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SYSTEM/PROJECT/PRODUCT: ST800 / TC12

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| ST800 Controller TC12 Upload/Download Interface Specification |
|---|

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CONTENTS

| | |
|---|----|
| 1. INTRODUCTION..... | 3 |
| 1.1 Purpose | 3 |
| 1.2 Scope..... | 3 |
| 1.3 Related Documents | 3 |
| 1.4 Glossary..... | 4 |
| 2. GENERAL DESCRIPTION | 5 |
| 2.1 TC12 OTU | 5 |
| 2.2 ST800/TC12 OTU Interface..... | 5 |
| 2.3 Junction Configuration Items | 5 |
| 2.4 Message Format..... | 6 |
| 2.5 Upload / Download Command and Reply Codes..... | 7 |
| 2.5.1 The Download Command | 8 |
| 2.5.2 The Upload Command | 8 |
| 2.5.3 The Defaults Command | 8 |
| 2.5.4 The Get Type Command | 8 |
| 2.6 Upload/Download Access Protection | 9 |
| 2.6.1 Controller Access Levels | 9 |
| 2.6.2 Access Protection | 9 |
| 2.6.3 UPDL Access to Level-3 Data | 10 |
| 2.7 Protocol Size Limits | 12 |
| 2.8 Uploading the IC4 Configuration Answer File | 13 |
| 2.9 Data Groups and Items | 14 |
| 2.9.1 Upload / Download Groups – Introduction..... | 14 |
| 2.9.2 List of Upload / Download Items | 15 |
| 2.9.3 Contents of Each Upload / Download Group..... | 22 |
| 3. ST800/TC12 Upload/Download Interface Tests | 27 |
| 3.1 Upload Each Group | 27 |
| 3.2 Download Each Group with Valid Data | 27 |
| 3.3 Download Group with Out of Range Values or Access Failure | 27 |
| 3.4 Download Group 501 with too much Data for an Item | 28 |
| 3.5 Upload of Configuration Answer File..... | 28 |
| 3.6 Remote Handset Commands | 29 |
| LAST PAGE..... | 29 |

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the modifications to the TC12 upload / download protocol to support the new ST800 traffic controller. It will be periodically updated as new items are added to the ST800.

The ST800 has been enhanced from the T400 in the following main areas:

- Expansion to 32 phases, 32 stages and 8 parallel stage streams
- Enhanced CLF signal plans (group times as offsets)
- 8 timesets
- IC4 configuration answer file stored in controller
- On street configuration by mnemonics
- Definable switch on and switch off sequences
- Part-time working on stream basis
- Historic rolling log with time and date
- Independent time switch events
- High speed handset port
- 8 hurry calls
- 8 U/D units (previously 6)
- 120 phase delays (previously 60)
- Translation of PLM source code to 'C'
- Porting to a new hardware architecture, based on the Motorola 68340 processor with a phase bus (secondary) processor
- Integration of Lamp Monitoring (including Red Lamp Monitoring)

1.2 Scope

This document addresses the enhancement of the TC12 upload / download protocol to support the new ST800 traffic controller. It is also kept up-to-date as the upload / download facility is developed further on the ST800.

The design of the ST800 processor software is detailed in the SWITCH documents listed in section 1.3.

The TC12 upload / download protocol is detailed in ref 1.3f).

The upload / download facility can now also be used through the handset port of the ST800 Controller and thus details specific to that implementation are detailed in ref 1.3g).

1.3 Related Documents

- a) 667/SA/20202/000 - T400 Software System Design Document
- b) 667/QP/27000/000 - SWITCH Project Statement, issue 1
- c) 667/UW/27000/000 - SWITCH Controller SDS
- d) 667/YA/27140/000 - SWITCH Controller Main Processor SMDS
- e) 667/SA/19561/000 - SDD for UTC [T400] Upload/Download Facility
- f) 667/SA/43100/000 - SDD for TC12
- g) 667/YA/26567/001 - ST800-OMU Serial Link SMDS

1.4 **Glossary**

| | |
|--------------|---|
| DoT | Department of Transport |
| IMU | Integral Monitoring Unit (interfacing to London's OMU transmission system) |
| LMU | Lamp Monitoring Unit |
| OMU | Outstation Monitoring Unit for remote monitoring of controllers |
| OTU | Outstation Transmission Unit for UTC systems |
| PCB | Printed Circuit Board |
| RLM | Red Lamp Monitoring |
| SDD | System Design Document |
| SDS | System Design Specification |
| Signal Group | UK Phase |
| SMDS | Software Module Design Document |
| ST800 | Marketing code for the new STCL controller product (resulting from the SWITCH joint Munich/Poole development project) |
| STCL | Siemens Traffic Controls Ltd., Poole |
| SWITCH | Siemens World-wide Intelligent Traffic Controller with easy Handling |
| T400 | Original STCL controller product |
| TC12 | STCL data transmission format for UTC (1200 baud) |
| UTC | Urban Traffic Control |
| UPDL | TC12 Upload DownLoad |

2. GENERAL DESCRIPTION

2.1 TC12 OTU

The TC12 integral OTU card is used on the new ST800 controller. The number of control and reply words supported by the integral OTU remains unchanged from the T400. That is 3 control words and 14 reply words. However, the controller will be modified to allow all 14 reply words to be written to by the controller (rather than just the first 4 which is all the T400 allowed).

Each of these 24 control bits can force any one of the controller's 32 stages and any reply bit can be configured to indicate stage confirms for any of the controller's 32 stages.

The TC12 upload/download is supported on the new controller and as far as possible compatibility is maintained with T400 upload/download. However, changes are unavoidable because of the change to 32 phases and stages.

Note that changes to the UPDL system will require changes to the UTC Instation software and the upload/download editor that runs on a PC. Details of the editor changes are not included in this specification.

2.2 ST800/TC12 OTU Interface

Although the number of phases has increased, since the controller itself will perform all the lamp monitoring functions, the lamp monitor information passed between the controller and the ancillary processor is simply redundant and does not need increasing in size.

See the following section for a list of the TC12 upload/download groups and the data items each contains.

With the increased number of phase etc, some of the TC12 upload/download groups now exceed the 1k data limit of the original system. By changing the OTU PLD and firmware, it is possible to pass more than 3½k between the controller and the OTU. The design of the T400 system ensured that 4k of shared RAM was reserved for an integral MOVA card. This space is not required and so can be utilised to give a total of over 3½k for upload/download (requires the OTU PLD to be modified to decode 8k from 5000_H to 7000_H).

This change to the PLD should be 'backwards compatible'; i.e. the existing integral OTU systems should function as before if fitted with the new PLD. Therefore, the two UPDL PLD's (667/1/12393/104 and /105) can simply be up-issued.

2.3 Junction Configuration Items

New item identity numbers have been allocated for junction configuration data from 512 onwards (not detailed in this specification). These items cannot be accessed by the current TC12 protocol, since the item number field is limited to 511 maximum. However, they are used by the IC4 configuration data loading process.

2.4 Message Format

An upload / download message normally¹ contains a header which details the number of bytes in the message, the command or reply code and a 'return address'. After this header, there may be one or more 'items' and following each item may be a number of data bytes.

Note that any upload/download message may have additional information attached in front of (and possibly after) the message structure shown below in order to transfer the messages securely through the transmission system. Details of how upload/download messages are transferred through any transmission system are outside the scope of this document and are defined in the documentation for the transmission system in question, see section 1.3.

The command and reply codes are described in section 2.5.

The 'return address' is a two-byte field that the originator can set-up in the request, which will appear in the reply message allowing it to be sent to the correct sub-system for example.

For each item, a unique item identity number is specified and the number of data bytes, the 'length' field. The 'offset' field is usually zero, but can be used is present to access part of the data rather than starting at the beginning of the item.

The example below shows a message that requests the upload of two Controller data items and the upload reply shows the same two data items now with the data attached.

| Upload Request Message | | | Upload Reply Message | | |
|------------------------|-------------------|---------|----------------------|-------------------|---------|
| Field Name | Data | Size | Field Name | Data | Size |
| UPDL Length | 15 | 2 Bytes | UPDL Length | 17 | 2 Bytes |
| UPDL Command | 2 | 1 Byte | UPDL Reply | 17 | 1 Byte |
| UPDL Ret/Addr | XXXX | 2 Bytes | UPDL Ret/Addr | XXXX | 2 Bytes |
| Item Identity | 87 | 2 Bytes | Item Identity | 87 | 2 Bytes |
| Data Offset | 0000 _H | 2 Bytes | Data Offset | 0000 _H | 2 Bytes |
| Data Length | 0001 _H | 2 Bytes | Data Length | 0001 _H | 2 Bytes |
| Item Identity | 88 | 2 Bytes | Data Bytes | 5 | 1 Byte |
| Data Offset | 0000 _H | 2 Bytes | Item Identity | 88 | 2 Bytes |
| Data Length | 0001 _H | 2 Bytes | Data Offset | 0000 _H | 2 Bytes |
| UPDL Sumcheck | ???? _H | 2 Bytes | Data Length | 0001 _H | 2 Bytes |
| | | | Data Bytes | 10 | 1 Byte |
| | | | UPDL Sumcheck | ???? _H | 2 Bytes |

The example below shows a message that downloads two Controller data items and the reply:

| Download Request Message | | | Download Reply Message | | |
|--------------------------|-------------------|---------|------------------------|-------------------|---------|
| Field Name | Data | Size | Field Name | Data | Size |
| UPDL Length | 17 | 2 Bytes | UPDL Length | 3 | 2 Bytes |
| UPDL Command | 1 | 1 Byte | UPDL Reply | 11 | 1 Byte |
| UPDL Ret/Addr | XXXX | 2 Bytes | UPDL Ret/Addr | XXXX | 2 Bytes |
| Item Identity | 87 | 2 Bytes | UPDL Sumcheck | ???? _H | 2 Bytes |
| Data Offset | 0000 _H | 2 Bytes | | | |
| Data Length | 0001 _H | 2 Bytes | | | |
| Data Bytes | 6 | 1 Byte | | | |
| Item Identity | 88 | 2 Bytes | | | |
| Data Offset | 0000 _H | 2 Bytes | | | |
| Data Length | 0001 _H | 2 Bytes | | | |
| Data Bytes | 11 | 1 Byte | | | |
| UPDL Sumcheck | ???? _H | 2 Bytes | | | |

¹ One notable exception is the format of upload / download messages on the TC12 modem lines. The format of these messages is described in ref 1.3f).

