.21 for a full description of this function.

4.16.8 Abort

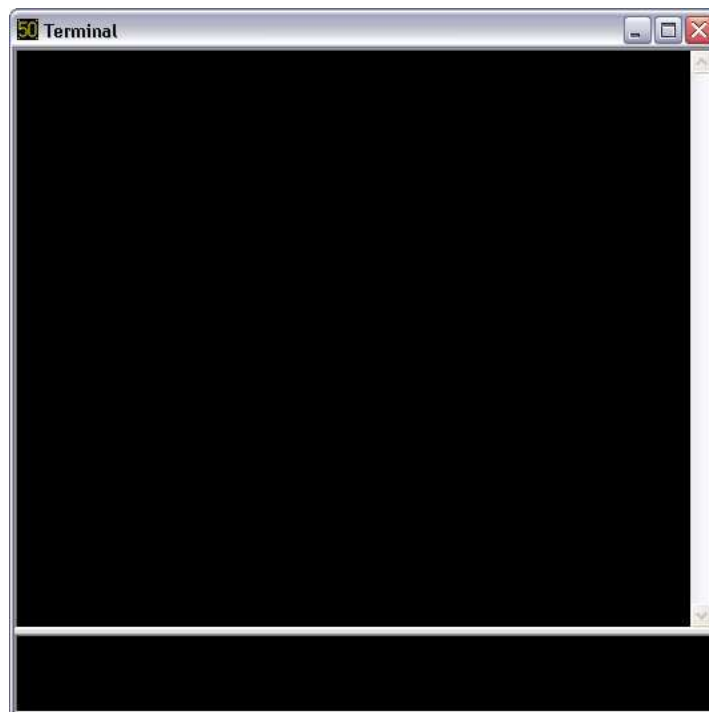
This option is only available in Serial and IP Control Modes. Select the Abort option to abandon any command sequence currently being executed.

4.17 Tools

The Tools menu provides the following options.

4.17.1 Terminal

The Terminal is only available in Replay/Off Mode. On entering TERMINAL MODE the operator will be presented with a console window with two separate panes.



Terminal Panes

The top pane (memo) will not be accessible but will display any issued commands as well as any syntax or runtime errors as they occur. The bottom pane (memo) will be used for entering script commands. Having entered the required script command the operator will need to hit return to automatically execute the typed command. If the entered command (statement) is well formed it will be executed immediately displaying the expanded statement (full definition), otherwise a syntax error will be displayed detailing the error.

Terminal mode can access all configuration parameters normally accessible through a script file. Please refer to the script language (see section 13) for further details.

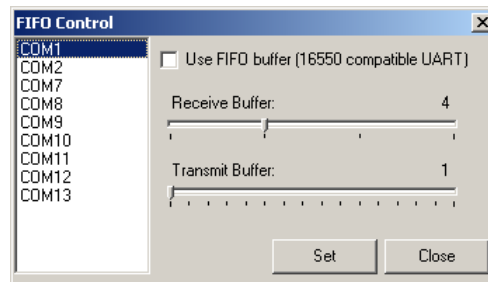
It will not be possible to single/auto step through sequences during TERMINAL MODE. Any executed commands will run till completion.

4.17.2 Log Viewer

Shall display the current script log file when a script that contains the SHOWLOG (see section 13.3.103) token is run.

4.17.3 FIFO Control

Shall run the FIFO Control application. All enumerated serial ports will appear in the list box on the left. The information about the current FIFO configuration will be obtained by clicking on any enumerated port. It shall be possible to configure or disable FIFO buffering on any enumerated port.



FIFO Control

4.18 Help

The Help menu option provides the following options.

4.18.1 About

Select the About menu option to access WinTester's system information. See Section 4.11 for a description of this function.

4.18.2 Read Me

Select the ReadMe menu option to open the "readme.txt" file that contains the following information:

- Important Notices
- Changes since version 3.31
- Installation
- Minimum Requirements & Configuration
- Future Developments
- Known Issues
- Support & Feedback

4.18.3 User Manual

Select the User Manual menu option to open this User Manual using Adobe® Acrobat® Reader, if installed.

4.19 Recording

The Recording/Replay buttons allow WinTester communications to be stored and replayed.

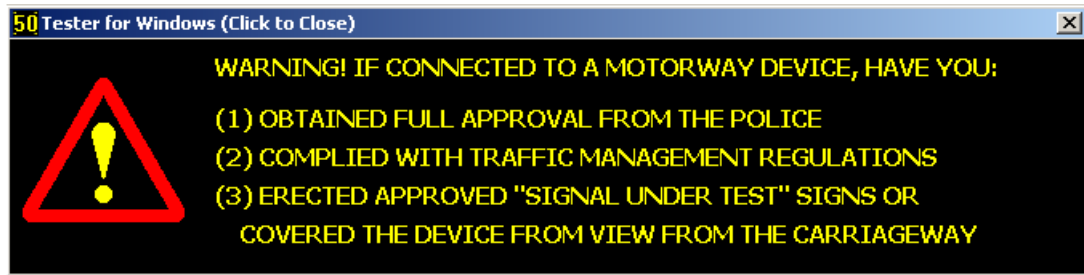


Replay Buttons

See Section 12.1 for a full description of their use.

4.20 Warning

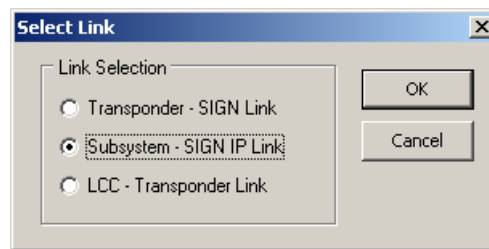
The following warning is displayed on entry to all modes other than the RS485 Monitor, HDLC Monitor and Off/Replay Modes. Ensure the instructions have been complied with before using any functions available with the current mode.



Warning

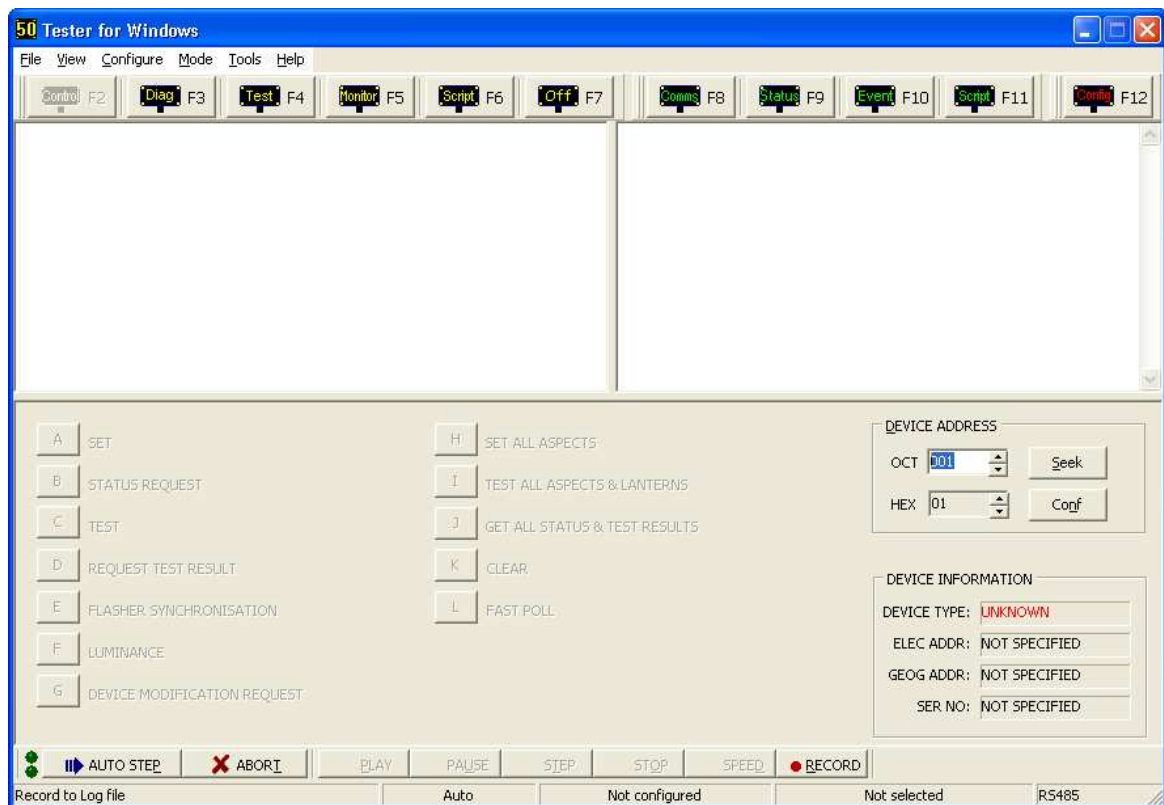
5 Serial Control Mode

Selecting the Control mode button, “Mode | Basic Control Mode” menu option or F2 function key will display a Select Mode dialog.



Select Mode Dialog

Select Transponder – SIGN Link to enter Serial Control Mode. This function provides the means to communicate with a sign or signs using appropriate messages according to the HA 5-byte packet protocol.



Serial Control Mode

On entry to the mode, a warning is displayed (see Section 4.20). **Ensure the instructions have been complied with before using any Serial Control Mode functions.**

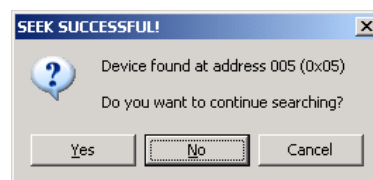
It will not be possible to use any functions within Serial Control Mode unless a sign type has been specified. Select the red Configuration button or select the F12 function key to enter or change a sign type (see also section 4.5.4). This can also be done by selecting the Conf button or press ‘n’ to invoke a serial device configuration form (section 4.1).

5.1 Device Address

The Address fields permit entry of an Electronic Address for the sign under test on Serial Configuration Form. Enter a number in the range 001 to 376 (Octal). Setting an address in the octal field results in the corresponding value automatically being set in the hexadecimal field; likewise, setting an address in the hexadecimal field results in the corresponding value being set in the octal field.

5.2 Address Seek

The address 'Seek' button is only enabled in Serial Control Mode. Select the Seek button to find the next valid address of a responding device on WinTester's link. This is achieved by WinTester sending a Status Request command to the current electronic address + 1 (modulo 255). If no reply is received a single retry is attempted. The process is repeated until an address is found to which a Status Reply command is received or the seek returns to the initial address. Once a responsive address is found it is possible to switch to that address, continue searching for the next responsive address, or abort the Seek and return to the original address.



Address Seek (Address 005 Detected)

5.3 General

When an operation (command or command sequence) is initiated all user interface controls are disabled. Retries for each command are carried out, if required, as configured. If, after all retries, no valid reply is received to a command then the operation will be aborted. When the operation is successfully completed or aborted then the user interface controls are re-enabled to allow modification of the parameters or a new command to be issued.

5.4 Set Aspect

If an EMI, AMI or CMI has been defined, select the Set Aspect button or use key press 'A' to select or change an EMI aspect, lanterns and dim/bright setting for the current sign type (see also section 4.6.1). Then press "OK" to send the EMI aspect to the sign using a 'Set' command. The 'Set' command will include the aspect code, lantern and display settings which have been specified for the sign. If no aspect has been selected, a clear aspect command will be sent to the sign. Select Auto Status to automatically send a Status Request command (see also section 5.5) after the aspect is set.

5.4.1 Intelligent Indicator / Countdown

If an EMI94xx has been defined, a speed restriction countdown is applied, where the speed displayed on the Intelligent Indicator is reduced over a period of time until the required Aspect is displayed according to a set of rules.

Not all speed aspects are counted down; only those which have a corresponding countdown aspect as defined in the following countdown table.

Required Aspect	Previous Aspect to be Displayed
30	40
20	30
40R	50R
30R	40R
20R	30R

EMI94xx Countdown Table

There is only one set of Countdown Table data for all Intelligent Indicators. It provides two different countdown sequences: 40, 30, 20 and 50R, 40R, 30R, 20R.

For example: if set speed aspect 20 is requested on an EMI94xx and the currently displayed speed is 50 or greater, it will firstly set aspect 40, then from 40 to 30 via countdown after 10 seconds countdown delay, finally from 30 to required aspect 20 via countdown after 10 seconds countdown delay. The countdown delay is pre-defined in WinTester.csv file (see section 2.7.2).

All commands exchanged will be displayed in the logger window.

5.4.2 Set Message

If an EMS has been defined select the Set Message button or use key press 'A' to enter or change a text message, lanterns (if permitted) and dim/bright setting for the current sign type (see also section 4.6.2). Then press "OK" to send the text message to the sign using multi-message incomplete and multi-message complete commands. The multi-message complete command will include the lantern settings requirement specified for the sign. The dim/bright setting will be transmitted in the next flasher synchronisation message. If no message has been selected, a clear message command will be sent to the sign. Select Auto Status to automatically send a Status Request command (see also section 5.5) after the multi-message complete command is transmitted.

All commands exchanged will be displayed in the logger window.

5.4.3 Set Face

If a VMS has been defined, select the Set Face button or use key press 'A' to select or change a VMS face code and lanterns setting for the current sign type (see also section 4.6.3). Then press "OK" to send the VMS face code to the sign using a 'Set' command. The 'Set' command will include the face code, lantern and display settings which have been specified for the sign. If no face code has been selected, a 00H Face code will be sent to the sign. Select Auto Reply to automatically send a Status Request command (see also section 5.5) after the face code is set.

All commands exchanged will be displayed in the logger window.

5.4.4 Set Sign

If an MS3 has been defined select the Set Sign button or use key press 'A' to change the settings of the current sign type. A selection dialog is shown to allow selection for EMS, EMI or BOTH. If EMS is selected, only text message settings can be changed. If EMI is selected, only aspect settings can be changed. If BOTH are selected, both text messages and aspect settings can be changed (see also section 4.6.4). After the necessary changes are

made, press “OK” to send the text message to the EMS address using multi-message incomplete and multi-message complete commands and/or the aspect to the EMI address using a ‘Set’ command. The multi-message complete command will include the lantern settings requirement specified for the EMS part of the MS3 sign. The dim/bright setting will be transmitted in the next flasher synchronisation message. If no message has been selected, a clear message command will be sent to the EMS address. The ‘Set’ command will include the aspect code, lantern and display settings which have been specified for the EMI part of the MS3 sign. If no aspect has been selected, a clear aspect command will be sent to the EMI address. Select Auto Status to automatically send a Status Request command (see also section 5.5.1) to the EMS address and/or the EMI address after the multi-message complete and/or set commands are transmitted.

If an MS4 has been defined select the Set Sign button or use key press ‘A’ to change the settings of the current sign type. A selection dialog is shown to allow selection for MS4 Multi-Message Subsystem, EMI or BOTH. If MS4 is selected, only text message and pictogram settings can be changed. If EMI is selected, only aspect settings can be changed. If BOTH are selected, both text messages/pictogram and aspect settings can be changed (see also section 4.6.5). After the necessary changes are made, press “OK” to send the text message to the MS4 address using multi-message incomplete and multi-message complete commands and/or the aspect to the EMI address using a ‘Set’ command.

The multi-message complete command will include the lantern settings requirement specified for the MS4 Multi-Message subsystem part of the MS4 sign. The dim/bright setting will be transmitted in the next flasher synchronisation message. To set MS4 Pictogram, either large pictogram or small pictogram can be configured, and the message will be “Command” followed by “Pictogram mnemonic”, e.g. “LP Accident” or “SP Snow”. The pictogram set message will be sent as plain text message as part of Multi-Message. If no message has been selected, a clear message command will be sent to the MS4 address.

The ‘Set’ command will include the aspect code, lantern and display settings which have been specified for the EMI part of the MS4 sign. If no aspect has been selected, a clear aspect command will be sent to the EMI address. Select Auto Status to automatically send a Status Request command (see also section 5.5.2) to the MS4 address and/or the EMI address after the multi-message complete and/or set commands are transmitted.

All commands exchanged will be displayed in the logger window.

5.5 Status Request

Select the Status Request button or use key press ‘B’ to send a Status Request command to the EMI/EMS/VMS/EMI94xx sign.

5.5.1 MS3

If an MS3 sign has been defined, further information is needed to specify which status is needed. A selection dialog is shown to allow selection for EMS, EMI or BOTH. If EMS is selected, the Status Request command is only sent to the EMS address. If EMI is selected, the Status Request command is only sent to the EMI address. If BOTH are selected, the same command is sent to the EMS address followed by the EMI address.

5.5.2 MS4

If an MS4 sign has been defined, further information is needed to specify which status is needed. A selection dialog is shown to allow selection for MS4, EMI or BOTH. If MS4 is selected, the Status Request command is only sent to the MS4 address. If EMI is selected, the Status Request command is only sent to the EMI address. If BOTH are selected, the same command is sent to the MS4 address followed by the EMI address.

All commands exchanged will be displayed in the logger window together with a description of the Status Reply command data received from the sign.

5.6 Test

Select the Test button or use key press 'C' to send a Test command to the sign (except VMS signs). Select Auto Reply to automatically send a Request Test Result command (see also section 5.7) after the Test command is sent. Note that there is no Auto Reply when the sign type is EMI94xx. Test command of EMI94xx sign type is automatically followed by Test Result.