2.5 Upload / Download Command and Reply Codes

The following is a list of all the UPDL Command and Reply codes currently defined:

- 1 DOWNLOAD.....Command sent to the Controller to download the data held in the item(s) in to the Controller's memory (see 2.5.1).
- 2 UPLOAD.....Command sent to the Controller to upload the current values of the data held in the Controller's memory for the item(s) in the request (see 2.5.2).
- 3 DEFAULTS.....Command sent to the Controller to upload the default values of item(s) in the request (see 2.5.3).
- 4 GET_TYPE.....Command sent to the Controller to upload the 16-bit 'type' description(s) of the data item(s) in the request (see 2.5.4).
- 5 RANGE CHECK.....(Used internally only)
- 6.....(Currently not used)
- 7.....(Currently not used)
- 8.....(Currently not used)
- 9 CRC BUSY RETRY.....(Used internally only)
- 10 CONTROLLER FAILED.....Not returned by the Controller but may be used by the originating equipment if the Controller fails to acknowledge UPDL messages, e.g. if the link fails.
- 11 DATA ACCEPTED.....This code is used when the download request has been accepted and the data successfully loaded into the Controller's memory.
- 12 CHECKSUM ERROR.....Returned by the Controller when the UPDL Request Telegram contains a sumcheck error or is the wrong length.
- 13 CHECKSUM ERROR ORIG..Not returned by the Controller but may be used by the originating equipment if the UPDL Reply Telegram from the Controller contains a sumcheck error or is the wrong length.
- 14 RANGE ERROR.....Returned by the Controller if the download request attempts to change the contents of an item to a value outside its allowed limits.
- 15 TOO MUCH DATA.....Returned by the Controller if the download request attempts to change too many values in an item.
- 16 READ ONLY ITEM.....Returned by the Controller if the download request attempts to change the contents of an item deemed to be read only (or level-3 access but access has not been granted).
- 17 UPLOAD REPLY.....This code is used to return the uploaded data after an upload request (for the actual data, default data or type information).
- 18 UNKNOWN ITEM ID.....Returned by the Controller if the download request contains an item identity not known by the Controller.
- 19 UNKNOWN COMMAND.....Returned by the Controller if the request contains a Command code not known by the Controller.
- 20 INVALID GROUP ID.....Not used since the Controller would assume that the value is an item identity and not a group identity and thus report "UNKNOWN ITEM ID" instead.

2.5.1 The Download Command

The DOWNLOAD command allows the current values of items in the Controller to be modified – the data in the message following each item is loaded in to the memory of the Controller. All the items in the message are checked before any items are loaded into the Controller's memory so all or none of the items are modified to prevent inconsistencies in the data held in the controller.

2.5.2 The Upload Command

The UPLOAD command allows the current values of items in the Controller to be examined – the data currently in the Controller's memory is 'uploaded' for each item in the request.

Any item in the upload request can request zero bytes of data, i.e. the length field is set to zero. In this case, the Controller will upload the configured number of data bytes and set the length field in the upload reply accordingly. For example, only four phase minimum green times will be uploaded from a Controller configured with four phases.

2.5.3 The Defaults Command

The DEFAULTS command allows the default values of the items to be examined, rather than the current values. This allows any equipment to determine whether or not the data within an item has been modified from its default, e.g. by a handset command or a download.

The format of the request and the reply is the same as a normal upload, including the ability to specify zero in the length field. It is just that the data within the reply is the default values rather than the current values. Note however that at present, the Controller will only accept a 'DEFAULTS' upload if the requested data offset field is set to zero, otherwise a 'TOO MUCH DATA' error code is returned.

2.5.4 The Get Type Command

The GET TYPE command allows the 'type' information for items to be examined, rather than the current or default values. The reply for each item always contains two bytes, regardless of the number of bytes requested (including zero). The two bytes upload for each item form the 16-bit type field for the item. The significance of each bit is detailed below. Those in grey are unlikely to be required outside of the Controller.

| Bit | Value | Name | Description |
|-----|--------|--------|---|
| 0 | 0x0001 | NC255 | The range check is not applied to value 255 |
| 1 | 0x0002 | LV3 | Level 3 item |
| 2 | 0x0004 | CHK | Complex range checking |
| 3 | 0x0008 | BIT | Bit manipulation required so two bytes are sent for every data byte, with the second byte of the pair forming a mask to identify which bits in the data byte are significant. |
| 4 | 0x0010 | ROY | Read-only item |
| 5 | 0x0020 | CFGTAB | Range limits table required |
| 6 | 0x0040 | JNC | Junction access item (the item is effectively read-only except during a complete configuration load from IC4). |
| 7 | 0x0080 | CRC | CRC protected item |
| 8 | 0x0100 | BITS16 | The item accesses data that is 16-bits wide, not 8-bits |
| 9 | 0x0200 | BITS32 | The item accesses data that is 32-bits wide, not 8-bits |
| 10 | 0x0400 | - | Currently unused |
| 11 | 0x0800 | - | Currently unused |
| 12 | 0x1000 | - | Currently unused |
| 13 | 0x2000 | - | Currently unused |

| Bit | Value | Name | Description |
|-----|--------|------|------------------|
| 14 | 0x4000 | - | Currently unused |
| 15 | 0x8000 | - | Currently unused |

2.6 Upload/Download Access Protection

2.6.1 Controller Access Levels

Since this facility allows timings to be modified, protecting access to these timings needs to be considered. The configuration data of a Controller falls into several categories:

- Open Access – A few items such as the PME code, the handset display width and command to start the enhanced serial link.
- Level-2 Data – Items such as vehicle maximum green timings, timetable entries and CLF plans. The UK Highways Authority allows these to be modified remotely.
- Level-3 Data – Items such as minimum green, intergreen and pedestrian clearance timings. These should not be modified unless someone is present at the Controller. No such restriction may apply to controllers for export.
- Junction Data – Items normally considered as ‘fixed in the config PROM’, such as the number of phases and stages and their relationship.

2.6.2 Access Protection

For each of the products and systems that can modify the configuration data within a Controller, the table below summarises the access protection implemented to prevent data of different access levels being modified:

| | | Open Access Values | Level-2 Timings | Level-3 Timings | Junction Data |
|------------------|----------------------|--------------------|--------------------|-----------------------------------|------------------------------|
| Existing Systems | Local Handset | No Restrictions | PME Code | Pushbutton | No Access¹ |
| | 3U And 5U OMU R/H | No Restrictions | PME Code | No Access² | No Access |
| | TfL IMU R/H | No Restrictions | PME Code | No Access² | No Access |
| | TC12 OTU R/H | No Restrictions | PME Code | No Access² | No Access |
| | TC12 OTU UPDL | No Restrictions | No Restrictions | Config Flag (Export Only) | No Access |
| | TfL IMU UPDL | No Restrictions | No Restrictions | No Access | No Access |
| | IC4 Config Load | N/A | Signals Off | Signals Off | Signals Off |
| New | New 3U Products R/H | No Restrictions | PME Code | No Access² | No Access |
| | New 3U Products UPDL | No Restrictions | No Restrictions | Config Flag (Export Only) | No Access |
| | New IC4 Timing Load | No Restrictions | No Restrictions | Pushbutton and Access Code | No Access |

Notes:

- 1) To allow simple junctions to be configured, the on-street configuration facility (on export Controller's only) does allow some Junction Data to be changed using the handset while the signals are switched off.
- 2) See note in the “3U And 5U OMU Remote Handset” description below.

Details of the Access Protection applied to each product and system:

- Local Handset – Normal handset command access to the Controller via the RS232 port on the processor card. Access to Level-3 Timings requires a pushbutton on the processor card to be pressed preventing these items being changed unless someone is at the Controller.

- 3U And 5U OMU Remote Handset – OMU's provides remote handset access to the Controller through the local handset port. Note that the Controller is unaware of equipment using the local handset port to provide a remote handset connection. Access to Level-3 Timings still requires the pushbutton to be pressed so remote access to Level-3 Timings is normally prevented since no one is present at the Controller to press the button.
- TfL IMU Remote Handset – The TfL IMU allows remote handset access to the Controller. The facility is similar to the above even though the IMU does not use the local handset port directly.
- TC12 OTU Remote Handset – The TC12 UTC Integral OTU allows remote handset access to the Controller. The facility is similar to the above even though the OTU does not use the local handset port directly.
- TC12 OTU UPDL – The TC12 UTC Integral OTU also allows upload/download access to timings within the Controller. Access to level-3 is usually prohibited, but can be enabled in an export Controller configuration.
- TfL IMU UPDL – The TfL IMU also allows upload/download access to timings within the Controller. Access to level-3 is prohibited since the Controller is not an export configuration.
- IC4 Config Load – The existing system of downloading a complete configuration in to the Controller through its handset port from a PC running IC4 requires switching the signals off (as well as entering the PME code and pressing the pushbutton).
- New 3U Products Remote Handset – Any product on the 3U platform (including new products such as UTMC and TCAM) will use the handset port for remote handset access as described for the existing 3U OMU above.
- New 3U Products Upload/Download – Any new product on the 3U platform that requires UPDL (such as UTMC and TCAM) will use UPDL messages in the enhanced serial link. Access to level-3 timings will be allowed only if the Controller's export configuration allows (as in "TC12 OTU UPDL").
- IC4 Timing Load – The new system proposed in this section allows IC4 to modify all timings, including level-3 items, but not junction data. The operator must press the Level-3 Pushbutton and IC4 must send an access code with every download request to the Controller (see below).

2.6.3 UPDL Access to Level-3 Data

This section details how the new IC4 Timing Load facility is given access to modify level-3 data items, while level-3 access is not granted to any other system that may use the download feature of the enhanced serial link.

To show that the operator is actually present at the Controller, the pushbutton on the Controller's processor card must be depressed no more than 30 minutes (default config value) before the download is attempted. Since a download request can be sent while the operator at the Controller is using the handset, that operator may press the pushbutton to gain level-3 access. This must not give the download request access to level-3 data so the additional 'lock' of an access code is required.

Note that the same problem does not affect the remote handset since if the operator is using the local handset to communicate with the Controller then an operator cannot use the remote handset. One always 'locks-out' the other.

Every download request that wishes to change level-3 data must include an additional item {Item=871, Offset=0, Length=1, Data=33} at the beginning of the message to enable level-3 access.

Thus only downloads that contain the correct access code and occur within 30 minutes of the operator pressing the level-3 pushbutton will be allowed to modify level-3 data. Note:

Downloads will still be able to modify level-3 items on an export Controller if the Config Flag is set as for "TC12 OTU UPDL".

2.7 Protocol Size Limits

With the increase in configuration data, some groups exceed the 1024 bytes per group limit of the original system. Therefore, the maximum size of a TC12 UPDL application message has been increased to 3800 bytes (this size to include data item headers).

The maximum number of bytes that can be specified for an item is 1023. Therefore, the 'offset' field is used to split large items (1024 bytes or more in length) into several parts. The message fields for a typical item are defined below:

| Field | Size | Range | Example |
|---------------|-----------|-----------|-----------------------|
| Item identity | 9 bits | 0 to 511 | "41" (Minimum Greens) |
| Offset | 13 bits | 0 to 8191 | "0" |
| Length | 10 bits | 0 to 1023 | "32" |
| Raw Data | 'n' bytes | - | XX, XX etc. |

For a large item, the application message would contain several entries to cover each segment of the item. For example, the 1024 intergreen times (32 x 32) would be transferred as follows:

| | |
|---------------|---|
| Item identity | "418" (intergreens) |
| Offset | "0" |
| Length | "512" |
| Raw Data | XX, XX etc. - first 512 byte segment of intergreen timings |
| Item identity | "418" |
| Offset | "512" |
| Length | "512" |
| Raw Data | XX, XX etc. - the second 512 byte segment of intergreen timings |

The design of the Instation and outstation systems should correctly handle items with zero length. This simplifies the operation by allowing all the possible entries for an item to be present, even if some are not required and therefore set to zero length. For example, the intergreens on a 4-phase controller would only occupy 128 bytes (4 x 32) and so would be transferred as follows:

| | |
|---------------|---|
| Item identity | "418" (intergreens) |
| Offset | "0" |
| Length | "128" |
| Raw Data | XX, XX etc. - 128 bytes of intergreen timings |
| Item identity | "418" |
| Offset | "512" |
| Length | "0" |
| Raw Data | <None> |

Note that the OTU/ST800 should also be designed to simply accept download items with zero length - so that downloads could have the same structure as uploads.

2.8 Uploading the IC4 Configuration Answer File

Group numbers 480 to 499 allow the Instation to upload the IC4 configuration answer file from the ST800. This file is held in a compressed format. It contains all the IC4 screen information entered by the user when configuring the junction.

Because of the group size limits detailed in section 2.7, the answer file cannot be uploaded as a single group. Each of these 20 new group numbers provides access to a 3000-byte part of the answer file data. When the Instation requests the data for a particular group number, the controller returns the same number as the item identity (to avoid having to allocate 20 new item numbers, one for each group). In addition, group 480 also returns item 443, the checksum covering the configuration data.

The Instation can request each group number in turn. Where there is no data in a group, because the end of file has been passed, then the controller returns a data length of zero.

Instation request of group 480:

| | |
|---------------|-----|
| Item identity | 480 |
| Offset | 0 |
| Length | 0 |

Controller reply:

| | |
|---------------|--|
| Item identity | 443 (answer file checksum ID) |
| Offset | 0 |
| Length | 4 |
| Raw Data | XX, XX, XX, XX - 4 bytes of checksum |
| Item identity | 480 (answer file data ID) |
| Offset | 0 |
| Length | 1000 |
| Raw Data | XX, XX...etc - 1000 bytes of answer file |
| Item identity | 480 |
| Offset | 1000 |
| Length | 1000 |
| Raw Data | XX, XX...etc - 1000 bytes of answer file |
| Item identity | 480 |
| Offset | 2000 |
| Length | 1000 |
| Raw Data | XX, XX...etc - 1000 bytes of answer file |

Instation request of group 481:

| | |
|---------------|-----|
| Item identity | 481 |
| Offset | 0 |
| Length | 0 |

Controller reply:

| | |
|---------------|--|
| Item identity | 481 (answer file data ID) |
| Offset | 0 |
| Length | 1000 |
| Raw Data | XX, XX...etc - 1000 bytes of answer file |
| Item identity | 481 |
| Offset | 1000 |
| Length | 1000 |
| Raw Data | XX, XX...etc - 1000 bytes of answer file |
| Item identity | 481 |
| Offset | 2000 |
| Length | 1000 |
| Raw Data | XX, XX...etc - 1000 bytes of answer file |

This is repeated for the reset of the group numbers (or until the controller reply contains zero data length).

The Instation should concatenate the IC4 configuration answer file data received from the controller and store the resultant file, with file extension “.8UL”, in binary form suitable for access by the IC4 Configurator software, as shown below:

| Field | Size (bytes) | Content |
|-------------------|--------------|---------------------------------------|
| IC4 Item identity | 2 | 836 (answer file data ID) |
| Offset | 2 | 0 |
| Length | 2 | N |
| Raw Data | N | XX, XX...etc - N bytes of answer file |
| IC4 Item identity | 2 | 837 (answer file checksum ID) |
| Offset | 2 | 0 |
| Length | 2 | 4 |
| Raw Data | 4 | XX, XX, XX, XX - 4 bytes of checksum |

The length of the answer file data is obtained by adding the lengths of each individual part of the data received from the controller.

2.9 Data Groups and Items

2.9.1 Upload / Download Groups – Introduction

The data groups that can be requested by the Instation are listed below. Only those items that are assigned to these group numbers should be uploaded or downloaded by TC12, when communicating with the ST800.

Note that the new groups 508 and 509 are available on the ST800 family of Controller's only (this includes the ST700). They have not been implemented on the T400 controller. Also, see the note on group 509 in section 2.9.3.

| Group | Use |
|------------|---|
| 480 to 499 | Configuration Answer File Groups |
| 500 | General Data Group |
| 501 | Intersection Safety Timings Group |
| 502 | Bus Priority Group |
| 503 | Monitoring Data Group |
| 504 | Maintenance Data Group |
| 505 | Cable-less Linking Facility Group |
| 506 | Master Time Clock Group |
| 507 | Pelican Data Group |
| 508 | Historic Rolling Fault Log (ST800 only) |
| 509 | Additional Handset Data (ST800 only) |

Thus, to upload all the handset modifiable data from an ST800 or ST700 Controller, IC4 only needs to request the groups 500-503, 505-507 and group 509. It can ignore groups 504 and 508 since these only contain the fault logs and not 'timing' data.

2.9.2 List of Upload / Download Items

In the following tables, item numbers with a strike through e.g. '329' are supported on the T400 OTU upload/download but not on the new controller. This is because the format of the data has changed and new item numbers are required to allow the different formats to be handled in a controlled way. Those item numbers marked with a '↔' have been moved from group 501 to group 500 in order to reduce the size of group 501.