5.6.1 MS3

If an MS3 sign has been defined, further information is required to specify which test is needed. A selection dialog is shown to allow selection for EMS or EMI. If EMS is selected, the Test command is only sent to the EMS address. If EMI is selected, the Test command is only sent to the EMI address. Select Auto Reply to automatically send a Request Test Result command (see also section 5.7.1) to the corresponding address after the Test command is sent.

5.6.2 MS4

If an MS4 sign has been defined, further information is required to specify which test is needed. A selection dialog is shown to allow selection for MS4 or EMI. If MS4 is selected, the Test command is only sent to the MS4 address. If EMI is selected, the Test command is only sent to the EMI address. Select Auto Reply to automatically send a Request Test Result command (see also section 5.7.2) to the corresponding address after the Test command is sent.

All commands exchanged will be displayed in the logger window.

5.7 Request Test Result

Select the Request Test Result button or use key press 'D' to send a Request Test Result command to the sign (except VMS and EMI94xx signs).

5.7.1 MS3

If an MS3 sign has been defined, further information is needed to specify which test result is needed. A selection dialog is shown to allow selection for EMS, EMI or BOTH. If EMS is selected, the Request Test Result command is only sent to the EMS address. If EMI is selected, the Request Test Result command is only sent to the EMI address. If BOTH are selected, the same command is sent to the EMS address followed by the EMI address.

5.7.2 MS4

If an MS4 sign has been defined, further information is needed to specify which test result is needed. A selection dialog is shown to allow selection for MS4, EMI or BOTH. If MS4 is selected, the Request Test Result command is only sent to the MS4 address. If EMI is

selected, the Request Test Result command is only sent to the EMI address. If BOTH are selected, the same command is sent to the MS4 address followed by the EMI address.

All commands exchanged will be displayed in the logger window together with a description of the Test Result command data received from the sign.

5.8 Flasher Synchronisation

Select the Flasher Synchronisation button or use key press 'E' to send a Flasher Synchronisation command to the sign with the selected dim/bright setting.

No reply is expected to a Flasher Synchronisation command. The command will be displayed in the logger window together with a description of the dim/bright setting.



Flasher Sync dim/bright selection.

5.9 Luminance

Select the Luminance button or use key press 'F' to send a Luminance Broadcast command to the sign with the selected luminance level and dim/bright setting (except VMS signs).

Check 'Save to Configuration' to save the selected luminance level for use in subsequent, scheduled Luminance Broadcasts.

No reply is expected to a Luminance Broadcast command. The command will be displayed in the logger window together with a description of the luminance level and dim/bright setting.



Luminance settings selection.

5.10 Device Modification Request

Select the Device Modification Request button or use key press 'G' to send a Device Modification Request command to the sign.

All commands exchanged will be displayed in the logger window together with a description of the Device Modification Reply command data received from the sign.

5.11 Set All Aspects

This function is only available if the current sign type is an EMI, AMI, CMI, MS3 or MS4 and uses the Status Delay (ms) and Set All Aspects Inter Delay (ms) fields specified using the Timing page of the WinTester Configuration box (see Section 4.5.2). It involves setting all aspects defined for the current sign type.

When the Set All Aspects button or key 'H' is selected, the following actions will be performed. Note that the functions will be carried out automatically unless the Single Step button has been selected (see Section 5.21).

- 1 Send a Set command for an aspect with lanterns and dim setting
- 2 Wait for Status Delay (ms)
- 3 Send a Status Request command
- 4 Wait for Set All Aspects Inter Delay (ms)
- 5 Repeat (1) – (4) until all aspects have been set
- 6 Send a Set command for red lanterns with dim setting if configured for sign type
- 7 Wait for Status Delay (ms)
- 8 Send a Status Request command
- 9 Wait for Set All Aspects Inter Delay (ms)
- 10 Send a Set command for an aspect with lanterns and bright setting
- 11 Wait for Status Delay (ms)
- 12 Send a Status Request command
- 13 Wait for Set All Aspects Inter Delay (ms)
- 14 Repeat (10) – (13) until all aspects have been set
- 15 Send a Set command for red lanterns with bright setting if configured for sign type
- 16 Wait for Status Delay (ms)
- 17 Send a Status Request command
- 18 Wait for Set All Aspects Inter Delay (ms)
- 19 Set aspect and lanterns OFF

Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.12 Set All Aspects (EMI94xx Sign)

This function is only available if the current sign type is an EMI94xx and uses the Status Delay (ms) and Set All Aspects Inter Delay (ms) fields specified using the Timing page of the WinTester Configuration box (see Section 4.5.2). It involves setting all aspects defined for the current sign type.

When the Set All Aspects button or key 'H' is selected, the following actions will be performed. Note that the functions will be carried out automatically unless the Single Step button has been selected (see Section 5.21). The Total Status Delay for aspects in countdown list will be status delay from WinTester Configuration box (see Section 4.5.2) plus countdown delay (see Section 4.10.8). And when setting aspect 30 or 30R, the Set All Aspects Inter Delay will be set all aspects inter delay from WinTester Configuration box (see Section 4.5.2) plus countdown delay (see Section 4.10.8) so that mimic in status form could go through the countdown list.

- 1 Send a Set Command for an aspect with pre-defined lanterns setting
- 2 Wait for Total Status Delay (ms)

- 3 Send a Status Request Command
- 4 Wait for Set All Aspects Inter Delay (ms)
- 5 Repeat from (1) – (4) until all aspects have been set
- 6 Set aspect and lanterns OFF

Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.13 Test All Aspects and Lanterns

This function is only available if the current sign type is an EMI, AMI or CMI and uses the Test Sequence Delay (ms) field specified using the Timing page of the WinTester Configuration box (see Section 4.5.2). It involves testing all aspects defined for the current sign type.

For sign type EMI, AMI or CMI, when the Test All Aspects and Lanterns button or key 'I' is selected, the following actions will be performed.

Note that the functions will be carried out automatically unless the Single Step button has been selected (see Section 5.21).

- 1 Send a Test command for aspect drive code
- 2 Wait for Test Delay (ms)
- 3 Send a Request Test Result command
- 4 Repeat (1) – (3) for all aspects
- 5 Send a Test command for amber lanterns if configured for current sign type
- 6 Wait for Test Delay (ms)
- 7 Send a Request Test Result command
- 8 Send a Test command for red lanterns if configured for current sign type
- 9 Wait for Test Delay (ms)
- 10 Send a Request Test Result command

Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.14 Test Sequence

This function is only available if the current sign type is an EMI94xx and uses the Test Sequence Delay (ms) field specified using the Timing page of the WinTester Configuration box (see Section 4.5.2). It involves testing all aspects defined for the current sign type.

For sign type EMI94xx, when the Test Sequence button or key 'I' is selected, the following actions will be performed.

Note that the functions will be carried out automatically unless the Single Step Button has been selected (see Section 5.21)

- 1 Send a Test All command
- 2 Wait for Test Delay (ms)
- 3 Send Corresponding Test Command based on further testing required from Test Result of Test All Command in (1)
- 4 Repeat (2) – (3) until no further testing required.

Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.15 Get Status and All Test Results

This function is only available if the current sign type is an EMI, AMI or CMI. When the Get Status & Test All Aspects button or key 'J' is selected, a Device Modification Request command will be sent to the sign followed by a Status Request Command. All aspects defined for the current sign type will then be tested as described in section 5.13.

Note that the functions will be carried out automatically unless the Single Step button has been selected (see Section 5.21). Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.16 Get Status and All Test Results (EMI94xx Sign)

This function is only available if the current sign type is an EMI94xx. When the Get Status & Test All Aspects button or key 'J' is selected, a Device Modification Request command will be sent to the sign followed by a Status Request Command. Test Sequence command will then be carried out as described in section 5.14.

Note that the functions will be carried out automatically unless the Single Step button has been selected (see Section 5.21). Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.17 Test 2 Sequence

This function is only available if the current sign type is an EMS, MS3, MS4 or AMS and uses the EMS/MS4 Test Sequence Delay (ms) field specified using the Timing page of the WinTester Configuration box (see Section 4.5.2). It involves driving the current sign through its TEST 2 sequence.

For sign type MS3 and MS4, further information is needed to specify which test sequence is to be performed when the Test 2 Sequence button or key 'I' is selected. A selection dialog is shown to allow selection for EMS, EMI or BOTH. If EMS is selected, the following sequence is performed. If EMI is selected, the sequence described in section 5.13 is performed. If BOTH are selected, both sequences are performed. The actions described below are performed after those described in section 5.13 are complete.

For sign type EMS, MS3, MS4 or AMS, when the Test 2 Sequence button or key 'I' is selected, the following actions will be performed.

Note that the functions will be carried out automatically unless the Single Step button has been selected (see Section 5.21).

- 1 Send a Test command set to Start Test 2 from Stage 1
- 2 Wait for EMS/MS4 Test Sequence Delay (ms)
- 3 Send a Test command set to Increment Test 2
- 4 Wait for EMS/MS4 Test Sequence Delay (ms)
- 5 Repeat (3) and (4) until all Test 2 stages have been completed for the selected device
- 6 Send a Test command set to End Test 2

Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.18 Test 1

This function is only available if the current sign type is an EMS, MS3, MS4 or AMS.

When the Test 1 button or key 'J' is selected, the following commands will be transmitted:

- 1 Device Modification Request
- 2 Status Request Command.
- 3 Test command set to Test 1
- 4 Request Test Result

Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.19 Set All Face

This function is only available if the current sign type is a VMS. When the Set all face button or key 'H' is selected, the following commands will be transmitted:

1. Set face code, lanterns
2. Wait for *VMSStatusDelay* ms
3. Status Request
4. Wait *SetAllAspectsDelay* ms
5. Repeat (1) – (4) for each face code in the 00H – 0FH range
6. Set face code and lanterns OFF

Select the 'Abort' button or key press 't' to abandon the command sequence at any time.

5.20 Clear

5.20.1 EMI, AMI, CMI or EMI94xx

Select the Clear button or key press 'K' to transmit a 'Set' command to set 'OFF' aspect.

5.20.2 EMS

Select the Clear button or key press 'K' to transmit a series of Multi-Message (Incomplete) commands with data bytes set to [00, 03], repeated for each line supported by the sign. This is followed by a Multi-Message (Complete) command.

5.20.3 VMS

Select the Clear button or key press 'K' to transmit a 'Set' command to set Face Code 00H.

5.20.4 MS3

Select the Clear button or key press 'K' to transmit a series of Multi-Message (Incomplete) commands with data bytes sent to [00, 03], repeated for each line supported by the sign. This is followed by a Multi-Message (Complete) command to set a blank message, which is also followed by a Set command to set 'OFF' aspect.

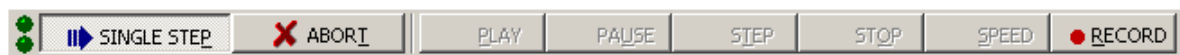
5.20.5 MS4

Select the Clear button or key press 'K' to transmit a series of Multi-Message (Incomplete) commands with data bytes sent to [00, 03], repeated for each line supported by the sign. This is followed by a Multi-Message (Complete) command to set a blank message, which is also followed by a Set command to set 'OFF' aspect.

5.21 Auto/Single Step

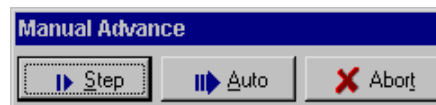
This button is only available in Serial and IP Control Modes. The function allows tests to be carried out by either single stepping through each command sequence or automatic advance of command sequences.

By default, commands are sent automatically until the command sequence is complete. Select the 'Auto Step' button or key press 'p' to revert to single step action. The button will be shown as pressed and changed to 'Single Step'



Single Step Enabled

When a function that involves sending multiple commands is selected, i.e. Set All Aspects, Test All Aspects & Lanterns and Get Status & All Test Results, a new set of buttons will be displayed between each set of commands:



Manual Advance Dialog

Select the Step button (or key press 'S') to advance to the next set of commands, select Auto (or key press 'A') to revert to Auto step or select Abort (or key press 't') to abandon the function.

When no functions are being performed and Single Step has been enabled, select the 'Auto Step' button (or key press 'p') to revert to automatic command action when required. The button will not be shown as pressed and changed to 'Auto Step'



Auto Step Enabled

5.22 Abort

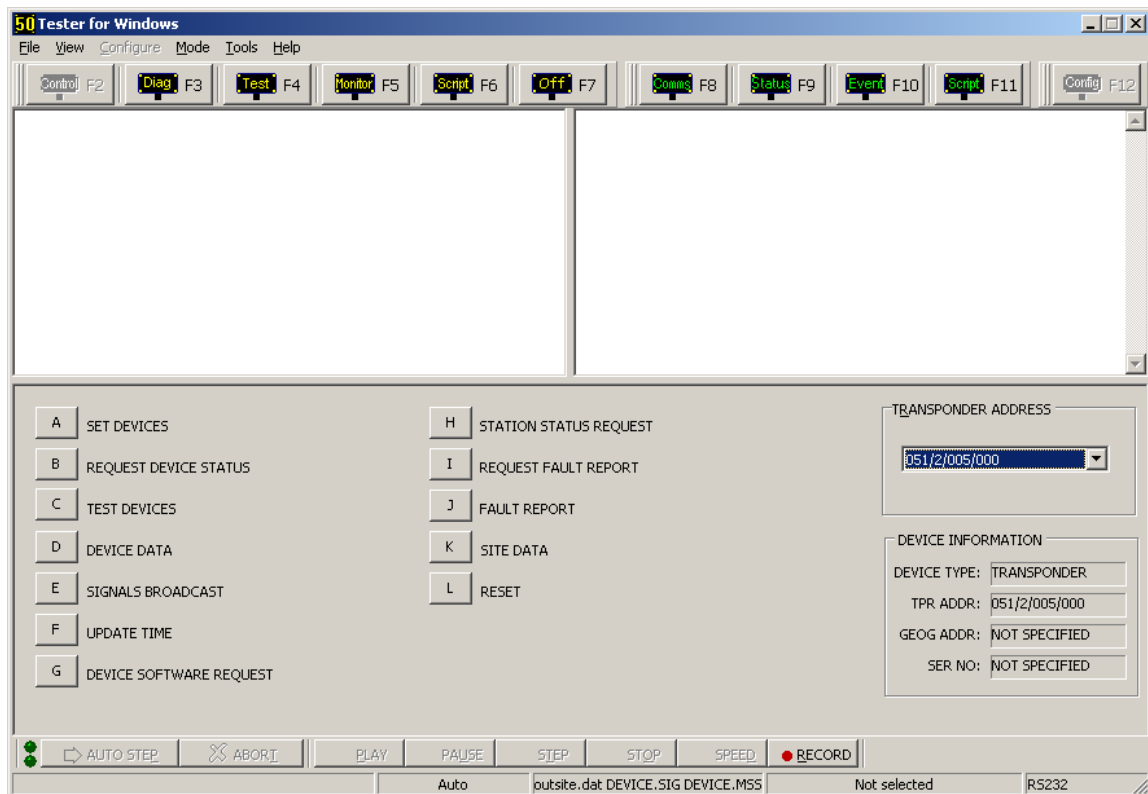
This button is only available in Serial Control Mode and IP Control Mode. Select the 'Abort' button or key press 't' to abandon any command sequence currently being executed.

5.23 Recording

See section 12.1.1 for a description of the function of the Record button.

6 LCC Simulation Mode

Selecting the Control mode button, “Mode | Basic Control Mode” menu option or F2 function key will display a Select Mode dialog. Select LCC-Transponder Link to enter LCC Simulation mode. This function provides the means to communicate with one or multiple transponders using appropriate command messages utilizing COBS site data.

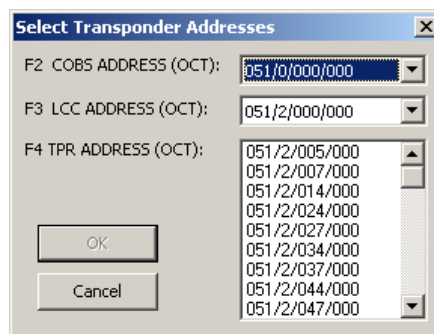


LCC Simulation Mode

If the option LCC-Transponder Link is disabled, this indicates that the relevant COBS data has not been loaded correctly. Section 4.13.1 explains how to load COBS data files.

When data has been correctly loaded, a warning is displayed (see Section 4.20). **Ensure the instructions have been complied with before using any LCC Simulation Mode functions.**

A Select Transponder Address Form will be shown after the warning form has been closed.



Select Transponder Addresses

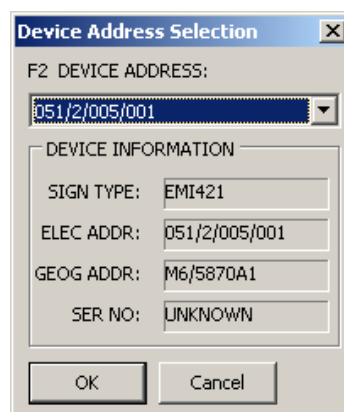
Select F2 to change the COBS address, F3 to change the LCC address, and then select any number of transponder addresses. If no transponder address has been selected, the “OK” button will be disabled. Select “OK” to enter LCC Simulation mode or “Cancel” to return to OFF mode. If “OK” is selected, all the selected transponders will be polled in ascending address order. All the selected transponder addresses will also be added to the transponder address combo box. The device information box will be updated on change of the transponder address.