The upload/download items for the ST800 (for T400 items see reference 1.3e) are detailed in the following table in item number order. The table also shows the 'Group' in which the item is uploaded (if any), the maximum length and any notes (NB). The explanation of these notes is at the end of the table.

It also shows the handset command (if any) associated with the same item, and their access level (A). Note that where the access level is shown in **inverse**, it shows the access level of the item, which is different to the access level applied to the handset command. For completeness, the remaining level 2 and level 3 handset commands that do not have an associated UPDL item are listed at the end.

Changes to items and groups between this and the previous issue of this document are **highlighted**.

| Item | Group | Len' | NB | Description | H/set | A |
|-------------|-------|------|-----|---|----------------|--------------|
| 1 to 34 | - | 0 | | Unused | | |
| 35 | 507 | 8 | ★ | Local Link Delay Time | LKD | 2 |
| 36 | 507 | 8 | ★ | Local Link Window Time | LKW | 2 |
| 37 | 507 | 8 | ★ | Local Link Override Time | LKO | 2 |
| 38 | 507 | 8 | ★ | Local Link Active Fail Time | LKA | 2 |
| 39 | 507 | 8 | ★ | Local Link Inactive Fail Time | LKI | 2 |
| 40 | BIT | 1 | | Local Link Override Mode (Binary) - use 376 | LKM | 2 |
| 41 | 501 | 32 | ★ | Min Green | MIN | 3 |
| 42 | - | 0 | | Unused | | |
| 43 | 500 | 32 | ★/↔ | Extension Times | EXT | 2 |
| 44 | - | 0 | | Unused | | |
| 45 | - | 0 | | Unused | | |
| 46 | 501 | 32 | ★ | Ped Blackout | PBT | 3 |
| 47 | 500 | 96 | ★ | Conditioning Timers | CDT | 2 |
| 48 | - | 0 | | Was intergreen times on T400, use 418 | IGN | 3 |
| 49 | - | 0 | | Unused | | |
| 50 | 501 | 32 | ★ | Extra Clearance Time (SDE/SA) | SCT | 3 |
| 51 | 501 | 32 | ★ | Minimum Green Thresholds | MTV | R |
| 52 | - | 0 | | Unused | | |
| 53 | - | 0 | | Unused | | |
| 54 | 501 | 1 | | Starting Intergreen | IGS | 3 |
| 55 | 500 | 32 | ★ | Ped Window | PWN | 2 |
| 56 | 500 | 32 | ★ | FT Periods | FIX | 2 |
| 57 to 64 | - | 0 | | Unused | | |
| 65 | - | 0 | | Was intergreen thresholds on T400, use 419 | ITV | R |
| 66 to 70 | - | 0 | | Unused | | |
| 71 | - | 32 | | (Pelican Vehicle) Min. Green (IMU Only) - use 41 | MIN | R |
| 72 | - | 0 | | Was T400 Pelican Veh Ext. Times - use 43 | VAE | 2 |
| 73 | - | 0 | | Unused | | |
| 74 | 507 | 40 | ★ | Pedestrian All Red Periods (5 Per Pelican) | PAR | 3 |
| 75 | - | 0 | | (Pelican Pedestrian) Green Time (IMU Only) - use 41 | MIN | R |
| 76 | - | 0 | | Was Pelican I/G Times on T400 - use 436 | PIT | 3 |

| Item Group | Len' | NB | Description | H/set | A |
|---------------|------|------|--|----------------|--------------|
| 77 to 80 | - | 0 | Unused | | |
| 81 | 500 | 8 | ★ Hurry Delay | DHC | 2 |
| 82 | 500 | 8 | ★ Hurry Hold | HHC | 2 |
| 83 | 500 | 8 | ★ Hurry Prevent | PHC | 2 |
| 84 to 86 | - | 0 | Unused | | |
| 87 | 500 | 8 | Call/Cancel Call Delay Time | DCL | 2 |
| 88 | 500 | 8 | Call/Cancel Cancel Delay Time | DCN | 2 |
| 89 to 90 | - | 0 | Unused | | |
| 91 | 502 | 32 | Bus Priority Extensions | PVE | 2 |
| 92 | 502 | 32 | Bus Priority Max Periods | PVM | 2 |
| 93 | 502 | 32 | Bus Priority Inhibits | PVI | 2 |
| 94 | 502 | 32 | Priority Demands | PDE | 2 |
| 95 | 502 | 32 | Bus Priority Revertive Demands | PRE | 2 |
| 96 | 502 | 32 | Bus Priority Revertive Inhibits | PRI | 2 |
| 97 | - | 0 | ⊛ Was allowed demands on T400 - use 420 | PWA | 2 |
| 98 | - | 0 | ⊛ Was enforced demands on T400 - use 421 | PWE | 2 |
| 99 | 502 | 1024 | ★ Bus Priority Compensation | PCA... | 2 |
| 100 | - | 0 | Unused | | |
| 101 | 502 | 1 | Bus Priority Unit Type | PUT | R |
| 402 | - | 0 | ⊛ Was priority unit phase on T400 - use 383 | PUP | R |
| 103 to 110 | - | 0 | Unused | | |
| 111 | 506 | 384 | Master Time Clock Time Switch Data | TSW TTB | 2 |
| 112 to 115 | - | 0 | Unused | | |
| 116 | M/O | 1 | Requested Plan | RPL | 2 |
| 447 | - | 2 | Was Time Switch Override (bit field) - now use 339 | SWS | 2 |
| 118 to 120 | - | 0 | Unused | | |
| 424 | - | 0 | Was CLF group times on T400 - use 325 | PLT | 2 |
| 122 to 126 | - | 0 | Unused | | |
| 127 | 505 | 32 | P Group Offset Times | OFF | 2 |
| 428 | - | 0 | Was Re-Entry Switch on T400 | PRS | 2 |
| 429 | - | 0 | Was Re-entry Delay on T400 | PRD | 2 |
| 130 to 165 | - | 0 | Unused | | |
| 166 | 503 | 1 | Ped Movement Option | PMV | 2 |
| 167 | BIT | 12 | DFM Enable/Disable (bit field - also see 373) | DFS | 2 |
| 168 to 172 | - | 0 | Unused | | |
| 173 | M/O | 1 | Accept detector fault | ADF | 2 |
| 174 | 503 | 1 | ● Manual Mode Disable | MND | 2 |
| 175 | 503 | 1 | DFM Time - Not Used On ST800/ST700 | DFD | 2 |
| 176 | 509 | 1 | Engineering display base | BAS | 2 |
| 177 | 504 | 64 | Fault Flags | FLF | R |
| 178 | 504 | 128 | Fault Data | FLD | R |
| 179 to 181 | - | 0 | Unused | | |
| 182 | IMU | 8 | TCSU/TfL IMU Controller password | --- | 2 |
| 183 to 207 | - | 0 | Unused | | |
| 208 | 503 | 32 | DFM Active Time | DSA | 2 |

| Item | Group | Len' | NB | Description | H/set | A |
|---------------|-------|------|-----------|--|-------------------|--------------|
| 209 | 503 | 32 | | DFM Inactive Time | DSI | 2 |
| 210 to 255 | - | 0 | | Unused | | |
| 256 | M/O | 7 | | Set RTC time | STM | 2 |
| 257 | M/O | 1 | | Set RTC week number | WEK | 2 |
| 258 | 506 | 1 | | BST Advance (Week Number) | BSA | 2 |
| 259 | 506 | 1 | | BST Retard (Week Number) | BSR | 2 |
| 260 | 500 | 32 | ★/↔ | Max Green - Time set A | MAX | 2 |
| 261 | 500 | 32 | ★/↔ | Max Green - Time set B | MBX | 2 |
| 262 | 500 | 32 | ★/↔ | Max Green - Time set C | MCX | 2 |
| 263 | 500 | 32 | ★/↔ | Max Green - Time set D | MDX | 2 |
| 264 | - | 0 | | Was Ped VA Max A on T400 - use 260 | VAX | 2 |
| 265 | - | 0 | | Was Ped VA Max B on T400 - use 261 | VBX | 2 |
| 266 | - | 0 | | Was Ped VA Max C on T400 - use 262 | VCX | 2 |
| 267 | - | 0 | | Was Ped VA Max D on T400 - use 263 | VDX | 2 |
| 268 | - | 0 | | Was Fixed Vehicle Period A - use 390 | FVA | 2 |
| 269 | - | 0 | | Was Fixed Vehicle Period B - use 391 | FVB | 2 |
| 270 | - | 0 | | Was Fixed Vehicle Period C - use 392 | FVC | 2 |
| 271 | - | 0 | | Was Fixed Vehicle Period D - use 393 | FVD | 2 |
| 272 to 303 | - | 0 | | Was T400 influence set data - use 379/380 | IFA... | 2 |
| 304 | M/O | 1 | | Load clock | CKL | 2 |
| 305 | IMU | 1024 | | IMU config data upload | --- | R |
| 306 | BIT | 12 | | Handset I/O force 0 (bit field) | DET | 2 |
| 307 | BIT | 12 | | Handset I/O force 1 (bit field) | DET | 2 |
| 308 | BIT | 12 | | DFM fault action 0 (bit field) | DFA | 2 |
| 309 | BIT | 12 | | DFM fault action 1 (bit field) | DFA | 2 |
| 310 | M/O | 1 | | Reset DFM | RDF | 2 |
| 311 | M/O | 1 | | Reset fault log | RFL | 2 |
| 312 | 505 | 16 | P | Plan Influence Set No | PLI | 2 |
| 313 | 501 | 32 | ★ | Phase Start Times | RAT | 3 |
| 314 | 500 | 1 | | Configured Number Of Phases | FAZ | R |
| 315 | 500 | 1 | | Configured Number Of Priority Veh Units | --- | R |
| 316 | 500 | 1 | | Configured Number Of Streams | --- | R |
| 317 | 502 | 8 | | First Priority Delay | PFD | 2 |
| 318 | 502 | 8 | | Second Priority Delay | PSD | 2 |
| 319 | - | 0 | | Was RLM All Red Max Time - use 387 | LMX | 2 |
| 320 | - | 0 | | Was RLM Supp. Intergreen Time - use 387 | SIE | 2 |
| 321 | 500 | 8 | ★ | Hold All-Red Extension | REX | 2 |
| 322 | 500 | 8 | ★ | Hold All-Red Maximum | RMX | 2 |
| 323 | 506 | 3 | | BST Advance Date | CKA | 2 |
| 324 | 506 | 3 | | BST Retard Date | CKR | 2 |
| 325 | 505 | 512 | P★ | Plan Group Times (was 121) | PLT | 2 |
| 326 | 505 | 16 | P☒ | Plan cycle times | CYC | 2 |
| 327 | 505 | 16 | P☒ | Plan entry delay times | PLE | 2 |
| 328 | 505 | 16 | P☒ | Plan exit delay times | PLX | 2 |
| 329 | - | 0 | ★ | Was T400 phase delay table - use 336/337 | DMV | 2 |
| 330 | 500 | 120 | ★ | Phase Delay Phase | DFZ | 2 |
| 331 | 500 | 120 | ★ | Phase Delay Period | DPG | 2 |
| 332 | 502 | 8 | | Bus Priority Monitor Time | PMT | 2 |
| 333 | 502 | 8 | | Bus Priority DFM Self Reset | PDR | 2 |
| 334 | 502 | 8 | | Bus Priority Units to Inhibit | PUI | 2 |
| 335 | 502 | 8 | | Bus Priority Interrupt Period | PVG | 2 |
| 336 | 500 | 120 | ★ | Phase Delay 'From Stage' (was 329) | DMF | 2 |
| 337 | 500 | 120 | ★ | Phase Delay 'To Stage' (was 329) | DMT | 2 |
| 338 | 501 | 32 | ★/⌚ | Amber Times - Timeset A | LAT | 3 |
| 339 | M/O | 4 | | Time Switch Override (was 2 bytes on T400) | SWS | 2 |

| Item | Group | Len' | NB | Description | H/set | A |
|------|-------|------|-------------------------------------|--|----------------|---|
| 340 | 500 | 32 | ★ | Linked Fixed Time | LFT | 2 |
| 341 | 500 | 32 | ★ | Step-On Time | STP | 2 |
| 342 | 500 | 8 | ★ | Uni-Direction Loops | CUD | 2 |
| 343 | 500 | 8 | ★ | Uni-Direction Timeout | UDT | 2 |
| 344 | 500 | 4 | | TC12 OTU O/P | OTO | 2 |
| 345 | 500 | 96 | | DFM Group | DGP | 2 |
| 346 | 500 | 4 | | Manual Panel Allocations | MPA | 3 |
| 347 | - | 0 | | Was T400 RLM delays - use 387 | RLT | 3 |
| 348 | 500 | 12 | | Config EM Number | CIC | R |
| 348 | 501 | 12 | | Config EM Number | CIC | R |
| 348 | 502 | 12 | | Config EM Number | CIC | R |
| 348 | 503 | 12 | | Config EM Number | CIC | R |
| 348 | 504 | 12 | | Config EM Number | CIC | R |
| 348 | 505 | 12 | | Config EM Number | CIC | R |
| 348 | 506 | 12 | | Config EM Number | CIC | R |
| 348 | 507 | 12 | | Config EM Number | CIC | R |
| 348 | 508 | 12 | | Config EM Number | CIC | R |
| 348 | 509 | 12 | | Config EM Number | CIC | R |
| 349 | 503 | 12 | | Program Prom | PIC | R |
| 350 | 503 | 1 | | CLF Status | MTS | R |
| 351 | 503 | 60 | | Facilities Table | FAC | R |
| 352 | 503 | 1 | | I/O Boards | IOB | 2 |
| 353 | 503 | 12 | | I/O Sense | IPS | 2 |
| 354 | 506 | 3 | | Power Fail Time | PFT | 2 |
| 355 | 506 | 1 | | Clock Source | CTS | 2 |
| 356 | 507 | 1 | | Dim Override Type | DIT | 2 |
| 357 | - | 0 | | Was T400 I/O Allocation - use 434 | FIO | 2 |
| 358 | - | 0 | | Was T400 Kerb Side Hold Time - use 433 | HKD | 2 |
| 359 | - | 0 | | Was T400 Push Button Hold - use 433 | HPB | 2 |
| 360 | - | 0 | | Was T400 Kerb Side Timeout - use 442 | TKD | 2 |
| 361 | 507 | 1 | | Computer Control LED Type | TOT | 2 |
| 362 | 507 | 8 | ★ | 'PV' Window Time | UIE | 2 |
| 363 | - | 0 | | Was T400 Wait Lamp Control - not used | WTI | 2 |
| 364 | 507 | 1 | | Cross Inhibit Linking | CIL | 2 |
| 365 | 500 | 8 | | Conditioning Facility Enable | CFE | 3 |
| 366 | - | - | RLM | Was T400 Pelican RLM Channels (see item 774) | RLM | 3 |
| 367 | - | - | | Was T400 Pelican Num of SDE/SA Assessors | SAS | 3 |
| 368 | 507 | 1 | RO | SDE/SA Select. | SDS | R |
| 369 | - | - | | Was T400 SDE Type Per Stream - see 445 | SDT | 3 |
| 370 | - | 8 | | Was T400 Pelican VA Selection - see 448 | VAD | 3 |
| 371 | 500 | 12 | | Detector Override (Force Inactive) | DET | 2 |
| 372 | 500 | 12 | | Detector Override (Force Active) | DET | 2 |
| 373 | 503 | 12 | | DFM Disable (See 167 for bit field version) | DFS | 2 |
| 374 | 503 | 12 | | DFM Fault Action (0) | DFA | 2 |
| 375 | 503 | 12 | | DFM Fault Action (1) | DFA | 2 |
| 376 | 507 | 1 | | Local Link Override Mode | LKM | 2 |
| 377 | 500 | 4 | <input checked="" type="checkbox"/> | Timings CRC - was 2 bytes on T400 | --- | R |
| 378 | 500 | 4 | <input checked="" type="checkbox"/> | CLF CRC - same data as item 377 | --- | R |
| 379 | 505 | 512 | <input checked="" type="checkbox"/> | Influence type - set 0 to set 15 | IFN | 2 |
| 380 | 505 | 512 | <input checked="" type="checkbox"/> | Influence stage - set 0 to set 15 | IFS | 2 |
| 381 | 509 | 4 | | Handset Phase Demands | PHD | 2 |
| 382 | 509 | 4 | | Handset Phase Extensions | PHE | 2 |
| 383 | 502 | 32 | ⊕ | Priority Phase (was 102) | PUP | R |
| 384 | 509 | 1 | | Handset Dim Override | DOV | 2 |
| 385 | 507 | 8 | ★ | Local link disable, per stream | LLD | 2 |
| 386 | M/O | 1 | | Remote Reconnect | RMR | 2 |
| 387 | 501 | 1024 | ⌚ | RLM Delays (was 347) | RLT | 3 |