The transponder addresses are selected on entry to the LCC Simulation Mode. All the selected addresses will be added to the Transponder Address combo box. Changes to the address list in the combo box can be made on re-entry to the LCC Simulation Mode. All the transponder addresses are included in the COBS data files. It is therefore not possible to select an address that is not specified in the COBS data files.

6.1 General

Before a transponder is initialized correctly, some messages transmitted will cause a Message Reject to be received. To avoid this, initialize the selected transponder by sending the correct Site Data to it.

Some messages require the specification of a device address (signal/message sign) which is selectable from a Device Address Selection dialog. Select F2 to change the device address and the Device Information box will be updated on change.



Device Address Selection

6.2 Set Devices

Select the Set Devices button or press key ‘A’, a Device Address Selection dialog (see Section 6.1) will be displayed.

If the selected device is an EMI, a Set Aspect Selection dialog (see section 4.6.1) will be shown allowing the selection of an EMI aspect. The Set Devices message will include the address of the device selected and the SAC of the selected EMI aspect. If the selected device is an EMS, a Message dialog (see section 4.6.2) will be shown allowing the selection of a number of a pre-defined text messages. The Set Devices message will include the address of the device selected and the number of the selected pre-defined message. If the master transponder is not correctly initialized, a Message Reject will be received in response to this command. If the aspect of the EMI is not supported by the transponder, a Message Reject will also be received.

All messages exchanged will be displayed in the logger window with a full English description.

6.3 Request Device Status

Select the Request Device Status button or press key 'B', a Device Address Selection dialog (see Section 6.1) will be displayed.

If a single device address is selected, the Request Device Status message will only specify that device address, alternatively if the "Select All" option is chosen, the Request Device Status message will include 0xFF as the selected device address. This will solicit the status of all the slave devices for the selected Transponder address. If the transponder of the slave device is not initialized correctly, a Message Reject will be received.

All messages exchanged will be displayed in the logger window with a full English description.

6.4 Test Devices

Select the Test Devices button or press key 'C', a Device Address Selection dialog (see Section 6.1) will be displayed.

If the selected device is an EMI, a Test Aspect Selection dialog (see section 4.6.1) will be shown to allow the selection of an EMI aspect. The Test Devices message will include the address of the device selected and the SAC of the selected EMI aspect. If the selected device is an EMS, a Select Test Parameter dialog will be shown to allow the selection of a Test Stage. The Test Devices message will include the address of the device selected and the corresponding Test. If the transponder of the slave device is not initialized correctly, a Message Reject will be received. If the aspect of the EMI is not supported by the transponder, a Message Reject will also be received.

All messages exchanged will be displayed in the logger window with a full English description.

6.5 Device Data

Select the Device Data button or press key 'D', a Device Address Selection dialog (see Section 6.1) will be displayed.

If the selected device is an EMI, the Device Data message will include the address of the device selected and 0x00 for the remaining data bytes. If the selected device is an EMS, a Message dialog (see section 4.6.2) will be shown, allowing the manual modification of the message to be displayed. The Device Data message will include the address of the device selected and the user-defined message including its CRC. If the transponder of the slave device is not initialized correctly, a Message Reject will be received. If the selected device is an EMI, a Message Reject will also be received.

All messages exchanged will be displayed in the logger window with a full English description.

6.6 Signals Broadcast

Select Signals Broadcast button or press key 'E' to send dim/brighten signals broadcast message. No reply should be received.

The message will be displayed in the logger window together with a full English description.

6.7 Update Time

Select the Update Time button or press key 'F' to send an update time broadcast message. No reply should be received.

The message will be displayed in the logger window together with a full English description.

6.8 Device Software Request

Select the Device Software Request button or press key 'G', a Device Address Selection dialog (see Section 6.1) will be displayed.

If a single device address is selected, the Device Software Request message will only include the address of that device. The Device Software Reply message will only include the software modification and stores type code numbers of that device. If the "Select All" option is chosen however, the Device Software Request message will include 0xFF as the selected device address. The software modification and stores type numbers of all the devices connected to the target transponder will be listed in the reply. If the transponder of the slave device is not initialized correctly, a Message Reject will be received.

All messages exchanged will be displayed in the logger window with a full English description.

6.9 Station Status Request

Select Station Status Request button or press key 'H' to send a station status request message to the selected transponder. A Station Status Data will be received whether the transponder is initialized or not.

All messages exchanged will be displayed in the logger window with a full English description.

6.10 Request Fault Report

Select Fault Report button or press key 'I' to request the fault report of all the devices connected to the selected transponder. A Fault Report will contain all of the faults found. If the transponder of the slave device is not initialized correctly, a Message Reject will be received.

All messages exchanged will be displayed in the logger window with a full English description.

6.11 Fault Report

Select the Fault Report button or press key 'J' to clear the faults associated with slave devices connected to the target transponder. An Acknowledgement will be received whether the transponder is initialized or not. If the selected fault cannot be cleared manually, a Message Reject will be received.

All messages exchanged will be displayed in the logger window with a full English description.

6.12 Site Data

Select the Site Data button or press key 'K' to send Site Data to the selected transponder. An Acknowledgement will be received.

If the Site Data is incorrect for the selected transponder, a Message Reject will be received. If the transponder has already been initialized, a Message Reject will also be received.

All messages exchanged will be displayed in the logger window with a full English description.

6.13 Reset

Select the Reset button or press key 'L' to invoke a software application reset of the target transponder. An Acknowledgement will be received whether the transponder is initialized or not.

All messages exchanged will be displayed in the logger window with a full English description.

6.14 Unsolicited Messages

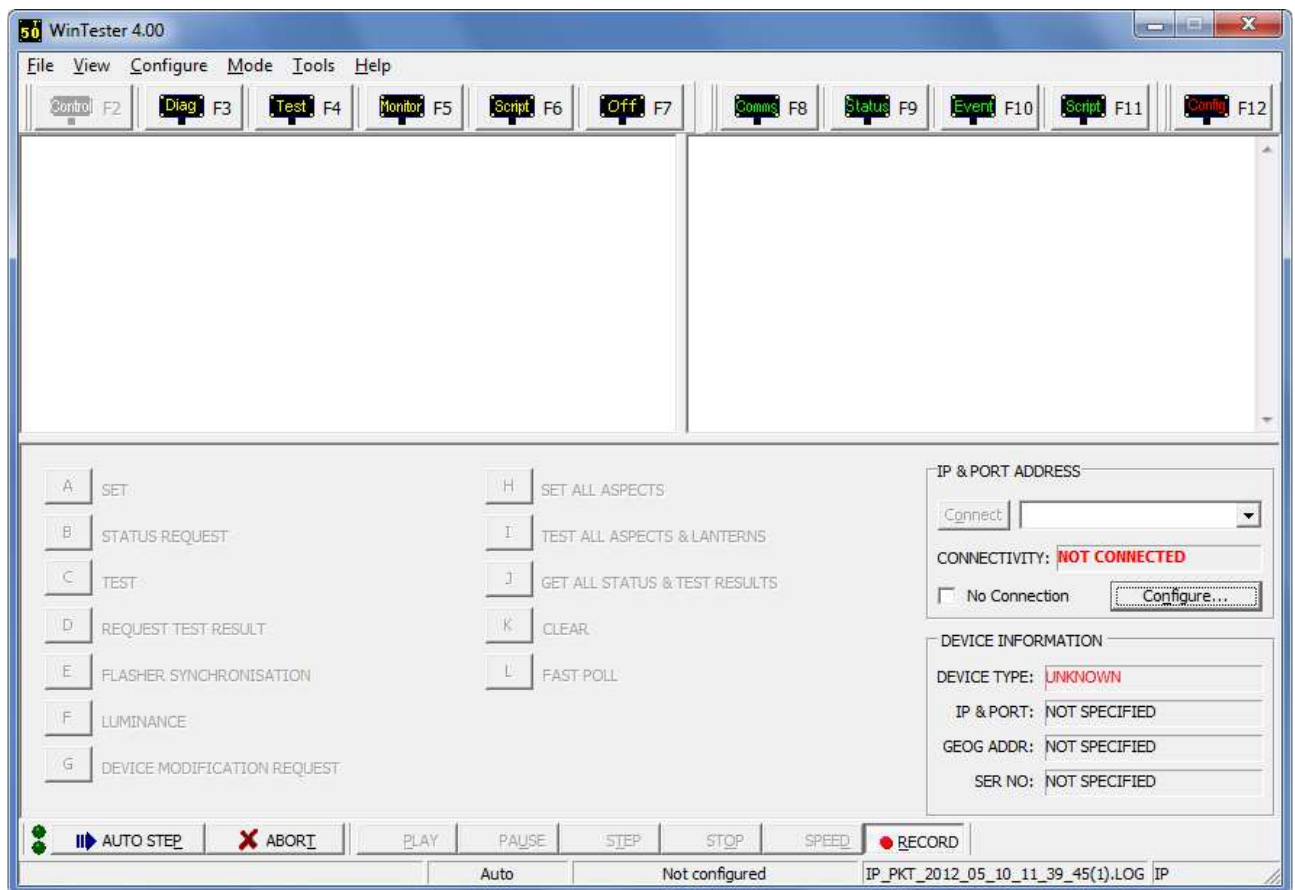
If a fault at a slave device (signal/non-signal) has occurred or has been cleared, a Fault Report message will be received by WinTester. If a change of status occurs on any of the polled transponders WinTester will receive a Station Status Data message. If any change of status of a slave device has occurred, a Device Status Data message will be received by WinTester. All unsolicited messages received by WinTester will be displayed in the logger window together with a full English description.

6.15 Recording

See section 12.1.1 for a description of the function of the Record button.

7 IP Control Mode

Selecting the Control mode button, “Mode | Basic Control Mode” menu option or F2 function key will display a Select Mode dialog. Select Subsystem – SIGN IP Link to enter IP Mode. This function provides the means to communicate with a sign or signs using appropriate messages according to MCE1126 IP Messages (A.4).



IP Mode

On entry to the mode, a warning is displayed (see Section 4.20). **Ensure the instructions have been complied with before using any IP Mode functions.**

It will not be possible to use any functions within IP Mode unless a sign type has been specified. Click the ‘Configure...’ button, select ‘Sign’ from the ‘Configure’ menu or press the Ctrl+4 keys to enter or change a sign type (see also section 4.5.4).

All the configured IP and Port addresses will appear in the IP & Port Address list box.

7.1 General

If connection between the server and client could not initially be established, it is still possible to attempt establish connection manually by pressing the connect button. The user interface will remain disabled until a connection has been established for the selected address.

Retries for each command shall be carried out, if required, as configured. If, after all retries, no valid reply is received to a command then the operation shall be aborted. When the

operation is successfully completed or aborted then the user interface controls shall be re-enabled to allow modification of the parameters or a new command to be issued.

7.2 Commands

All the single commands and command sequences in Serial Control Mode are available in IP Control Mode. Please refer to Sections 5.4 to 5.23 for detailed explanations.

7.3 Request Test Result (All)

If an intelligent indicator (EMI94xx) is configured, selecting the Req Test Result (All) button or using key press 'M' will send a Request Test Result command (CF = 25h, DB1 = FFh, DB2 = FFh). The sign will return an extended Test Result message (CF = 26h) comprising a 2 data byte test result for each configured aspect.

7.4 Unsolicited Status Messages

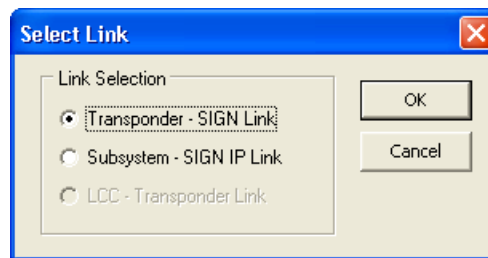
Any unsolicited STATUS REPLY (CF = 0x23) messages received will be logged and analysed. The status of the sign and related statistics will be updated accordingly.

7.5 Application Level Keep Alive Message

This is the STATUS REQUEST (CF = 0x22) sent to the connected outstation to maintain the connection. If no application message is sent or received on a connection for the 'keepalive timeout' period, configured in the 'Timing' dialog, a STATUS REQUEST (CF = 0x22) message will be sent to ensure the connection remains established. Any STATUS REPLY (CF = 0x23) messages received will be analysed and the status of the sign and related statistics will be updated accordingly.

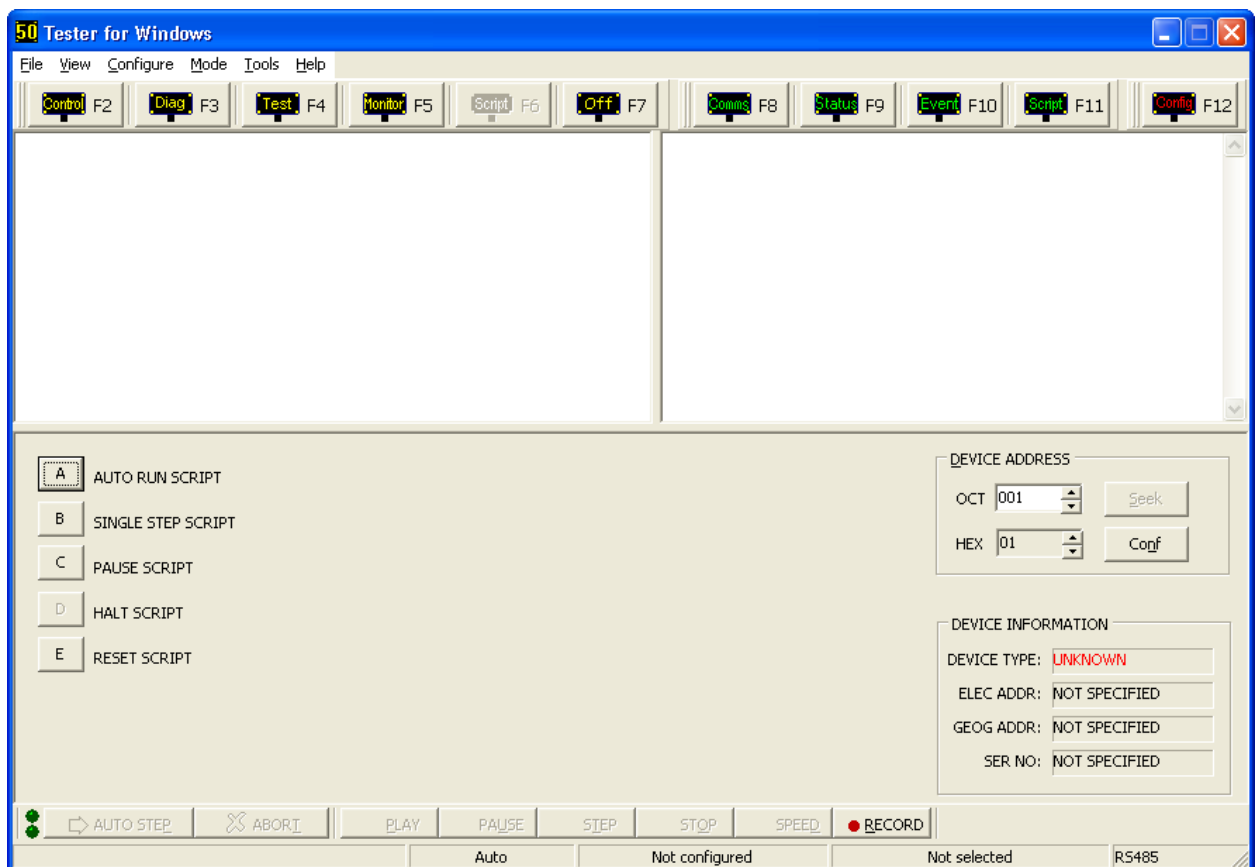
8 Serial Script Mode

Selecting the Script mode button, “Mode | Script Mode” menu option or F6 function key will display a Select Mode dialog.



Select Mode Dialog

Select Transponder – SIGN Link to enter Serial Script Mode. This function provides the means to communicate with a sign or signs using predefined scripts according to the HA 5-byte packet protocol. See Section 13 for further information on WinTester’s script language.



Serial Script Mode

On entry to the mode, a warning is displayed (see Section 4.20). **Ensure the instructions have been complied with before using any Serial Script Mode functions.**

It will not be possible to use any functions within Serial Script Mode unless a script file without any syntax errors has been opened. See Section 8.1 for more details.