| Item | Group | Len' | NB | Description | H/set | A |
|---------------|-------|------|-----------|---|-------|----------|
| 388 | 509 | 1 | | OTU fitted | OTF | 3 |
| 389 | 503 | 1 | | Push button DFM groups | PBG | 2 |
| 390 | 500 | 32 | ★/⌚ | Max Green - Time set E (or FVP Set A) | MEX | 2 |
| 391 | 500 | 32 | ★/⌚ | Max Green - Time set F (or FVP Set B) | MFY | 2 |
| 392 | 500 | 32 | ★/⌚ | Max Green - Time set G (or FVP Set C) | MGX | 2 |
| 393 | 500 | 32 | ★/⌚ | Max Green - Time set H (or FVP Set D) | MHX | 2 |
| 394 | 501 | 32 | ★/⌚ | Amber Times - Time set B | LAT | 3 |
| 395 | 501 | 32 | ★/⌚ | Amber Times - Time set C | LAT | 3 |
| 396 | 501 | 32 | ★/⌚ | Amber Times - Time set D | LAT | 3 |
| 397 | 501 | 32 | ★/⌚ | Amber Times - Time set E | LAT | 3 |
| 398 | 501 | 32 | ★/⌚ | Amber Times - Time set F | LAT | 3 |
| 399 | 501 | 32 | ★/⌚ | Amber Times - Time set G | LAT | 3 |
| 400 | 501 | 32 | ★/⌚ | Amber Times - Time set H | LAT | 3 |
| 401 | 504 | 520 | L | Lamp Fault Data (10 bytes per sensor) | KLD | R |
| 402 | 506 | 16 | | Timetable Day Codes | TDY | 2 |
| 403 to 410 | - | 0 | | Unused | | |
| 411 | 508 | 6 | I | Rolling log information | LOG | R |
| 412 | 508 | 3200 | 📖 | Rolling log records (800 records x 4 bytes each) | LOG | R |
| 413 | 506 | 1 | | Controller Base Time - Hours | --- | 2 |
| 414 | 506 | 1 | | Controller Base Time - Minutes | --- | 2 |
| 415 | 506 | 1 | | Controller Base Time - Seconds | --- | 2 |
| 416 | - | 0 | | Unused | | |
| 417 | 503 | 1 | | Faulty Config PROM Action | --- | 2 |
| 418 | 501 | 1024 | * | Intergreen Times (was 48) | IGN | 3 |
| 419 | 501 | 1024 | * | Intergreen Thresholds (was 65) | ITV | R |
| 420 | 502 | 32 | ⊕ | Bus Priority Allowed VA Demands (was 97) | PSA | 2 |
| 421 | 502 | 32 | ⊕ | Bus Priority Enforced Demands (was 98) | PSE | 2 |
| 422 | 509 | 1 | | Lamp Monitor Enable | KLE | 3 |
| 423 | 503 | 1 | | Lamp Monitor Fault Confirm Time | KLC | 2 |
| 424 | 503 | 1 | | Dimming Present | KDP | 2 |
| 425 | 503 | 1 | | Max dim/bright changes expected in 24 hrs | KDL | 2 |
| 426 | 503 | 1 | | Low lamp supply voltage threshold in dim | LDT | 3 |
| 427 | 503 | 1 | | Low lamp supply voltage in bright | LBT | 3 |
| 428 | 503 | 1 | | Number of mains cycles to confirm low supply | LSF | 3 |
| 429 | 503 | 1 | | Seconds to confirm lamp supply has returned | LSN | 3 |
| 430 | 503 | 1 | | Low lamp supply hysteresis voltage in dim | LDH | 3 |
| 431 | 503 | 1 | | Low lamp supply hysteresis voltage in bright | LBH | 3 |
| 432 | 500 | 96 | | Conditioning timer scale: 0 = 0-255, 1 = 0.0-31.8 (Read only - required for item 47 display) | --- | R |
| 433 | 500 | 96 | | Extension time per input | IPX | 3 |
| 434 | 503 | 96 | | Logical to physical I/O allocation map | IOA | 3 |
| 435 | 507 | 32 | | Ped Demand Delay for each phase (secs) | PDD | 2 |
| 436 | 507 | 32 | | Pelican Intergreen Times (4 Per Stream) | PIT | 3 |
| 437 | 507 | 32 | | Ped Clearance Maximum Time for each phase | CMX | 3 |
| 438 | 507 | 64 | | Ped Clearance Delay Times, 2 for each phase | CDY | 3 |
| 439 | - | 32 | | Was Push button Extend Time (use 433) | --- | - |
| 440 | - | 32 | | Was Cycle Detector Extend Time (use 433) | --- | - |
| 441 | - | 32 | | Was Kerbside Detector Extend Time (use 433) | --- | - |
| 442 | 507 | 32 | | Ped Demand Extend Time (0.0-31.8 per phase) | PDX | 2 |
| 443 | 480 | 4 | | Configuration Answer File Checksum | --- | R |
| 444 | 503 | 1 | | Level 3 push-button time to clear lamp faults | --- | 2 |
| 445 | 507 | 32 | RO | SDE assessor type. | SAT | R |
| 446 | 507 | 32 | | Ped Clearance Red Time for each phase | CRD | 3 |
| 447 | 507 | 4 | | Phase runs pre-timed max (1 bit per phase) | PTM | 2 |
| 448 | 507 | 8 | | 1=Ped stream enable VA mode (2=force VA) | PEV | 3 |
| 449 | 503 | 1 | | Low Lamp Supply Fault Time | LST | 3 |

| Item | Group | Len' | NB | Description | H/set | A |
|---------------|---------------|------|------------|---|-------|----------|
| 450 | 506 | 256 | | Holiday Clock, Special Days table | TSD | 2 |
| 451 | 506 | 192 | | Holiday Clock, Special Holiday Periods table | TSH | 2 |
| 452 | 507 | 32 | | Pre-Timed Maximum Extra Period | PTX | 2 |
| 453 | 507 | 1 | | SDS/SA Disabled on Stream (bit per stream) | SDD | 3 |
| 454 | 507 | 1 | RO | ST700 Extra Low Voltage Setting. | ELV | R |
| 455 | 501 | 1 | | First Red Lamp Fault Speed | RLS | 2 |
| 456 | IMU | - | | IFC Polled Information | --- | 2 |
| 457 | IMU | - | | IFC Current State | --- | R |
| 458 | IMU | - | | IFC Time Of Day | --- | R |
| 459 | 501 | 1 | | UTC Watchdog | UWD | 2 |
| 460 to 479 | - | 0 | | Currently Unused | | |
| 480 to 499 | 480 to 499 | 3000 | | Configuration Answer File - 3000 byte blocks | --- | R |
| | | | | Max Green - Same as MBX item 261 | AMX | 2 |
| | | | | Call Current CLF Plan - Maintenance Only | CCP | 2 |
| | | | | On-Street Config. Complete - Maintenance Only | CFG | 3 |
| | | | | Last GPS Clock Sync Time (Level 2 only for CKS=1) | CKS | 2 |
| | | | | Controller Reset Command - Maintenance Only | CNN | 3 |
| | | | | DFM Time Override - Maintenance Only | DTO | 2 |
| | | | | Free Processor Time - Maintenance Only | FRE | 2 |
| | | | | Lamp Monitor Reset - Maintenance Only | KLR | 3 |
| | | | | Lamp Monitor Learning - Maintenance Only | KML | 3 |
| | | | | Power-Up Diagnostics - Maintenance Only | KPU | 2 |
| | | | | Red Lamp Fault Delete - Maintenance Only | KRD | 3 |
| | | | | Lamp Monitor Diagnostics - Maintenance Only | KTD | 2 |
| | | | | Access Level Obtained - Maintenance Only | LEV | 2 |
| | | | | Illuminate Phase Aspect - Maintenance Only | LMP | 3 |
| | | | | Lamp Test - Maintenance Only | LPT | 2 |
| | | | | Controller Reset Command - Maintenance Only | LRN | 3 |
| | | | | Set MST Sync Change Time - Maintenance Only | MST | 2 |
| | | | | Integral OMU (IMU) Fitted - Maintenance Only | OMF | 2 |
| | | | | Conditioning Timers - See CDT item 47 | PIR | 2 |
| | | | | Maintenance Access - Maintenance Only | PME | 0 |
| 774 | - | 52 | RLM | Number Of RLM Channels Enabled | RLM | R |
| | | | | Request Relay Test - Maintenance Only | RRT | 3 |
| | | | | On-Street Config. Access Code - Maintenance Only | SAC | 3 |
| | | | | Reset To Group 0 - Maintenance Only | SGT | 2 |
| | | | | Simulated Lamp Loads Access Code | SLA | 3 |
| | | | | Simulated Lamp Loads - Maintenance Only | SLL | 3 |
| | | | | Controller Reset Command - Maintenance Only | TKE | 3 |
| | | | | Controller Test Mode (Access) - Maintenance Only | TMA | 3 |
| | | | | Controller Test Mode (C/down) - Maintenance Only | TMC | 2 |
| | | | | Controller Test Mode (Timer) - Maintenance Only | TMT | 2 |
| | | | | Master Time Clock Setting - See STM and CKL | TOD | 2 |
| | | | | Trip Watchdog - Maintenance Only | TWD | 3 |
| | | | | Handset Display Width - Maintenance Only | WID | 0 |

Description of entries in the 'Group' column:

M/O Indicates that the item accesses data normally only used for maintenance and does not access 'timing' data and thus should not appear in any group. The majority of these are implemented to allow the TCSU/TfL IMU to perform various maintenance functions requested by the Instation.

BIT Indicates that the item accesses the data in BIT format (again for the IMU) in which case this item should not appear in any group since the same data is accessed via another item identity code which accesses the data as normal bytes.

IMU Indicates that the item is only used by the IMU (which does not use groups).