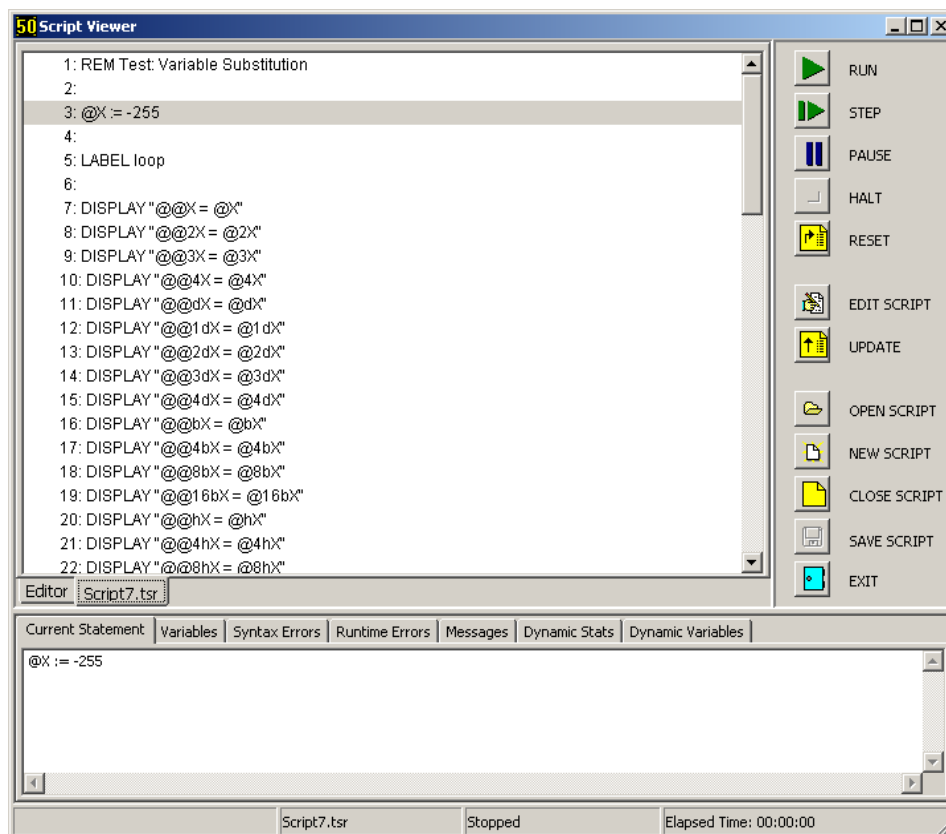
8.1 Script Viewer

Open a script file by selecting “File | Open Script” (see 4.13.3) or click on the Script Viewer open button. To view the script select “View | Script Viewer” or press the F11 key. A Script window will be displayed. Note that loading a script file containing one or more syntax errors will automatically display the Script Viewer listing all the syntax errors (see section 8.1.3).

The Script Viewer displays the script file in the top windows, numbering each line. The top window is divided into the editor and active script tab pages. The bottom part of the window is divided into pages containing additional script related information which is updated at runtime.

While the Script Viewer is displayed, select the script file using the “File | Open Script” menu option and the Script window will be updated with the selected script.

While the Script Viewer is displayed, all the shortcut keys on the main form will be disabled. This is to ensure the possible editing of a script. Upon closing the Script Viewer, all the shortcut keys will be re-enabled.



Script Window

When the Transponder Address group box on the main form is visible instead of the Device Address group box, trying to display Script Viewer will invoke a warning message stating this function does not support NMCS2 Transponders.

8.1.1 Current Statement

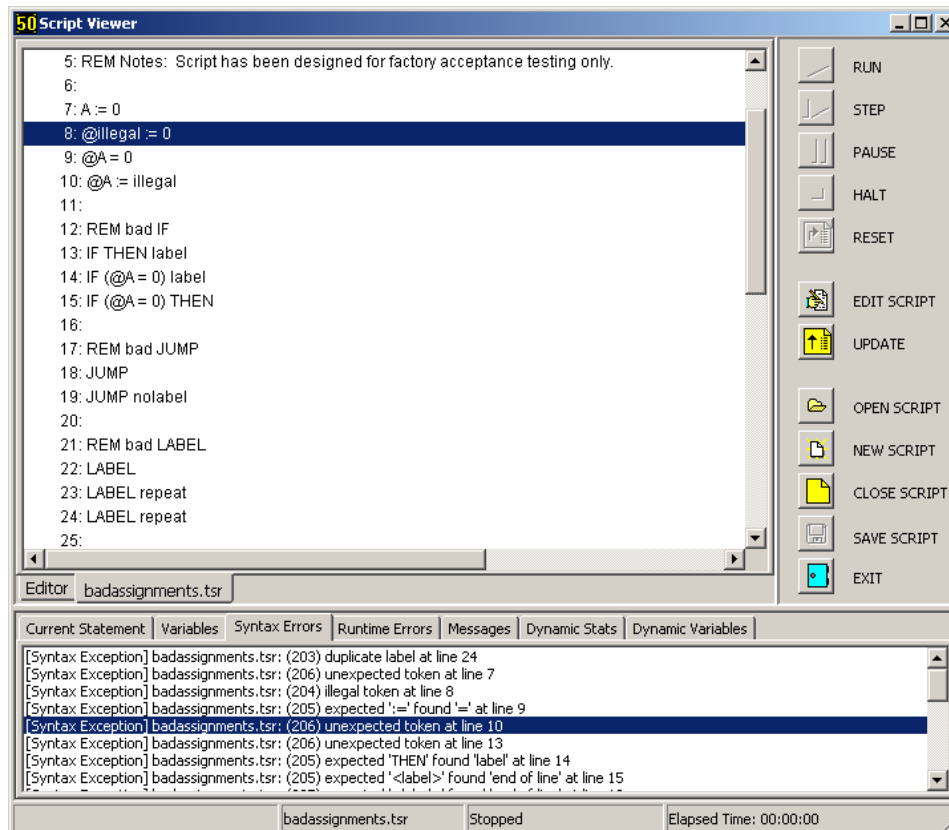
This page displays the first line in the script (other than comments). During single step script processing, it is updated with the next statement to be processed.

8.1.2 Variables

This page displays all variables defined in the script. When a script is processed, the values associated with the variables are updated according to the statements in the script.

8.1.3 Syntax Errors

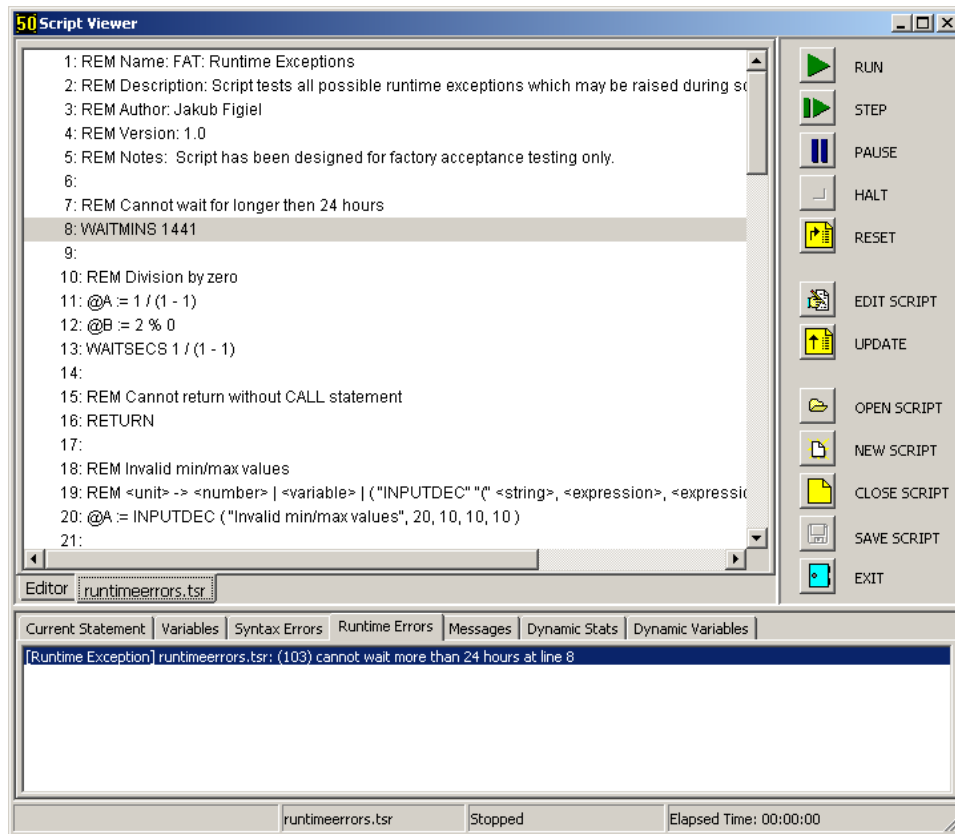
If the selected file contains syntax errors within the script, the Script window will automatically show the syntax errors page. Double clicking on a syntax error will automatically highlight the syntax error in the script. Note that no functions will be available in Script Mode when the current script file contains syntax errors.



Script Window with Syntax Errors

8.1.4 Runtime Errors

When an executed script causes a runtime error the Script Viewer will automatically display and highlight the statement that caused the exception.

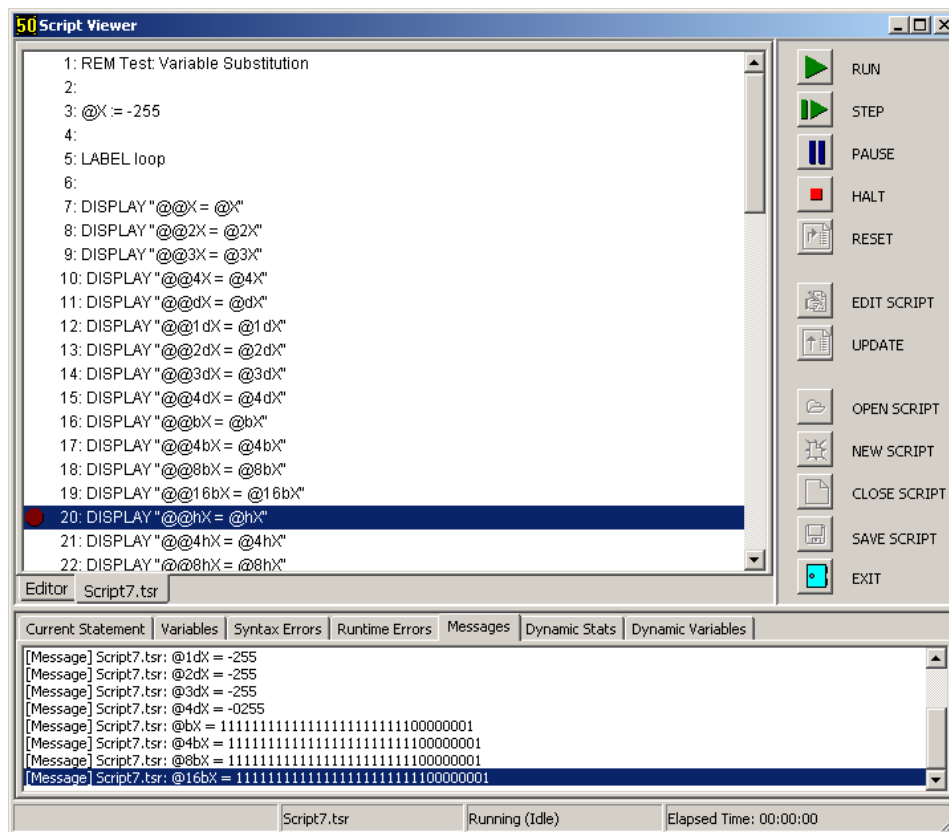


Script Window with Runtime Errors

The script processing will automatically cease on identification of any runtime errors.

8.1.5 Messages

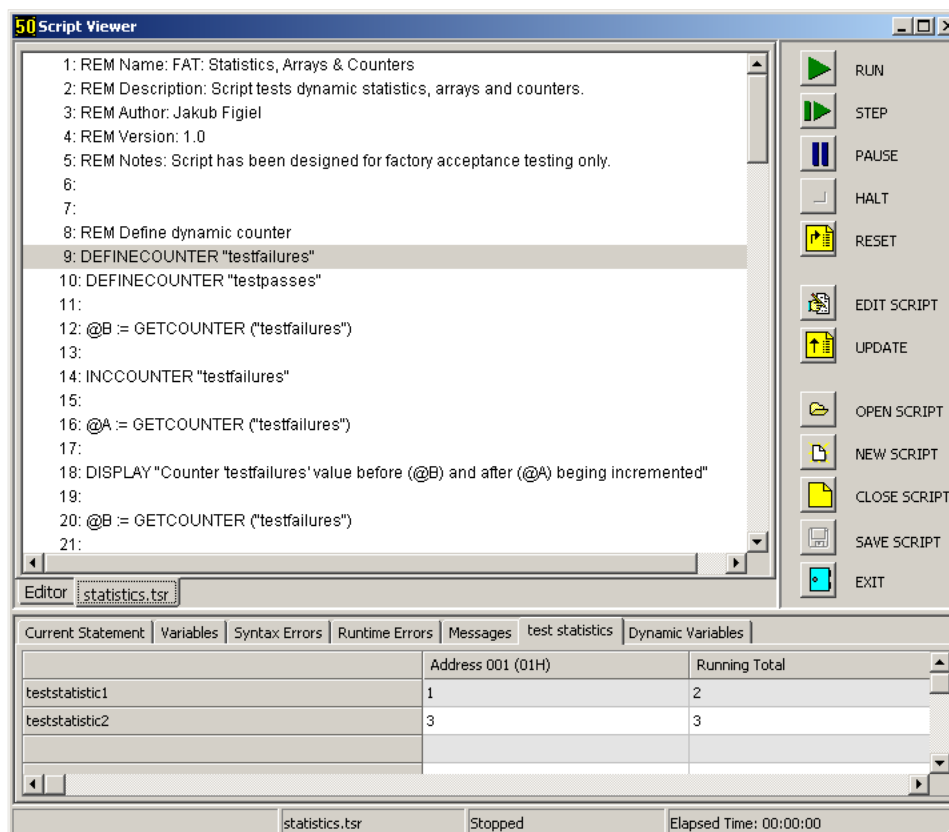
When a script containing DISPLAY tokens is run (see 13.3.26), messages will be displayed on the Messages tab page.



Script Window with Messages

8.1.6 Dynamic Stats

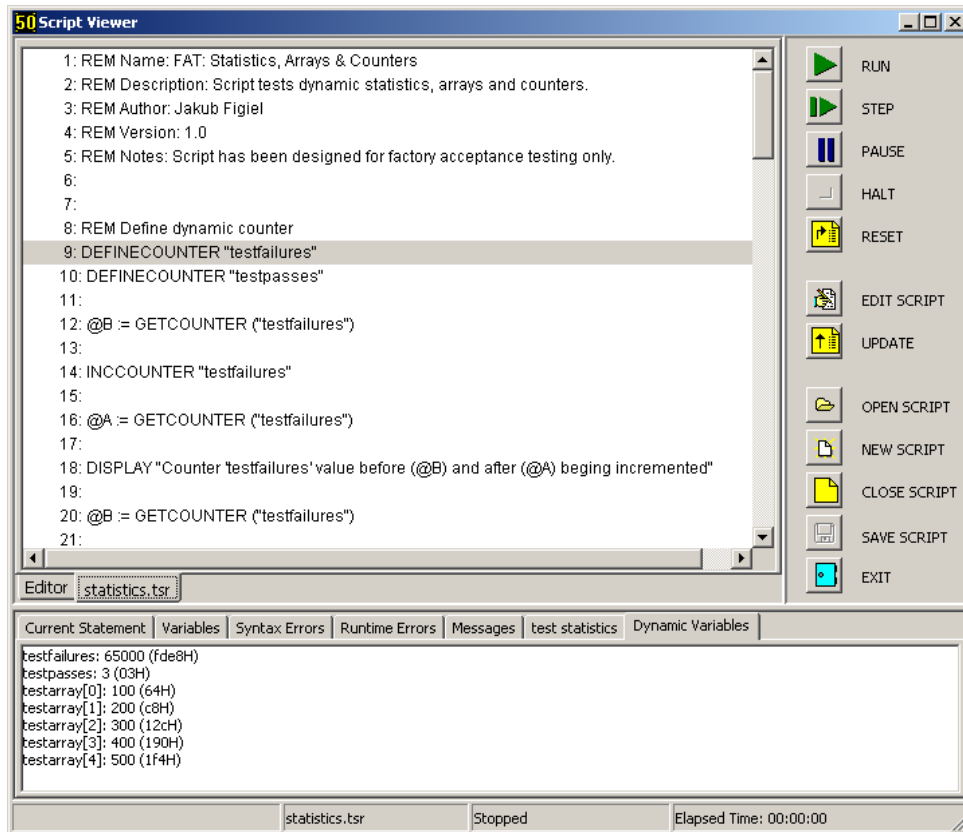
Dynamic statistics are automatically added and removed to and from the Script Viewer at runtime.



Script Window with Dynamic Stats

8.1.7 Dynamic Variables

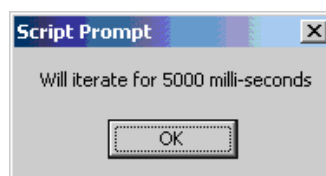
Dynamic variables are automatically added and removed to and from the Script Viewer at runtime.



Script Window with Dynamic Variables

8.1.8 Prompts

When a script that contains PROMPT tokens is run (see section 13.3.85), a prompt dialog is displayed showing the message associated with the token.

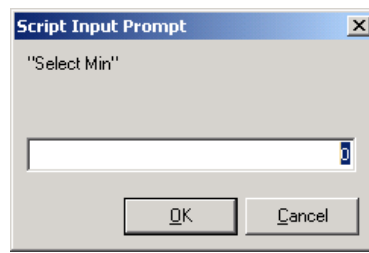


Script Prompt

8.1.9 Input Prompts

Input prompts enable values to be entered into a script at runtime. This feature is very useful for changing the function or duration of a script at runtime without having to manually edit the script file.