Description of entries in the 'NB' column:

- ↔ These items have been moved to group 500 from group 501 to make room for the larger 'RLM delay' array in group 501.
- ☑ There is now only one CRC protected area & the CRC is 4 bytes long (was 2 bytes). The same CRC value is returned for both items, for compatibility
- * Intergreen arrays are now 'n bytes x 32 bytes' and not 'n bytes x 16 bytes'. In addition, intergreen times (T) uploaded and downloaded are as seen on the handset and not '199 - 2 - T'.
- ⌚ RLM delays are now specified on a phase-to-phase basis, not one per phase.
- 🕒 The number of alternate maximum green timesets has been increased from 4 to 8, and the Amber Leaving times are now changeable by time of day (again 8 timesets).
- ⊕ Encoded as one bit per phase so the format of the data was 2 bytes per unit and is now 4 bytes per unit making it incompatible.
- ① Reduced to a single byte to avoid possible endian problems
- ☒ CLF Influences are heavily modified from those used on the T400.
- ★ Number of phases, stages, streams, conditioning timers, uni-direction loops, hurry call units, and phase delays have all been increased.
- I* This item contains three 16-bit (Intel format) items. The first item holds a sumcheck value so the contents of the records in the log can be validated. It is a simple sum total of all the bytes in the rolling log modulo 65536. The second item holds the record number of the newest record and third holds the record number of the oldest.
- 📖 The format of the log is described in the ST800 Main Processor SMDS. The first record uploaded is numbered '0', but to read the log in the same order as the handset, you must start at the newest record number and count backwards through the records until the oldest is reached. If record '0' is reached, then continue reading the records starting from the last one uploaded.
- P* Number of CLF plans and influence sets increased from 8 to 16.
- L* The size of the lamp monitor fault log has been corrected: is actually 10 bytes per sensor.
- RO* Some handset changeable items are currently read-only for UPDL since their associated handset commands make complex checks that have not (yet) been duplicated in the UPDL interface.
- RLM* Item 366 (Red Lamp Monitor Channels) is not available on the ST800. However, the read-only item 774 can be uploaded on the ST800 by IC4, which contains the 'RLM enabled' flag for each lamp monitor sensor, the 'source' data for the RLM handset command. However, if a 'Single Ped. Stream' PLD is fitted resulting the "RLM 1:0" display, this does not effect item 774, however, no handset changes have been made or need to be made to disable this stream so this is consistent.

2.9.3 Contents of Each Upload / Download Group

This table has been derived from the data in the previous section, by sorting on group number and then adding in the 'total length' function for each data group.

Note: The order of upload of items within a group is not necessarily as listed here.

Groups 480 to 499 - IC4 Answer File

| | | | | | |
|--------|--------|------|--|-----|---|
| 443 | 480 | 4 | Configuration Answer File Checksum | --- | R |
| 480 | 480 | 3000 | Configuration Answer File - 3000 byte blocks | --- | R |
| to 499 | to 499 | 48k | Current Maximum Size | | |

Group 500 - General Data

| | | | | | |
|-----|-----|-----|---|-----|---|
| 348 | 500 | 12 | Config EM Number | CIC | R |
| 43 | 500 | 32 | ★/↵ Extension Times | EXT | 2 |
| 47 | 500 | 96 | ★ Conditioning Timers | CDT | 2 |
| 55 | 500 | 32 | ★ Ped Window | PWN | 2 |
| 56 | 500 | 32 | ★ FT Periods | FIX | 2 |
| 81 | 500 | 8 | ★ Hurry Delay | DHC | 2 |
| 82 | 500 | 8 | ★ Hurry Hold | HHC | 2 |
| 83 | 500 | 8 | ★ Hurry Prevent | PHC | 2 |
| 87 | 500 | 8 | Call/Cancel Call Delay Time | DCL | 2 |
| 88 | 500 | 8 | Call/Cancel Cancel Delay Time | DCN | 2 |
| 260 | 500 | 32 | ★/↵ Max Green - Time set A | MAX | 2 |
| 261 | 500 | 32 | ★/↵ Max Green - Time set B | MBX | 2 |
| 262 | 500 | 32 | ★/↵ Max Green - Time set C | MCX | 2 |
| 263 | 500 | 32 | ★/↵ Max Green - Time set D | MDX | 2 |
| 314 | 500 | 1 | Configured Number Of Phases | FAZ | R |
| 315 | 500 | 1 | Configured Number Of Priority Veh Units | --- | R |
| 316 | 500 | 1 | Configured Number Of Streams | --- | R |
| 321 | 500 | 8 | ★ Hold All-Red Extension | REX | 2 |
| 322 | 500 | 8 | ★ Hold All-Red Maximum | RMX | 2 |
| 330 | 500 | 120 | ★ Phase Delay Phase | DFZ | 2 |
| 331 | 500 | 120 | ★ Phase Delay Period | DPG | 2 |
| 336 | 500 | 120 | ★ Phase Delay 'From Stage' (was 329) | DMF | 2 |
| 337 | 500 | 120 | ★ Phase Delay 'To Stage' (was 329) | DMT | 2 |
| 340 | 500 | 32 | ★ Linked Fixed Time | LFT | 2 |
| 341 | 500 | 32 | ★ Step-On Time | STP | 2 |
| 342 | 500 | 8 | ★ Uni-Direction Loops | CUD | 2 |
| 343 | 500 | 8 | ★ Uni-Direction Timeout | UDT | 2 |
| 344 | 500 | 4 | TC12 OTU O/P | OTO | 2 |
| 345 | 500 | 96 | DFM Group | DGP | 2 |
| 346 | 500 | 4 | Manual Panel Allocations | MPA | 3 |
| 365 | 500 | 8 | Conditioning Facility Enable | CFE | 3 |
| 371 | 500 | 12 | Detector Override (Force Inactive) | DET | 2 |
| 372 | 500 | 12 | Detector Override (Force Active) | DET | 2 |
| 377 | 500 | 4 | <input checked="" type="checkbox"/> Timings CRC - was 2 bytes on T400 | --- | R |
| 378 | 500 | 4 | <input checked="" type="checkbox"/> CLF CRC - same data as item 377 | --- | R |
| 390 | 500 | 32 | ★/⊙ Max Green - Time set E (or FVP Set A) | MEX | 2 |
| 391 | 500 | 32 | ★/⊙ Max Green - Time set F (or FVP Set B) | MFY | 2 |
| 392 | 500 | 32 | ★/⊙ Max Green - Time set G (or FVP Set C) | MGX | 2 |
| 393 | 500 | 32 | ★/⊙ Max Green - Time set H (or FVP Set D) | MHX | 2 |
| 432 | 500 | 96 | Conditioning timer scale: 0 = 0-255, 1 = 0.0-31.8 (Read only - required for item 47 display) | --- | R |
| 433 | 500 | 96 | Extension time per input | IPX | 3 |

1415 Max Size Of Group 500 (excluding headers)

Group 501 - More General Data

| | | | | | | |
|-----|-----|------|-----|--------------------------------|-----|---|
| 348 | 501 | 12 | | Config EM Number | CIC | R |
| 41 | 501 | 32 | ★ | Min Green | MIN | 3 |
| 46 | 501 | 32 | ★ | Ped Blackout | PBT | 3 |
| 50 | 501 | 32 | ★ | Extra Clearance Time (SDE/SA) | SCT | 3 |
| 51 | 501 | 32 | ★ | Minimum Green Thresholds | MTV | R |
| 54 | 501 | 1 | | Starting Intergreen | IGS | 3 |
| 313 | 501 | 32 | ★ | Phase Start Times | RAT | 3 |
| 338 | 501 | 32 | ★/⌚ | Amber Times - Timeset A | LAT | 3 |
| 387 | 501 | 1024 | ⌚ | RLM Delays (was 347) | RLT | 3 |
| 394 | 501 | 32 | ★/⌚ | Amber Times - Time set B | LAT | 3 |
| 395 | 501 | 32 | ★/⌚ | Amber Times - Time set C | LAT | 3 |
| 396 | 501 | 32 | ★/⌚ | Amber Times - Time set D | LAT | 3 |
| 397 | 501 | 32 | ★/⌚ | Amber Times - Time set E | LAT | 3 |
| 398 | 501 | 32 | ★/⌚ | Amber Times - Time set F | LAT | 3 |
| 399 | 501 | 32 | ★/⌚ | Amber Times - Time set G | LAT | 3 |
| 400 | 501 | 32 | ★/⌚ | Amber Times - Time set H | LAT | 3 |
| 418 | 501 | 1024 | * | Intergreen Times (was 48) | IGN | 3 |
| 419 | 501 | 1024 | * | Intergreen Thresholds (was 65) | ITV | R |
| 455 | 501 | 1 | | First Red Lamp Fault Speed | RLS | 2 |
| 459 | 501 | 1 | | UTC Watchdog | UWD | 2 |