When a script that contains INPUT prompt tokens is run (see section 13.4.13), an input prompt dialog is displayed showing the message associated with the token.

*Script Input Prompt*

8.2 Auto Run Script

Select the Run button in the script viewer, Auto Run Script button or use key press 'A' in the main form to process the current script files. If the script file contains valid sign commands, these will be transmitted according to the statements specified.

All commands exchanged will be displayed in the logger window.

To stop script processing at any time, select the Halt or Pause button in the script viewer, Halt Script or Pause Script buttons (key press 'C' or 'D') in the main form.

8.3 Single Step Script

Select the Step button in the script viewer, Single Step Script button or use key press 'B' in the main form to process the current script file one statement at a time. After processing a statement the Script Viewer will automatically highlight the following executable statement.

Keep selecting the Step button in the script viewer, Single Step Script button (or key 'B') in the main form until the script file has completed processing. If open, the Script window will be updated as the file is processed. If the script file contains valid sign commands, these will be transmitted according to the statements specified.

All commands exchanged will be displayed in the logger window.

To stop script processing at any time, select the Halt Script or Pause Script buttons (key press 'C' or 'D').

8.4 Pause Script

Select the Pause button in the script viewer, Pause Script button or use key press 'C' in the main form during processing of a script file to halt the processing. The button will change to 'Unpause Script' and no further processing will be performed until either this button has been selected again or the Halt Script button is pressed. When the 'Unpause Script' button is selected, the script will continuing processing automatically or stop at the next executable statement if single stepping.

8.5 Halt Script

Select the Halt button in the script viewer, Halt Script button or use key press 'D' in the main form during processing of a script file to abandon the processing. The Script window will show the script file returned to its start position. The Variables and Messages pages will display the values as set up until the point the processing was stopped.

8.6 Reset Script

This function is only available when a script file is not being processed. Select the Reset button in the script viewer, Reset Script button or use key press 'E' in the main form to set all values in the Variables page to 0 and to clear the Script window.

8.7 Edit/Save Script

Select the Edit Script button in the script viewer to load the opened script into the Script Editor, which will allow the script to be modified. Any modification made can be saved by selecting the Save Script button in the script viewer form.

8.8 Update Script

Select the Update button in the script viewer to update a modified script. This will save and reload the modified script from editor to the active script and will be executable unless syntax errors exist.

8.9 Open Script

Select the Open Script button in the script viewer or "File | Open Script" menu option to open an existing script.

8.10 New Script

Select the New Script button in the script viewer to create a new script file with the default name "Script File". The script can then be edited by pressing the Edit Script button or saved by pressing the Save button (see section 8.7).

8.11 Close Script

Select the Close Script button in the script viewer or "File | Close Script" menu option to close the opened script.

8.12 Exit Script Viewer

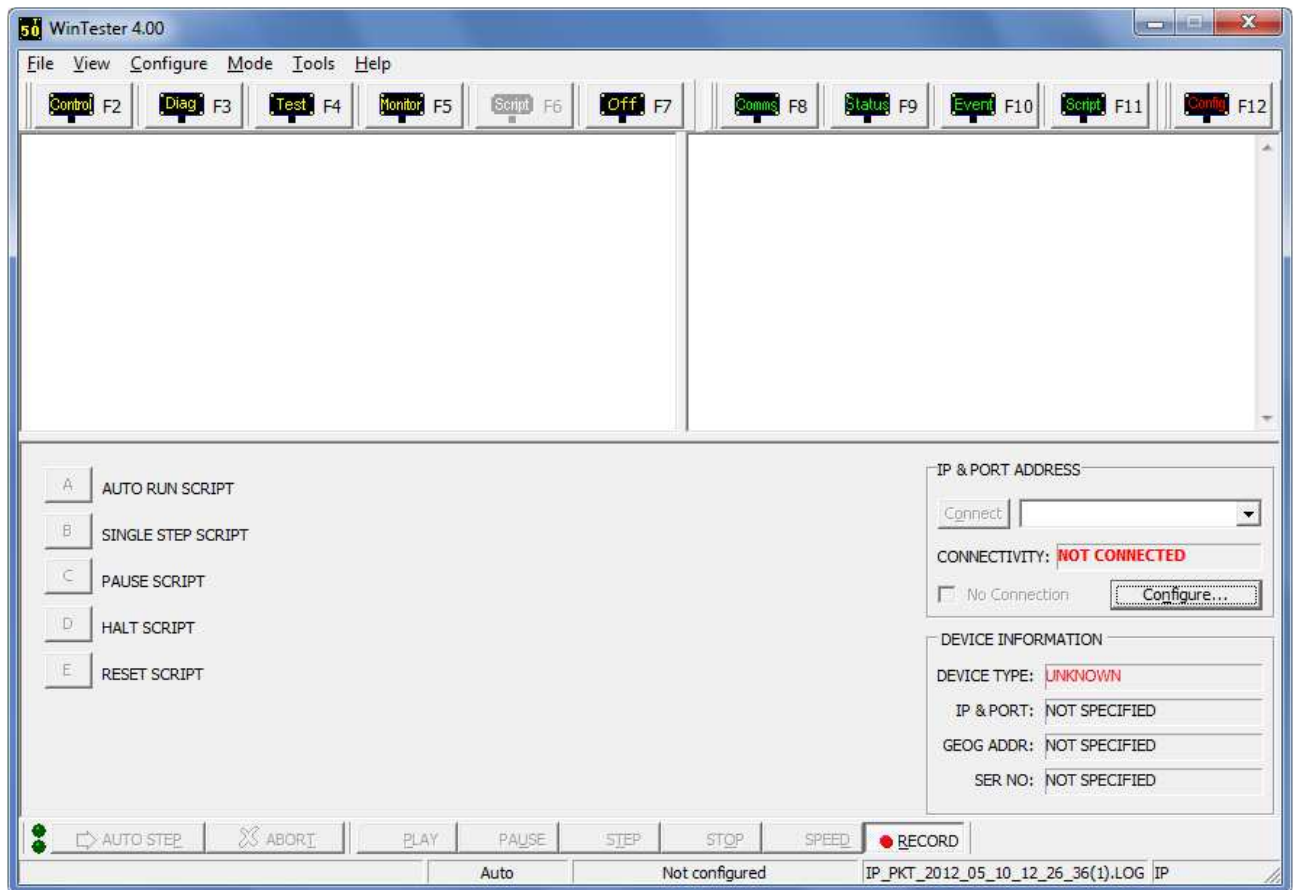
Select the Exit button in the script viewer, the green Script button or press the F11 function key again to close the script viewer. However, the script file will not be closed.

8.13 Recording

See section 12.1.1 for a description of the function of the Record button.

9 IP Script Mode

Selecting the Control mode button, “Mode | Script Mode” menu option or F6 function key will display a Select Mode dialog. Select Subsystem – SIGN IP Link to enter IP Script Mode. This function provides the means to communicate with a sign or signs using predefined scripts according to MCE1126 IP Messages (A.4). See Section 13 for further information on WinTester’s script language.



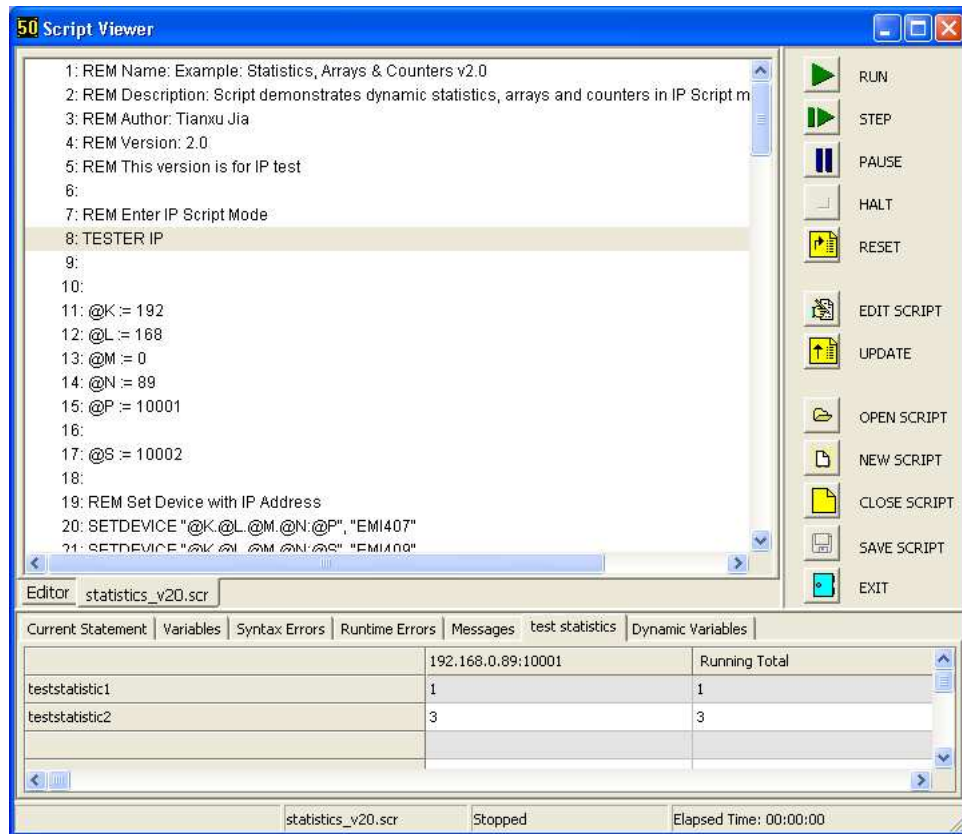
IP Script Mode

On entry to the mode, a warning is displayed (see Section 4.20). **Ensure the instructions have been complied with before using any IP Script Mode functions.**

It will not be possible to use any functions within IP Script Mode unless an IP script file without any syntax errors has been opened. Note that the keyword “TESTER IP” needs to be present in the beginning of the script to indicate that it is an IP script file and required to run in IP Script Mode. Please refer to Section 9.1 for more details.

9.1 Script Viewer

All the information displayed in Script Mode (Section 8.1.1 to 8.1.9) is available in IP Script Mode, apart from the Dynamic statistics (Section 8.1.6). It is now shown according to IP address rather than electronic address.



IP Script Window with Dynamic Stats

9.2 Commands

The connection between the server and client should have been established before any data packet can be transmitted. The connect button is disabled in this mode, so command “CONNECT” (Section 13.3.14) is the only way to attempt to establish connection.

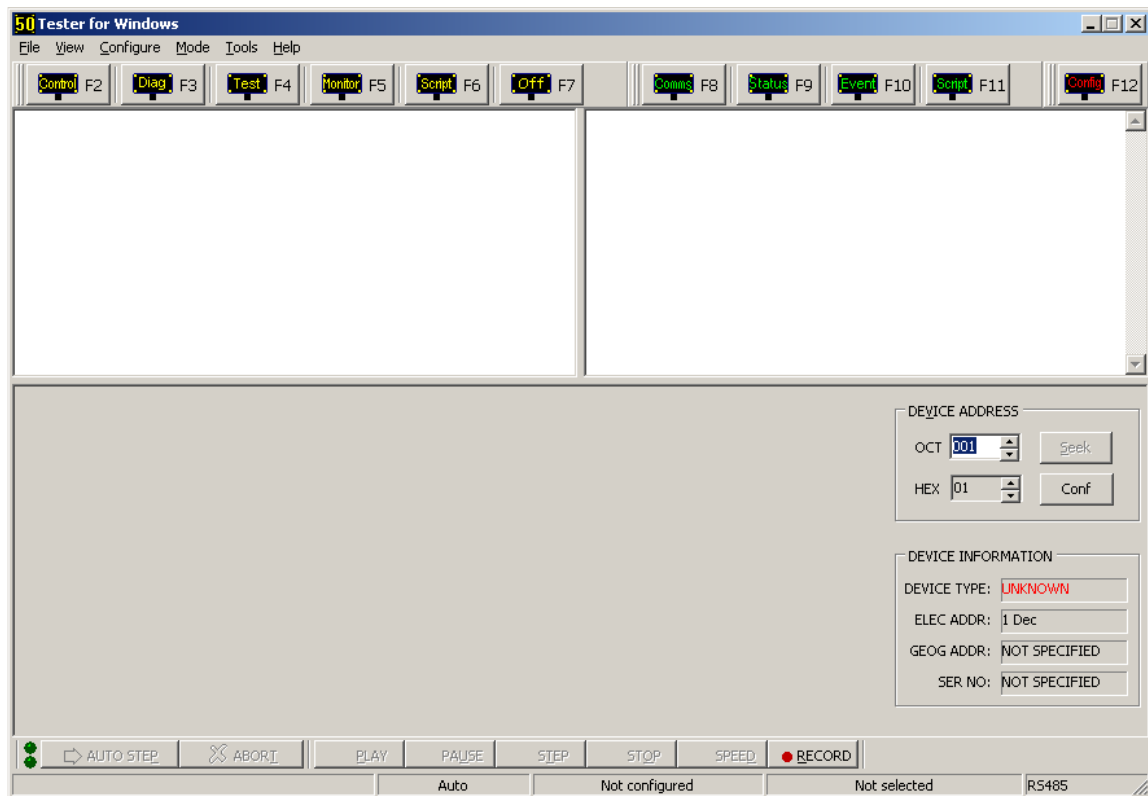
Note that Script Mode and IP Script Mode share most of the script languages, but all of them. Please refer to Section 13 for more details.

9.3 Functions

All functions in Script Mode are available to IP Script Mode, please refer to Sections 8.2 to 8.13 for more details.

10 RS485 Monitor Mode

Selecting the Monitor mode button, “Mode | Monitor Mode” menu option or F5 function key will display a Select Mode dialog. Select Transponder – SIGN Link to enter RS485 Monitor Mode. This function provides the facility to monitor messages transmitted to motorway signs on the RS485 link.

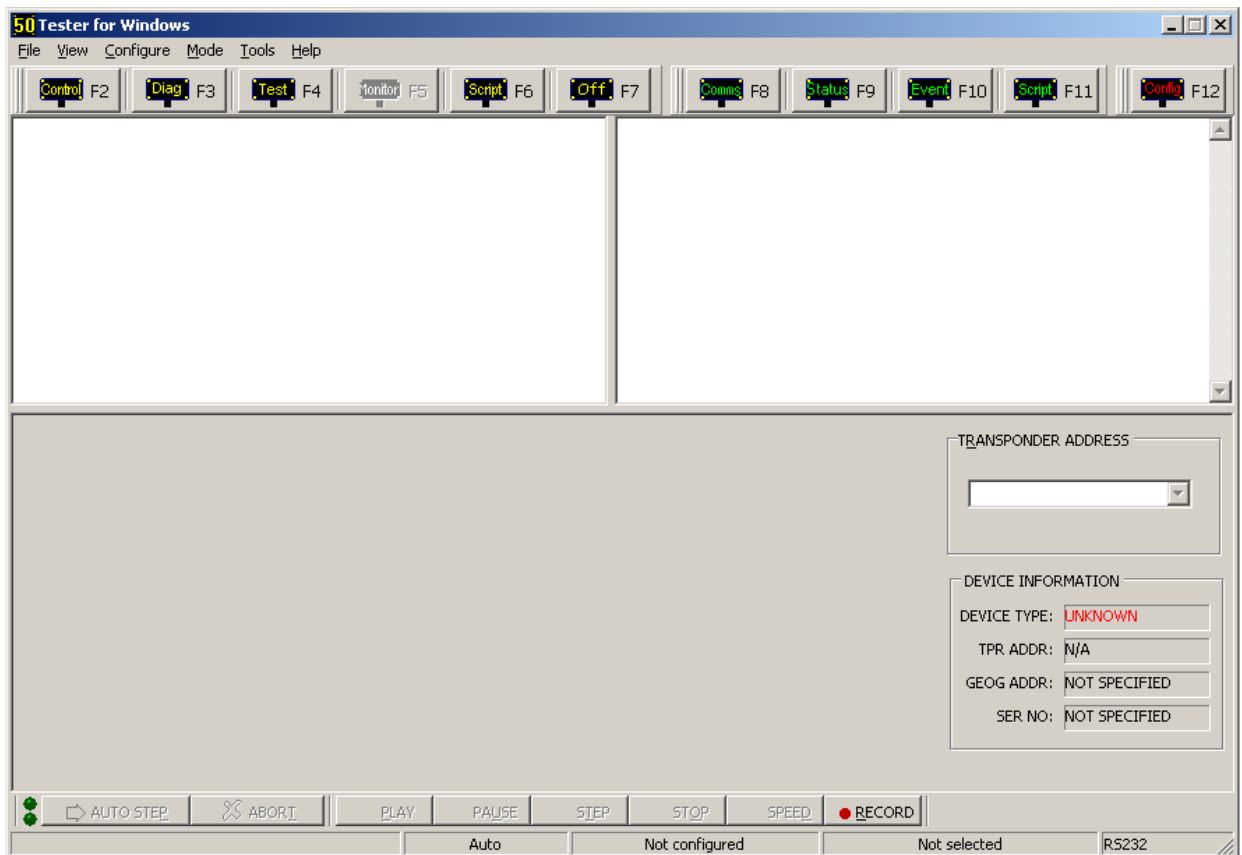


RS485 Monitor Mode

Any messages monitored on the RS485 link will be displayed in the logger window.

11 HDLC Monitor Mode

Selecting the Monitor mode button, “Mode | Monitor Mode” menu option or the F5 function key will display a Select Mode dialog. Select LCC – Transponder Link to enter HDLC Monitor Mode. This function provides the facility to monitor messages transmitted to transponders on the V.26 link.



HDLC Monitor Mode

Any messages monitored on the RS232 HDLC link will be displayed in the logger window.

12 Off Mode and Replay

Selecting the Off mode button, “Mode | Replay/Off Mode” menu option or F7 key will enter Off Mode.

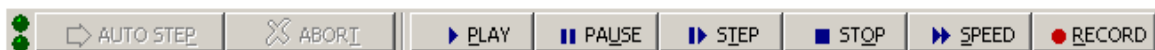


Off Mode

From this screen it is only possible to Replay a 5-byte packet log file previously recorded using the Replay controls.

12.1 Replay Controls

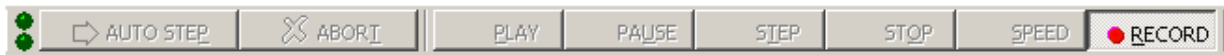
It is possible to store and replay WinTester communications. This is achieved using the Replay buttons on the main WinTester window.



Replay Buttons

12.1.1 Record

To record communications from any WinTester Mode, select the ‘Record’ button (key press ‘R’) prior to selecting any WinTester communication functions. All messages and their decoding will be written to two separate log files on disk which will be continued until the ‘Record’ button is pressed again. 5-byte packets will be logged to a file with the prefix “5BYTE_”, IP packets will be logged to a file with the prefix “IP_PKT_”, frames will be logged to a file with the prefix “HDLC_” and the decoding and descriptions of the exchanged messages will be logged to a separate file with the prefix of the current mode. The filename is followed by the timestamp of the log when it is created.



Recording

12.1.2 Replay

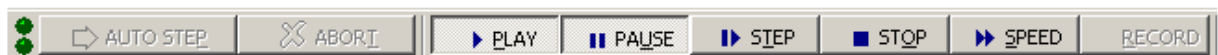
IP Packet, frame and message log files cannot be used for replaying. To replay any previous 5-byte packet recordings, ensure that the Off mode has been entered and select the “File | Open Log...” menu option to select a 5-byte packet file (5BYTE_) to replay. This file will be used by all subsequent selection of Replay buttons. Select the ‘Play’ (key press ‘P’) Replay button. WinTester will display in the log window all commands exchanged during the recording and will update Status form and Stats form accordingly. Note that WinTester will transmit no commands to any connected devices during the replay.

12.1.3 Pause

To pause a file being replayed, select the ‘Pause’ button (key press ‘U’). To continue with the replay, select the ‘Pause’ button again.

12.1.4 Step

To play the file one command at a time, select the ‘Step’ button (key press ‘T’). The ‘Play’ and ‘Pause’ buttons will stay pressed until the end of the file being played. Select the ‘Step’ button to progress to the next command in the file. The log window will be updated for one command only. To view the whole file by this method, keep selecting the ‘Step’ button until the ‘Play’ and ‘Pause’ button are no longer pressed (i.e. end of the file has been reached). To abandon the ‘Step’ function, select either the ‘Stop’ button (key press ‘O’) to stop the replay or select the ‘Pause’ button to automatically play the rest of the file.



Replay ‘Step’ function

12.1.5 Speed

To play the file at a different speed, select the ‘Speed’ button (key press ‘S’). A list of speeds will be displayed.

- Five Times
- Four Times
- Three Times
- Double
- Real Time
- Half
- Third
- Quarter
- Fifth

Select the required speed and select the ‘Play’ button. The current log file will be replayed at the speed specified.

13 Script Language

13.1 Overview

Script files are used to communicate with a sign or signs from WinTester's Diagnose Mode and Test Mode. They are stored as *.tsr files and can be loaded using the "File | Open Script" menu option and viewed using the Script button or F11 function key (see section 8 for further information).

Scripts beginning with the "TESTER IP" token shall be considered as IP scripts. This should be use in conjunction with IP Script mode and the <ip address> rather than <address> should be provided in the script command.

All script files have the following rules in common:

- Statements beginning with the "REM" token shall be considered comments (remarks) to be ignored by the script processor.
- Blank lines and comments are ignored during processing.
- A syntactically correct script consists of a sequence of statements with a single complete syntactically correct statement on each line of the script. Each line comprises of a sequence of tokens defined in the lexicon.
- There are twenty-six pre-defined integer variables "@A" – "@Z". Each variable is initialised to zero when script processing begins. A special read-only variable "DUT" is initialised to the address of the currently selected sign when a script is started. Another special read-only variable "&TIME" shall be used to display the system timestamp in hh:mm:ss:nnn format when it is used.
- All values are considered to be binary two's complement signed integers comprised of 32 bits. Where a byte value is to be derived from an integer the least significant 8-bits are used "as-is". Where Boolean values are required 0 is considered to represent FALSE, non-zero to represent TRUE. Operators that return Boolean values always return the value 1 to represent TRUE.
- All reserved words are upper case.
- The assignment operator is ":= " (not "=") and the equality operator is "==" (not "= "). Extensive bit manipulation is supported.
- White space may be used to separate tokens if required.
- The arrays RX[.] and TX[.] provide byte-access to the most recently received and transmitted packets, respectively. The index specifies the byte to be accessed. Both RX[.] and TX[.] indices are based at zero. If an index accesses a byte that does not exist then the value of the expression is -1. If (RX[0] = -1) then no packet has been received – either since start-up or since the last command was transmitted.

13.2 Operators

Below is a list of operators, grouped by order of precedence.

[.]	Array subscript
CRC(.)	CRC ¹
(.)	Parentheses
~	Bit-wise complement
!	Logical negation
+	Unary plus
-	Unary minus
*	Multiplication
/	Division
%	Modulus
+	Addition
-	Subtraction
<<	Bit-wise shift left
>>	Bit-wise shift right
<	Less than
<=	Less than or equal
>=	Greater than or equal
>	Greater than
=	Equality
!=	Inequality
&	Bit-wise AND
^	Bit-wise Exclusive OR
 	Bit-wise OR
&&	Logical AND
 	Logical OR

¹ Returns CRC-12 over a string of BS4730 characters.

13.3 Command Statements

The script includes the following key identifiers, where:

<address>	An expression defining the value of the address field of a packet. This field is only valid in Serial Script Mode and will cause a syntax error if used in IP mode.
<ip address>	A string defining the ip address and port number of the message. This field is only valid in IP Script Mode and will cause a syntax error if used in Serial mode. An invalid IP address and port number or an IP address with no connection will cause a runtime error.
<control>	An expression defining the value of the control field of a packet.
<data1>	An expression defining the value of the DATA1 field of a packet. If the expression is optional, this field is zero if the expression is not present.
<data2>	An expression defining the value of the DATA2 field of a packet. If the expression is optional, this field is zero if the expression is not present.
<checksum>	An expression defining the value of the checksum field of a packet. This field defaults to the correct checksum for the packet if the expression is not present. This is only necessary for 5-byte protocol packet (i.e. when the script is running in serial script mode).
?	If present indicates that the script processor should wait for a valid response before proceeding, performing retries as required.
< MDFIVE >	If this keyword is used, the ip packet will be sent using MD5 encoding technique. This field is only valid in IP Script Mode and will cause a syntax error if used in Serial mode.
<TCP UDP>	If keyword TCP is used, the ip packet will be sent via TCP connection. If keyword UDP is used, it will be sent via UDP connection. If no keyword exists, the ip packet will be sent via UDP connection. This only applies to ip broadcast packets. This field is only valid in IP Script Mode and will cause a syntax error if used in Serial mode.

13.3.1 ABORT

The script processor will abort executing the current script.

13.3.2 ACK <address> , <data1> , <data2> [, <checksum>]

The script processor transmits an Acknowledgement 5-byte protocol packet with fields defined by the statement.

13.3.3 ACK <ip address> , <data1> , <data2> [, MDFIVE]

The script processor transmits an Acknowledgement ip packet with fields defined by the statement.

13.3.4 ADDEVENT <description> , EVENTINFO | EVENTINPROGRESS | EVENTOK | EVENTERROR | EVENTWARNING [, <additional information>] [, <progress>]

The script processor creates a new event. The specified event status will determine if the event is presented to the operator as information, a progress message or an indication of a successful/failed operation or a warning.

13.3.5 ADDEVENTDETAIL <description> , EVENTINFO | EVENTINPROGRESS | EVENTOK | EVENTERROR | EVENTWARNING [, <additional information>] [, <progress>]

The script processor adds additional information to the last event. The specified event status will determine if the event detail is presented to the operator as information, a progress message or an indication of a successful/failed operation or a warning. This command will cause a runtime error if a parent event does not exist.

13.3.6 AUTOSTEP

The script processor will check whether the current script sequence is to be processed automatically or stepped through. If the latter, the script processor will display a dialog allowing the operator to continue execution, switch to auto stepping mode or abort the entire sequence.

NOTE: This command only applies to Acceptance Test and Diagnostic scripts where it is possible to toggle auto/single step sequences.

13.3.7 AUTORUN ON | OFF

The script processor sets the terminal auto run flag, enabling or disabling automatic execution of statements interpreted by the terminal. If auto run is disabled, the operator can type in a sequence of statements to a temporary program. Re-enabling auto run would execute the temporary program until it is completed or the operator aborts the operation.

NOTE: This command only applies to Terminal Mode and should not be used within normal script files.

13.3.8 BAUDRATE <baud rate>

The script processor will reconfigure the serial driver to the specified baud rate. If the expression does not evaluate to a valid baud rate a runtime error will occur.

13.3.9 BYTESEQ <data1> [, <data>] x N [?]

The script processor will transmit between 1 and 63 bytes.

NOTE: This command only applies to Serial Script Mode. Using it in IP Script Mode will cause a syntax error.

13.3.10CALL <label>

The script processor adds the current script position to a call stack and transfers control to the labelled statement. RETURN (13.3.91) will transfer control back to the first statement after the last call statement. If the specified label is not present in the script, a runtime exception will occur.

13.3.11CALLSCRIPT <script> [, <label>]

The script processor adds the current script position to a call stack and transfers control to the specified script. If a label is specified, the control is transferred to the labelled statement in the specified script. The called script has to finish executing before control returns back to the calling statement. If the specified script cannot be found, a runtime exception will occur.

13.3.12CHANGEADDRESS or CHADD <address>

The script processor will set the Device Under Test (DUT) address and update the user interface.

NOTE: This command only applies to Serial Script Mode. Using it in IP Script Mode will cause a syntax error.

13.3.13CLEAR or CLS

The script processor will clear the terminal.

NOTE: This command will only work in TERMINAL MODE and will have no effect in any other mode.

13.3.14CONNECT <ip address>

The script processor tries to connect to the specified ip address and port number. An invalid ip address and port number will cause a runtime error.

NOTE: This command will only work in IP Script Mode. Using it in Serial Script Mode will cause a syntax error.

13.3.15DATABITS <expression>

The script processor reconfigures the serial driver to use the specified number of data bits in character transmission (byte size). Data-bits outside the valid (5-8) range will cause a runtime error.

13.3.16DEFINEARRAY <name> , <size>

The script processor creates a dynamic array with specified number of elements. If the array already exists, a runtime exception will occur. Use the GETARRAY (see section 13.4.4) and SETARRAY (see section 13.3.94) to read/write the dynamic array.

13.3.17DEFINEFIELD <string>

The script processor creates a dynamic string field. If the field already exists, a runtime exception will occur. Use the INPUTFIELD (see section 13.4.14) command to set the dynamic string field at runtime.

Dynamic string fields can be logged to disk using the command LOGFIELD (see section 13.3.57) command to facilitate report generation.

13.3.18 **DEFINESTAT** <string>

The script processor creates a dynamic statistic. If the statistic already exists, a runtime exception will occur. Use the GETSTAT (see section 13.4.5) command and INCSTAT (see section 13.3.38) command to read/write a dynamic statistic.

Dynamic statistics can be logged using the LOGDYNAMICSTATS command (see section 13.3.51).

13.3.19 **DEFINESTATGROUP** <string>

The script processor names the dynamic statistic group. Any dynamic statistics will automatically be listed under the defined group name in the communication statistics form.

13.3.20 **DEFINEVARIABLE** or **DEFINEVAR** or **DEFINECOUNTER** <string>

The script processor creates a dynamic variable. If variable already exists, a runtime exception will occur. Use the GETVAR (see section [13.4.7](#)) and SETVAR commands (see section 13.3.100) to read/write a dynamic variable.

13.3.21 **DEVREP** <address> , <data1> , <data2> [, <checksum>]

The script processor transmits a Device Modification Reply 5-byte protocol packet.

13.3.22 **DEVREP** <ip address> , <data1> , <data2> [, **MDFIVE**]

The script processor transmits a Device Modification Reply ip packet.

13.3.23 **DEVREQ** <address> [, <data1> , <data2> [, <checksum>]] [**?**]

The script processor transmits a Device Modification Request 5-byte protocol packet. The data bytes default to zero but may be overridden for test purposes.

13.3.24 **DEVREQ** <ip address> [, <data1> , <data2> [, **MDFIVE**]] [**?**]

The script processor transmits a Device Modification Request ip packet. The data bytes default to zero but may be overridden for test purposes.

13.3.25 **DISCONNECT** <ip address>

The script processor tries to disconnect the specified ip address and port number. An invalid ip address or port number will cause a runtime error.

NOTE: This command will only work in IP Script Mode. Using DISCONNECT in a serial script will cause a syntax error.

13.3.26 **DISPLAY** <string>

The script processor displays the specified string on the Script Viewer message tab page.

13.3.27 **EVENTSTATE EVENTINFO | EVENTINPROGRESS | EVENTOK | EVENTERROR | EVENTWARNING**

The script processor changes the state of the last event. A runtime error will occur if no event exists.

13.3.28 **EVENTDETAILSTATE EVENTINFO | EVENTINPROGRESS | EVENTOK | EVENTERROR | EVENTWARNING**

The script processor changes the state of the last event detail. A runtime error will occur if no event details are present.

13.3.29 **EXECUTEPROGRAM or EXECPROG**

The script processor will execute an entered program when the script auto-run flag has been set to false (see section 13.3.7 AUTORUN). This command will only work in TERMINAL MODE and will have no effect in any other mode.

13.3.30 **EXIT**

The script processor will close an open Terminal. This command will only work in TERMINAL MODE and will have no effect in any other mode.

13.3.31 **FASTSEQ <expression>**

If expression evaluates to 1 the script processor will set an internal flag to indicate that commands should be executed as fast as possible. This command should only be used in time critical sections of a script for more accurate timing and response speeds. To end a fast sequence simply invoke the command again ensuing the expression evaluates to 0.

13.3.32 **FLASHER <data1> , <data2> [, <checksum>]**

The script processor transmits a Flasher Synchronisation 5-byte protocol packet to address FFh.

13.3.33 **FLASHER <ip address> , <data1> , <data2> [, TCP | UDP] [, MDFIVE]**

The script processor transmits a Flasher Synchronisation ip packet to the specified ip address using specified underlying protocol, and the default protocol type is **UDP**.

13.3.34 **FLASHERBROADCAST <interval> [, DIM | BRIGHT]**

The script processor configures the automated flasher broadcast to be transmitted at the specified interval (in seconds). To disable luminance broadcast set the interval to 0.

13.3.35 **GOTO <label>**

The script processor transfers control to the labelled statement (same as JUMP).

13.3.36 **JUMP <label>**

The script processor transfers control to the labelled statement (same as GOTO).

13.3.37 IF <expression> THEN <label>

If the expression evaluates to true then the script processor transfers control to the labelled statement otherwise control passes sequentially to the next statement as for any other command (except GOTO/JUMP).

13.3.38 INCSTAT <address>, <string>

The script processor increments the specified dynamic statistic. If the statistic does not exist, a runtime exception will occur.

13.3.39 INCSTAT <ip address>, <string>

The script processor increments the specified dynamic statistic. If the statistic does not exist, a runtime exception will occur.

13.3.40 INCVARIABLE or INCVAR or INCCOUNTER <string>

The script processor increments the specified dynamic variable. If the variable does not exist, a runtime exception will occur.

13.3.41 INTERCHARTIMEOUT <expression>

The script processor will reconfigure the serial driver to use the specified inter-character-timeout in milliseconds.

13.3.42 INTERPACKETTIMEOUT <expression>

The script processor will reconfigure the serial driver to use the specified inter-packet-timeout in milliseconds.

13.3.43 LABEL <label>

Defines a point of reference in a script for use in an “IF ... THEN” or “GOTO” / ”JUMP” statement.

13.3.44 LOG <string>

The script processor outputs the string to the current log file. Use the LOGFILE command (see section 13.3.58) to define log file. If no log file is defined, the script processor will create one using the standard script filename format.

13.3.45 LOGCOMMSSTATS <address> | ALL

The script processor outputs the communication statistics for the specified non-zero address to the current log file. It outputs the running total of the communication statistics to the current log file when address is zero or when the keyword ALL is present.

13.3.46 LOGCOMMSSTATS <ip address> | ALL

The script processor outputs the communication statistics for the specified valid ip address to the current log file. It outputs the running total of the communication statistics to the current log file when the keyword ALL is present.

13.3.47 LOGDEVDETAILS <address>

The script processor outputs device details for the specified address to the current log file.

13.3.48 LOGDEVDETAILS <ip address>

The script processor outputs device details for the specified valid ip address to the current log file.

13.3.49 LOGDEVSTATS <address>

The script processor outputs device statistics for the specified address to the current log file.

13.3.50 LOGDEVSTATS <ip address>

The script processor outputs device statistics for the specified valid ip address to the current log file.

13.3.51 LOGDYNAMICSTATS <address> | ALL

The script processor outputs the dynamic statistics for the specified non-zero address to the current log file. It outputs the running total of the dynamic statistics to the current log file when address is zero or when the keyword ALL is present.

13.3.52 LOGDYNAMICSTATS <ip address> | ALL

The script processor outputs the dynamic statistics for the specified valid ip address to the current log file. It outputs the running total of the dynamic statistics to the current log file when the keyword ALL is present.

13.3.53 LOGEMISTATS <address> | ALL

The script processor outputs the EMI statistics for the specified non-zero address to the current log file. It outputs the running total of the EMI statistics to the current log file when address is zero or when the keyword ALL is present.

13.3.54 LOGEMISTATS <ip address> | ALL

The script processor outputs the EMI statistics for the specified valid ip address to the current log file. It outputs the running total of the EMI statistics to the current log file when the keyword ALL is present.

13.3.55 LOGEMSSTATS <address> | ALL

The script processor outputs the EMS statistics for the specified non-zero address to the current log file. It outputs the running total of the EMS statistics to the current log file when address is zero or when the keyword ALL is present.

13.3.56 LOGEMSSTATS <ip address> | ALL

The script processor outputs the EMS statistics for the specified valid ip address to the current log file. It outputs the running total of the EMS statistics to the current log file when the keyword ALL is present.

13.3.57 LOGFIELD <string>

The script processor logs the specified field and its value to the current log file. A runtime error will be raised if the specified field is not found.

13.3.58 LOGFILE <filename> [, <extension>]

The script processor creates a log file using the specified filename and the current timestamp. The file extension will default to 'log' unless specified otherwise.

13.3.59 LOGHEADER

The script processor outputs session information to the current log file.

13.3.60 LOGINTELLIGENTINDICATORSTATS <address> | ALL

The script processor outputs the EMI94xx statistics for the specified non-zero address to the current log file. It outputs the running total of the EMI94xx statistics to the current log file when address evaluates to zero or when the keyword ALL is present.

13.3.61 LOGINTELLIGENTINDICATORSTATS <ip address> | ALL

The script processor outputs the EMI94xx statistics for the specified valid ip address to the current log file. It outputs the running total of the EMI94xx statistics to the current log file when the keyword ALL is present.

13.3.62 LOGMSFOURSTATS <address> | ALL

The script processor outputs the MS4 statistics for the specified non-zero address to the current log file. It outputs the running total of the MS4 statistics to the current log file when address evaluates to zero or when the keyword ALL is present.

13.3.63 LOGMSFOURSTATS <ip address> | ALL

The script processor outputs the MS4 statistics for the specified valid ip address to the current log file. It outputs the running total of the MS4 statistics to the current log file when the keyword ALL is present.

13.3.64 LOGMSGSTATS <address> | ALL

The script processor outputs the message statistics for the specified non-zero address to the current log file. It outputs the running total of the message statistics to the current log file when address evaluates to zero or when the keyword ALL is present.

13.3.65 LOGMSGSTATS <ip address> | ALL

The script processor outputs the message statistics for the specified valid ip address to the current log file. It outputs the running total of the message statistics to the current log file when the keyword ALL is present.

13.3.66 LOGMSTHREESTATS <address> | ALL

The script processor outputs the MS3 statistics for the specified non-zero address to the current log file. It outputs the running total of the MS3 statistics to the current log file when address is zero or when the keyword ALL is present.

13.3.67 LOGMSTHREESTATS <ip address> | ALL

The script processor outputs the MS3 statistics for the specified valid ip address to the current log file. It outputs the running total of the MS3 statistics to the current log file when the keyword ALL is present.

13.3.68 LOGVMSSTATS <address> | ALL

The script processor outputs the VMS statistics for the specified non-zero address to the current log file. The script processor outputs the running total of the VMS statistics to the current log file when address is zero or when the keyword ALL is present.

13.3.69 LOGVMSSTATS <ip address> | ALL

The script processor outputs the VMS statistics for the specified valid ip address to the current log file. The script processor outputs the running total of the VMS statistics to the current log file when the keyword ALL is present.

13.3.70 LUMINANCE <data1> , <data2> [, <checksum>]

The script processor transmits a Luminance 5-byte protocol packet to address FFh.

13.3.71 LUMINANCE <ip address> , <data1> , <data2> [, TCP | UDP] [, MDFIVE]

The script processor transmits a Luminance ip packet to the specified ip address using specified underlying protocol, and the default protocol type is **UDP**.

13.3.72 LUMINANCEBROADCAST <interval> , <level> [, DIM | BRIGHT]

The script processor configures the automated luminance broadcast to be transmitted at the specified interval (in seconds). To disable luminance broadcast set the interval and level to 0.

13.3.73 MESSAGE <address> , <string> [, LANTERNS]

The script processor transmits a sequence of Multi-Message commands to the specified address to set the message defined by the supplied string. If the keyword “LANTERNS” is present then lanterns are set ON otherwise lanterns are set OFF. Sending MESSAGE to an address not configured as a Message sign type will cause a runtime error.

NOTE: The message string must be in compliance with the following rules:

- Each line must end with an ASCII ETX [#03] character (all lines are required even if blank).
- Do NOT include leading and trailing spaces from each line unless this is intended.
- Blank lines must consist of the [#00#03] sequence unless a space character is present.

For example: if send message “SSL|SSL|” to device EMS3x16, the string should be “SSL#03SSL#03#00#03”.

13.3.74 MESSAGE <ip address> , <string> [, LANTERNS] [, MDFIVE]

The script processor transmits a Multi-Message Complete command to the specified ip address to set the message defined by the supplied string. If the keyword “LANTERNS” is present then lanterns are set ON otherwise lanterns are set OFF. Sending MESSAGE to an address not configured as a Message sign type will cause a runtime error.

NOTE: The message string must be in compliance with the rules defined in 13.3.73 above.

13.3.75**MMC** <address> , <data1> , <data2> [, <checksum>] [?]

The script processor transmits a Multi-Message (Complete) 5-byte protocol packet.

13.3.76**MMC** <ip address> , <data1> , <data2> [, <data3>...<dataNN>] [, **MDFIVE**] [?]

The script processor transmits a Multi-Message (Complete) ip packet.

13.3.77**MMI** <address> , <data1> , <data2> [, <checksum>] [?]

The script processor transmits a Multi-Message (Incomplete) 5-byte protocol packet.

13.3.78**NOSTEP ON | OFF**

The script processor will prevent the operator from single stepping through a script sequence which begins with NOSTEP ON. To enable single stepping call NOSTEP OFF.

This command should be used in time critical sections of a script that should not be single stepped.

13.3.79**NOTICE** <string> , < timeout>

The script processor will display a prompt dialog displaying the specified string. The expression will define the timeout period in seconds. If a value of 0 is used, the dialog will be displayed until closed by the operator. A runtime error will occur if the timeout interval is greater than 24 hours.

NOTE: The notice dialog will NOT stop script execution and should be used for notice purposes only. Use the PROMPT (see section 13.3.85) command to prevent the script from executing whilst the dialog is displayed.

13.3.80**PACKET** <address> , <control> , <data1> , <data2> [, <checksum>] [?]

The script processor transmits a completely user-defined 5-byte protocol packet.

13.3.81**PACKET** <ip address> , <control> , <data1> , <data2> [, **MDFIVE**] [?]

The script processor transmits a completely user-defined ip packet.

13.3.82**PARITY EVEN | MARK | NONE | ODD | SPACE**

The script processor reconfigures the serial driver to use the specified parity.

13.3.83**PRINTLOG**

The script processor prints the current log file using the default printer driver.

Note: No notification will be displayed. It is therefore recommended that the script displays a notice or prompt informing the operator that a log has been printed.

13.3.84**PROGRESS** <caption> , <status> , <progress>

The script processor shows a progress dialog displaying the specified caption, the status string and a progress bar at the position specified by the expression. The dialog will also display an "Abort" button to enable the operator to terminate execution of the current script.

A progress expression which does not evaluate to a value between 0 – 100 will cause a runtime exception.

13.3.85 **PROMPT** <string>, <timeout>

The script processor shows a modal information dialog displaying the specified caption. The dialog may be closed by the operator, but will close automatically after the timeout interval (in seconds) expires. A timeout interval greater than 24 hours will cause a runtime error.

13.3.86 **QUESTION** <caption> , <default> , <timeout>

The script processor shows a confirmation (YES/NO) dialog displaying the specified caption. The dialog may be closed by the operator, but will close automatically after the timeout interval (in seconds) expires. Whilst the dialog is displayed for the timeout interval script execution may continue. To obtain the result use the ANSWER (see section 13.4.1) command expression. A timeout interval greater than 24 hours will cause a runtime error.

13.3.87 **REPLYTIMEOUT** <timeout>

The script processor will set the reply timeout interval.

13.3.88 **REQTESTRES** <address> [, <data1> , <data2> [, <checksum>]] [?]

The script processor transmits a Request Test Result 5-byte protocol packet.

13.3.89 **REQTESTRES** <ip address> [, <data1> , <data2> [, **MDFIVE**]] [?]

The script processor transmits a Request Test Result ip packet.

13.3.90 **RETRY** <expression>

The script processor sets the number of retries to the value of the expression. If the expression is negative the number of retries is set to zero.

13.3.91 **RETURN**

The script processor transfers control back to the last CALL statement. A RETURN used without an associated CALL statement will cause a runtime error.

13.3.92 **SET** <address> , <data1> , <data2> [, <checksum>] [?]

The script processor transmits a Set 5-byte protocol packet.

13.3.93 **SET** <ip address> , <data1> , <data2> [, **MDFIVE**] [?]

The script processor transmits a Set ip packet.

13.3.94 **SETARRAY** <name> , <index> , <value>

The script processor sets the specified dynamic array at index position with the value parameter. A runtime error will occur if the array does not exist.

13.3.95SETASPECT <address> , <mnemonic> [, DIM | BRIGHT]

The script processor transmits a Set 5-byte protocol packet to the specified address to set the Standard Aspect Code (SAC) specified by mnemonic in the <string> token. The Dim/Bright parameter is optionally set by the DIM or BRIGHT token (defaults to DIM). A runtime error is generated if the SAC is undefined for the configured sign type. The script processor then awaits an Acknowledgement response, issues a Status Request and awaits a Status Reply. Sending SETASPECT to an address not configured as a Matrix Indicator will cause a runtime error.

Additional “AMB” and “RED” mnemonics are provided for setting of amber and red lanterns respectively.

13.3.96SETASPECT <ip address> , <mnemonic> [, DIM | BRIGHT] [, MDFIVE]

The script processor transmits a Set ip packet to the valid ip address to set the Standard Aspect Code (SAC) specified by mnemonic in the <string> token. The Dim/Bright parameter is optionally set by the DIM or BRIGHT token (defaults to DIM). A runtime error is generated if the SAC is undefined for the configured sign type. The script processor then awaits an Acknowledgement response, issues a Status Request and awaits a Status Reply. Sending SETASPECT to an address not configured as a Matrix Indicator will cause a runtime error.

Additional “AMB” and “RED” mnemonics are provided for setting of amber and red lanterns respectively.

13.3.97SETDEVICE <address> , <mnemonic> [, <geographic> , <serial>]

The script processor configures the address to the device type specified by the mnemonic. An invalid entry in mnemonic will cause a runtime error.

13.3.98SETDEVICE <ip address> , <mnemonic> [, <geographic> , <serial>]

The script processor configures the valid ip address to the device type specified by the mnemonic. An invalid entry in mnemonic will cause a runtime error.

13.3.99SETFIELD <name> , <default string>

The script processor sets the specified dynamic string field with the default string. A runtime error will occur if the dynamic string field does not exist.

13.3.100 SETVARIABLE or SETVAR or SETCOUNTER <name> , <value>

The script processor sets the specified dynamic variable with the value parameter. A runtime error will occur if the variable does not exist.

13.3.101 SETVMSCIMODE or SETCIEMODE or SETVMSCIETYPE or SETCIETYPE <address> , <cie-type>

The script processor sets the address to the specified VMS CIE sub type (0 = DECODE, 1 = NMCS1, 2 = TRANS). Sending these commands to an address not configured as a VMS sign will cause a runtime error.

13.3.102 **SETVMSCIEMODE or SETCIEMODE or SETVMSCIETYPE or SETCIETYPE** <ip address> , <cie-type>

The script processor sets the valid ip address to specified VMS CIE sub type (0 = DECODE, 1 = NMCS1, 2 = TRANS). Sending these commands to an address not configured as a VMS sign will cause a runtime error.

13.3.103 **SHOWLOG**

The script processor will display the current script log file using the WinTester log viewer.

13.3.104 **STATREP** <address> , <data1> , <data2> [, <checksum>]

The script processor transmits a Status Reply 5-byte protocol packet.

13.3.105 **STATREP** <ip address> , <data1> , <data2> [, **MDFIVE**]

The script processor transmits a Status Reply ip packet.

13.3.106 **STATREQ** <address> [, <data1> , <data2> [, <checksum>]] [?]

The script processor transmits a Status Request 5-byte protocol packet.

13.3.107 **STATREQ** <ip address> [, <data1> , <data2> [, **MDFIVE**]] [?]

The script processor transmits a Status Request ip packet.

13.3.108 **STOPBITS ONESTOPBIT | ONEFIVESTOPBITS | TWOSTOPBITS**

The script processor reconfigures the script driver to use 1, 1.5 or 2 stop bits.

13.3.109 **TEST** <address> , <data1> , <data2> [, <checksum>] [?]

The script processor transmits a Test 5-byte protocol packet.

13.3.110 **TEST** <ip address> , <data1> , <data2> [, **MDFIVE**] [?]

The script processor transmits a Test ip packet.

13.3.111 **TESTASPECT** <address> , <mnemonic>

The script processor transmits a Test 5-byte protocol packet to the specified address to test the Standard Aspect Code (SAC) specified by mnemonic in the < mnemonic > token. A runtime error is generated if the SAC is undefined for the configured sign type. The script processor then awaits an Acknowledgement response, issues a Request Test Result and awaits a Test Result. Sending TESTASPECT to an address not configured as a Matrix Indicator will cause a runtime error.

Additional “AMB” and “RED” mnemonics are provided for testing of amber and red lanterns respectively.

13.3.112 **TESTASPECT** <ip address> , <mnemonic> [, **MDFIVE**]

The script processor transmits a Test ip packet to the specified ip address to test the Standard Aspect Code (SAC) specified by mnemonic in the < mnemonic > token. A runtime error is generated if the SAC is undefined for the configured sign type. The script processor then awaits an Acknowledgement response, issues a Request Test Result and awaits a Test

Result. Sending TESTASPECT to an address not configured as a Matrix Indicator will cause a runtime error.

Additional “AMB” and “RED” mnemonics are provided for testing of amber and red lanterns respectively.

13.3.113 TESTRES <address> , <data1> , <data2> [, <checksum>]

The script processor transmits a Test Result 5-byte protocol packet.

13.3.114 TESTRES <ip address> , <data1> , <data2> [, MDFIVE]

The script processor transmits a Test Result ip packet.

**13.3.115 UPDATEEVENT <description> , EVENTINFO | EVENTINPROGRESS
| EVENTOK | EVENTERROR | EVENTWARNING [, <additional information>]
[, <progress>]**

The script processor changes the state, additional info and progress of the last event. A runtime error will occur if no event exists.

**13.3.116 UPDATEEVENTDETAIL < description > , EVENTINFO |
EVENTINPROGRESS | EVENTOK | EVENTERROR | EVENTWARNING [,
< additional information >] [, < progress >]**

The script processor changes the state, additional info and progress of the last event detail. A runtime error will occur if no event details are present.

13.3.117 WAITMILLI <milliseconds>

The script processor pauses execution of the script for the specified number of milliseconds.

13.3.118 WAITMINS <minutes>

The script processor pauses execution of the script for the specified number of minutes.

13.3.119 WAITSECS <seconds>

The script processor pauses execution of the script for the specified number of seconds.

13.4 Assignment Expressions

The following key identifiers are used as assignment statements.

13.4.1 ANSWER

The ANSWER expression should be used with the QUESTION command (see section 13.3.86). Unlike the CONFIRM expression command (see section 13.4.2) which will stop script execution, the QUESTION command will NOT stop script execution requiring the use of the ANSWER expression command to retrieve the result.

Return Values:

- 1 = Timeout
- 2 = Cancelled
- 3 = Answer not yet available
- 0 = NO
- 1 = YES

13.4.2 CONFIRM (<string>, <expression>, <expression>)

The script processor will display a confirmation dialog with the string as the caption. The first expression will specify the default value and determine whether the YES (=1) or NO (=0) button has focus. The second expression will specify the timeout parameter and determine how long the dialog is displayed (in seconds) before closing. A value of 0 will display the confirmation dialog until it is closed by the operator.

Return Values:

- 1 = Timeout
- 2 = Cancelled
- 0 = NO
- 1 = YES

13.4.3 ELAPSED

ELAPSED token will not take any parameters and return the duration of the time the script has been executing (not idle) in milliseconds.

13.4.4 GETARRAY (<string>, <expression>)

The script processor will return the value in the dynamic array at the position specified by the index. Before the GETARRAY command can be used, the array must first be defined using the DEFINEARRAY command (see section 13.3.16). If the array does not exist or the index used is out of range, a runtime error will occur.

13.4.5 GETSTAT (<address>, <string>)

The script processor will return the value of the dynamic statistic for the specified address. Before the GETSTAT command can be used, the statistic must first be defined using the DEFINESTAT command (see section 13.3.18). If the dynamic statistic does not exist, a runtime error will occur.

13.4.6 **GETSTAT** (<ip address>, <string>)

The script processor will return the value of the dynamic statistic for the specified ip address. Before the GETSTAT command can be used, the statistic must first be defined using the DEFINESTAT command (see section 13.3.18). If the dynamic statistic does not exist, a runtime error will occur.

13.4.7 **GETVARIABLE/ GETVAR/GETCOUNTER** (<string>)

The script processor will return the value of the dynamic variable specified by the string identifier. Before the GETVAR command can be used, the variable must first be defined using the DEFINVARIABLE command (see section 13.3.20). If the dynamic variable does not exist, runtime error will occur.

13.4.8 **GETVERSION/ GETVER/ GETBUILD**

The script processor will return the build number of WinTester which identifies the version of the software.

13.4.9 **GETVMSCIETYPE/ GETCIETYPE/ GETCIEMODE** (<address>)

The script processor will return the VMS CIE type code.

Return Values:

- 1 = Address not configured as VMS CIE type
- 0 = DECODE
- 1 = NMCS1
- 2 = TRANS

13.4.10 **GETVMSCIETYPE/ GETCIETYPE/ GETCIEMODE** (<ip address>)

The script processor will return the VMS CIE type code.

Return Values:

- 1 = IP Address not configured as VMS CIE type
- 0 = DECODE
- 1 = NMCS1
- 2 = TRANS

13.4.11 **GETVMSPROTOCOL** (<address>)

The script processor will return the VMS sign protocol code.

Return Values:

- 1 = Address not configured as VMS type
- 0 = SET Protocol
- 1 = Multi-Message Protocol
- 2 = CIE Protocol (SET)

13.4.12 **GETVMSPROTOCOL** (<ip address>)

The script processor will return the VMS sign protocol code.

Return Values:

- 1 = IP Address not configured as VMS type

- 0 = SET Protocol
- 1 = Multi-Message Protocol
- 2 = CIE Protocol (SET)

13.4.13 INPUT

INPUTDEC (<string> , <expression> , <expression> , <expression> , <expression>) or
INPUTOCT (<string> , <expression> , <expression> , <expression> , <expression>) or
INPUTHEX (<string> , <expression> , <expression> , <expression> , <expression>)

The INPUTDEC / INPUTOCT / INPUTHEX prompt will display an integer input dialog with the string as the caption. The first expression will define the minimum value, the second the maximum and the third the default value to be displayed. If the expression for the minimum value is greater than the maximum, or the default value is out of the min/max range then a runtime error will be generated.

The fourth parameters will specify the timeout parameter and determine how long the dialog is displayed (in seconds) before it will close automatically.

Return Values:

- 1 = Timeout
- 2 = Cancelled

13.4.14 INPUTFIELD (<field> , <default> , <caption> , <expression>)

The script processor will display a string entry dialog for the specified field. The default string will be displayed in the text input control. The expression will specify the timeout parameter and determine how long the dialog is displayed (in seconds) before it will close automatically. A value of 0 will display the input dialog until it is closed by the operator.

Return Values:

- 1 = Timeout
- 2 = Cancelled

13.4.15 ISCONNECTED (<ip address>)

The script processor will return 1 if the specified valid ip address is connected, otherwise 0 is returned.

13.4.16 ISEMI / ISEMS / ISVMS / ISMSTHREE / ISMSFOUR / INTELLIGENTINDICATOR (<address>)

The script processor will return 1 if specified address is configured as a Matrix Indicator (ISEMI), otherwise 0 is returned.

13.4.17 ISEMI / ISEMS / ISVMS / ISMSTHREE / ISMSFOUR / INTELLIGENTINDICATOR (<ip address>)

The script processor will return 1 if specified ip address is configured as a Matrix Indicator (ISEMI), otherwise 0 is returned.

13.4.18 ISSIGNTYPE (<address>, <string>)

The script processor will return 1 if specified address is configured according to device mnemonic.

13.4.19 ISSIGNTYPE (<ip address>, <string>)

The script processor will return 1 if specified ip address is configured according to device mnemonic.

13.4.20 MSGCRC (<string>)

The script processor will return the value of the 12-bit CRC, calculated from the BS4730 string.

13.4.21 RX / TX ([<expression>])

The script processor will return the value of the byte in the RX/TX array at the index position. -1 will be returned if the RX/TX array has not been assigned a value at the specified index. This would normally indicate that a packet has not been transmitted (TX empty) or has not been received (RX empty).

NOTE: Automatic broadcast will not set the RX/TX arrays.

13.5 Strings – Variable and Hexadecimal Character Substitution

Hexadecimal character substitution in strings is specified as follows.

The syntax: # <hex-digit> <hex-digit> *denotes the following*:

The 2-digit number represents, in hexadecimal, the character code of the substitute character.

Examples:

#23	Character 23h	“£”
#41	Character 40h	“A”
#80	Character 80h	Special Character 1 (square)

Variable substitution in strings is specified as follows.

The syntax: “@” [<decimal-digit>+] [“b” | “o” | “h” | “d” | “c”] <upper> *denotes the following*:

The optional field <decimal-digit>+ specifies the number of digits to be output.

The default output notation is decimal.

The optional field “d” (redundantly) specifies decimal output notation.

The optional field “b” specifies binary output notation.

The optional field “o” specifies octal output notation.

The optional field “h” specifies hexadecimal output notation.

The optional field “c” specifies character output notation.

The field <upper> specifies the variable whose value is to be substituted.

To insert an “@” symbol in a string use “@@” – “@@” *denotes “@”*.

Examples: Let @A := 1, @B := 10, @C := 127, @D := 65, @X := 99

@3oA	Variable A, 3 digits, Octal	“001”
@2hB	Variable B, 2 digits, Hexadecimal	“0A”
@8bC	Variable C, 8 digits, Binary	“01111111”
@cD	Variable D, 1 digit, Character	“A”
@ @X=@X	Variable X, Decimal	“@X=99”

13.6 Runtime Exceptions

The following errors will cause runtime exceptions:

Exception Code	Description
101	bad variable
102	progress out of 0 – 100 range
103	cannot wait more than 24 hours
104	label not found
105	script not found
106	cannot return without call statement
107	aspect ____ unknown
108	sign ____ does not support ____ lanterns
109	sign ____ does not support aspect ____
110	address ____ not configured
111	sign type ____ unknown
112	minimum value cannot exceed maximum
113	default value out of range
114	luminance level out of (0-255) range
115	statistic not found
116	address out of range
117	array already exists
118	variable already exists
119	statistic already exists
120	field already exists
121	variable not found
122	array index out of range
123	field not found
124	array not found
125	division by zero
126	invalid baud rate
127	entered value out of range
128	invalid data bits
129	cie mode out of range
130	address ____ not configured as a VMS CIE type
131	maximum array size exceeded
132	event not found
133	sub event not found
134	invalid ip address
135	invalid command for current sign type
136	no ip connection at ____
137	address ____ not configured as a Matrix Indicator
138	ip address ____ not configured as a Matrix Indicator
139	ip address ____ not configured as a VMS CIE type
140	ip address ____ not configured
141	address ____ not configured as a Message Sign
142	ip address ____ not configured as a Message Sign

13.7 Syntax Exceptions

The following errors will cause Syntax exceptions:

Exception Code	Description
201	sub-script not found or failed to load
202	maximum number of scripts exceeded
203	duplicate label
204	illegal token
205	expected ____ found ____
206	unexpected token
207	unknown event state
208	expected 'ON' or 'OFF' found ____
209	byte sequence length too long (63 maximum)
210	expected 'DIM' or 'BRIGHT' found ____
211	label not found
212	unknown parity bits
213	unknown stop bits
214	unexpected end of line
215	statement too long (maximum 255 characters)
216	script empty or failed to open
217	command not valid for current mode
218	keyword not allowed in serial script mode
219	keyword not allowed in ip script mode
220	keyword 'TESTER IP' missing for IP Script mode

14 Common Problems & Fixes / FAQ

14.1 Application Problems

14.1.1 WinTester fails to load

Ensure that the PC conforms to the system requirements described in Section 2.1. If still unable to load, consult an SSL Engineer.

14.1.2 WinTester fails to run properly

Ensure file “WinTester.csv” is present (see section 2.7.2). If problems continue, reinstall WinTester (see Section 2.2).

14.1.3 Unable to select a Device Type / Aspect / Pictogram / Message

Device data is stored in file “WinTester.csv”. Ensure that this file is present and contains valid data. If the file is not found in the WinTester program directory, the following error will be displayed when WinTester is run:



Error Message

Reload the file from the setup disk (see Section 2.2).

14.1.4 Unable to open User Manual

Opening this User Manual from within WinTester requires that Adobe® Acrobat® Reader is installed. Ensure that this application is available on the PC running WinTester.

14.2 Communication Problems

14.2.1 Sign fails to respond

Check the following:

- a) Cabling between WinTester and sign correctly installed.
- b) WinTester is set to the correct comms mode, serial port, baud rate, parity and stop bits. See section 4.5.
- c) WinTester is set to the correct device type. See section 4.5.
- d) WinTester is set to the correct address. If in doubt, use the 'Seek' button on WinTester to find the next valid address of a (responding) device on WinTester's link.

14.2.2 Receiving Short Packets

Depending on your operating system and PC specification it may be necessary to alter the Inter Character Timeout. It is recommended that 6ms be used on Windows NT/XP/Vista and 18ms on all other supported operating systems. Refer to section 4.5 for configuration instructions.

14.2.3 User Interface buttons disabled

Check the following:

- a) WinTester is set to the correct device type. See section 4.5.
- b) A test sequence (e.g. Set All Aspects 5.11) is not in progress.
- c) An address seek is not in progress. See section 5.2.

A. Message Commands and Associated Responses

A.1. HA CF Messages (RS484 operation)

Command	CF	Reply	CF
SET	20	ACKNOWLEDGEMENT	21
STATUS REQUEST	22	STATUS REPLY	23
TEST	24	ACKNOWLEDGEMENT	21
REQUEST TEST RESULT	25	TEST RESULT	26
FLASHER SYNCHRONISATION	27	None – broadcast message	
LUMINANCE BROADCAST	2A	None – broadcast message	
MULTI MESSAGE (INCOMPLETE)	2B	ACKNOWLEDGEMENT	21
MULTI MESSAGE (COMPLETE)	2C	ACKNOWLEDGEMENT	21
DEVICE MODIFICATION REQUEST	30	DEVICE MODIFICATION REPLY	31

A.2. HA CF Messages (IP operation)

Command	CF	Reply	CF
SET	20	ACKNOWLEDGEMENT	21
STATUS REQUEST	22	STATUS REPLY	23
TEST	24	ACKNOWLEDGEMENT	21
REQUEST TEST RESULT*	25	TEST RESULT	26
FLASHER SYNCHRONISATION	27	None – broadcast message	
LUMINANCE BROADCAST	2A	None – broadcast message	
MULTI MESSAGE *	2C	ACKNOWLEDGEMENT	21
DEVICE MODIFICATION REQUEST	30	DEVICE MODIFICATION REPLY	31

*See A.4

A.3. HDLC Messages (Multi-drop)

Command	CI	Reply	CI
UPDATE TIME	10	None – broadcast frame	
REQUEST FAULT REPORT	1B	FAULT REPORT (INCOMPLETE)	1C
		FAULT REPORT (COMPLETE)	1D
		MESSAGE REJECT	3F
FAULT REPORT (INCOMPLETE)	1C	MESSAGE REJECT	3F
FAULT REPORT (COMPLETE)	1D	ACKNOWLEDGEMENT	
		MESSAGE REJECT	3F
STATION STATUS	20	STATION STATUS DATA	21

REQUEST		MESSAGE REJECT	3F
DEVICE SOFTWARE REQUEST (INCOMPLETE)	22	MESSAGE REJECT	3F
DEVICE SOFTWARE REQUEST (COMPLETE)	23	DEVICE SOFTWARE REPLY (INCOMPLETE)	24
		DEVICE SOFTWARE REPLY (COMPLETE)	25
		MESSAGE REJECT	3F
TEST DEVICES (INCOMPLETE)	26	MESSAGE REJECT	3F
TEST DEVICES (COMPLETE)	27	TEST RESULTS (INCOMPLETE)	28
		TEST RESULTS (COMPLETE)	29
		MESSAGE REJECT	3F
RESET	36	ACKNOWLEDGEMENT	
		MESSAGE REJECT	3F
SITE DATA (INCOMPLETE)	38	MESSAGE REJECT	3F
SITE DATA (COMPLETE)	39	ACKNOWLEDGEMENT	
		MESSAGE REJECT	3F
SET DEVICES (INCOMPLETE)	44	MESSAGE REJECT	3F
SET DEVICES (COMPLETE)	40	DEVICE STATUS DATA (INCOMPLETE)	45
		DEVICE STATUS DATA (COMPLETE)	46
		MESSAGE REJECT	3F
REQUEST DEVICE STATUS DATA (INCOMPLETE)	42	MESSAGE REJECT	3F
REQUEST DEVICE STATUS DATA (COMPLETE)	43	DEVICE STATUS DATA (INCOMPLETE)	45
		DEVICE STATUS DATA (COMPLETE)	46
		MESSAGE REJECT	3F
DIM SIGNALS	47	None – broadcast frame	
BRIGHTEN SIGNALS	48	None – broadcast frame	
DEVICE DATA (INCOMPLETE)	49	MESSAGE REJECT	3F
DEVICE DATA (COMPLETE)	4A	DEVICE STATUS DATA (INCOMPLETE)	45
		DEVICE STATUS DATA (COMPLETE)	46
		MESSAGE REJECT	3F

A.4. MCE1126 IP Messages

Data Length Field, N	Protocol Identifier	Application Layer Message	Message Digest	Message Delimiter
4 bytes	2 bytes	N minus 22 bytes	16 bytes	4 bytes

- Data Length Field

The value of the data length field must equal the total length of the protocol identifier, application layer message, message digest and message delimiter fields.

- Protocol Identifier

The protocol identifier for a CF message is 0x8002.

- Application Layer Message

Control Field (CF) Code	Message Data
1 byte	Variable, ≥ 2 bytes

In the current version, most message data is 2 bytes in length. However, CF = 0x2B (Multi Message Incomplete) messages are not valid on IP links, as the entire message is contained in a single CF = 0x2C (Multi Message Complete) message.

The intelligent indicator (EMI94xx) can be requested to send an extended Test Result message (CF = 26h) comprising 2 data bytes for each configured aspect.

- Message Digest

This field is not required and is set to all zeros.

- Message Delimiter

The message delimiter is 0x9B40644F.

B. Device Types

Device types supported by WinTester:

Major Device Type	Sub-types
EMS	2x6, 2x12, 2x16, 3x9, 3x12, 3x14, 3x16, 3x18, 4x12, 4x15, 4x17, 4x18
EMI	407, 409, 421, 427, 429, 442, 443, 444, 445, 446, 447, 9407, 9409, 9421, 491, 492, 493, 494, 495
CMI	450, 450H, 451, 452, 455, 456, 457, 458
AMI	460 460H
VMS	TR2095, DRC, Multi-message, KC, CIE,
MS3*	EMS 2x16 or EMS 3x18 + EMI 442, 443, 444, 445, 446 or 447
MS4*	Message Sign + EMI 442, 443, 444, 445, 446 or 447
EMI94xx	None

* Note: simultaneously supports an EMI and an EMS address

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B	03.02.2006	Phase II & Partial Phase III Version 3-2 Enhancements
C	21.04.2006	Dual Addressing & MS3 Support
D	25.09.2006	LCC (HDLC) Mode
E	15.12.2006	IP Mode
F	02.11.2007	MCE1126B IP Encapsulation
G	28.02.2008	MS4 Support
H	25.03.2008	EMI94xx Support
I	19.06.2008	TCP / IP Extensions
J	17.03.2009	TCP/IP and 94xx Updates
K	25.10.2011	Free Text Removal – Assign ‘Super User’ password
L	30.04.2012	Add running advice to introduction, replace out of date dialog screenshots and descriptions, and implement change requests.

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