3503 Max Size Of Group 501 (excluding headers)

Group 502 - Priority Vehicle Data

| | | | | | | |
|-----|-----|------|---|--|--------|---|
| 348 | 502 | 12 | | Config EM Number | CIC | R |
| 91 | 502 | 32 | | Bus Priority Extensions | PVE | 2 |
| 92 | 502 | 32 | | Bus Priority Max Periods | PVM | 2 |
| 93 | 502 | 32 | | Bus Priority Inhibits | PVI | 2 |
| 94 | 502 | 32 | | Priority Demands | PDE | 2 |
| 95 | 502 | 32 | | Bus Priority Revertive Demands | PRE | 2 |
| 96 | 502 | 32 | | Bus Priority Revertive Inhibits | PRI | 2 |
| 99 | 502 | 1024 | ★ | Bus Priority Compensation | PCA... | 2 |
| 101 | 502 | 1 | | Bus Priority Unit Type | PUT | R |
| 317 | 502 | 8 | | First Priority Delay | PFD | 2 |
| 318 | 502 | 8 | | Second Priority Delay | PSD | 2 |
| 332 | 502 | 8 | | Bus Priority Monitor Time | PMT | 2 |
| 333 | 502 | 8 | | Bus Priority DFM Self Reset | PDR | 2 |
| 334 | 502 | 8 | | Bus Priority Units to Inhibit | PUI | 2 |
| 335 | 502 | 8 | | Bus Priority Interrupt Period | PVG | 2 |
| 383 | 502 | 32 | ⊛ | Priority Phase (was 102) | PUP | R |
| 420 | 502 | 32 | ⊛ | Bus Priority Allowed VA Demands (was 97) | PSA | 2 |
| 421 | 502 | 32 | ⊛ | Bus Priority Enforced Demands (was 98) | PSE | 2 |

1373 Max Size Of Group 502 (excluding headers)

Group 503 - Monitoring Data

| | | | | | |
|-----|-----|----|---|-----|---|
| 348 | 503 | 12 | Config EM Number | CIC | R |
| 166 | 503 | 1 | Ped Movement Option | PMV | 2 |
| 174 | 503 | 1 | ① Manual Mode Disable | MND | 2 |
| 175 | 503 | 1 | DFM Time - Not Used On ST800/ST700 | DFD | 2 |
| 208 | 503 | 32 | DFM Active Time | DSA | 2 |
| 209 | 503 | 32 | DFM Inactive Time | DSI | 2 |
| 349 | 503 | 12 | Program Prom | PIC | R |
| 350 | 503 | 1 | CLF Status | MTS | R |
| 351 | 503 | 60 | Facilities Table | FAC | R |
| 352 | 503 | 1 | I/O Boards | IOB | 2 |
| 353 | 503 | 12 | I/O Sense | IPS | 2 |
| 373 | 503 | 12 | DFM Disable (See 167 for bit field version) | DFS | 2 |
| 374 | 503 | 12 | DFM Fault Action (0) | DFA | 2 |
| 375 | 503 | 12 | DFM Fault Action (1) | DFA | 2 |
| 389 | 503 | 1 | Push button DFM groups | PBG | 2 |
| 417 | 503 | 1 | Faulty Config PROM Action | --- | 2 |
| 423 | 503 | 1 | Lamp Monitor Fault Confirm Time | KLC | 2 |
| 424 | 503 | 1 | Dimming Present | KDP | 2 |
| 425 | 503 | 1 | Max dim/bright changes expected in 24 hrs | KDL | 2 |
| 426 | 503 | 1 | Low lamp supply voltage threshold in dim | LDT | 3 |
| 427 | 503 | 1 | Low lamp supply voltage in bright | LBT | 3 |
| 428 | 503 | 1 | Number of mains cycles to confirm low supply | LSF | 3 |
| 429 | 503 | 1 | Seconds to confirm lamp supply has returned | LSN | 3 |
| 430 | 503 | 1 | Low lamp supply hysteresis voltage in dim | LDH | 3 |
| 431 | 503 | 1 | Low lamp supply hysteresis voltage in bright | LBH | 3 |
| 434 | 503 | 96 | Logical to physical I/O allocation map | IOA | 3 |
| 444 | 503 | 1 | Level 3 push-button time to clear lamp faults | --- | 2 |
| 449 | 503 | 1 | Low Lamp Supply Fault Time | LST | 3 |

310 Max Size Of Group 503 (excluding headers)**Group 504 - Maintenance Data**

| | | | | | |
|-----|-----|-----|--|-----|----------|
| 348 | 504 | 12 | Config EM Number | CIC | R |
| 177 | 504 | 64 | Fault Flags | FLF | R |
| 178 | 504 | 128 | Fault Data | FLD | R |
| 401 | 504 | 520 | <i>L</i> Lamp Fault Data (10 bytes per sensor) | KLD | R |

724 Max Size Of Group 504 (excluding headers)**Group 505 - Cableless Link Facility Data**

| | | | | | |
|-----|-----|-----|---|-----|---|
| 348 | 505 | 12 | Config EM Number | CIC | R |
| 127 | 505 | 32 | <i>P</i> Group Offset Times | OFF | 2 |
| 312 | 505 | 16 | <i>P</i> Plan Influence Set No | PLI | 2 |
| 325 | 505 | 512 | <i>P★</i> Plan Group Times (was 121) | PLT | 2 |
| 326 | 505 | 16 | <i>P☒</i> Plan cycle times | CYC | 2 |
| 327 | 505 | 16 | <i>P☒</i> Plan entry delay times | PLE | 2 |
| 328 | 505 | 16 | <i>P☒</i> Plan exit delay times | PLX | 2 |
| 379 | 505 | 512 | <i>P☒</i> Influence type - set 0 to set 15 | IFN | 2 |
| 380 | 505 | 512 | <i>P☒</i> Influence stage - set 0 to set 15 | IFS | 2 |

1644 Max Size Of Group 505 (excluding headers)

Group 506 - Master Time Clock Data

| | | | | | | |
|-----|-----|-----|--|--|------------|---|
| 348 | 506 | 12 | | Config EM Number | CIC | R |
| 111 | 506 | 384 | | Master Time Clock Time Switch Data | TSW TTB | 2 |
| 258 | 506 | 1 | | BST Advance (Week Number) | BSA | 2 |
| 259 | 506 | 1 | | BST Retard (Week Number) | BSR | 2 |
| 323 | 506 | 3 | | BST Advance Date | CKA | 2 |
| 324 | 506 | 3 | | BST Retard Date | CKR | 2 |
| 354 | 506 | 3 | | Power Fail Time | PFT | 2 |
| 355 | 506 | 1 | | Clock Source | CTS | 2 |
| 402 | 506 | 16 | | Timetable Day Codes | TDY | 2 |
| 413 | 506 | 1 | | Controller Base Time - Hours | --- | 2 |
| 414 | 506 | 1 | | Controller Base Time - Minutes | --- | 2 |
| 415 | 506 | 1 | | Controller Base Time - Seconds | --- | 2 |
| 450 | 506 | 256 | | Holiday Clock, Special Days table | TSD | 2 |
| 451 | 506 | 192 | | Holiday Clock, Special Holiday Periods table | TSH | 2 |


875 Max Size Of Group 506 (excluding headers)

Group 507 - Pedestrian Data

| | | | | | | |
|-----|-----|----|----|---|-----|---|
| 348 | 507 | 12 | | Config EM Number | CIC | R |
| 35 | 507 | 8 | ★ | Local Link Delay Time | LKD | 2 |
| 36 | 507 | 8 | ★ | Local Link Window Time | LKW | 2 |
| 37 | 507 | 8 | ★ | Local Link Override Time | LKO | 2 |
| 38 | 507 | 8 | ★ | Local Link Active Fail Time | LKA | 2 |
| 39 | 507 | 8 | ★ | Local Link Inactive Fail Time | LKI | 2 |
| 74 | 507 | 40 | ★ | Pedestrian All Red Periods (5 Per Pelican) | PAR | 3 |
| 356 | 507 | 1 | | Dim Override Type | DIT | 2 |
| 361 | 507 | 1 | | Computer Control LED Type | TOT | 2 |
| 362 | 507 | 8 | ★ | 'PV' Window Time | UIE | 2 |
| 364 | 507 | 1 | | Cross Inhibit Linking | CIL | 2 |
| 368 | 507 | 1 | RO | SDE/SA Select. | SDS | R |
| 376 | 507 | 1 | | Local Link Override Mode | LKM | 2 |
| 385 | 507 | 8 | ★ | Local link disable, per stream | LLD | 2 |
| 435 | 507 | 32 | | Ped Demand Delay for each phase (secs) | PDD | 2 |
| 436 | 507 | 32 | | Pelican Intergreen Times (4 Per Stream) | PIT | 3 |
| 437 | 507 | 32 | | Ped Clearance Maximum Time for each phase | CMX | 3 |
| 438 | 507 | 64 | | Ped Clearance Delay Times, 2 for each phase | CDY | 3 |
| 442 | 507 | 32 | | Ped Demand Extend Time (0.0-31.8 per phase) | PDX | 2 |
| 445 | 507 | 32 | RO | SDE assessor type. | SAT | R |
| 446 | 507 | 32 | | Ped Clearance Red Time for each phase | CRD | 3 |
| 447 | 507 | 4 | | Phase runs pre-timed max (1 bit per phase) | PTM | 2 |
| 448 | 507 | 8 | | 1=Ped stream enable VA mode (2=force VA) | PEV | 3 |
| 452 | 507 | 32 | | Pre-Timed Maximum Extra Period | PTX | 2 |
| 453 | 507 | 1 | | SDS/SA Disabled on Stream (bit per stream) | SDD | 3 |
| 454 | 507 | 1 | RO | ST700 Extra Low Voltage Setting. | ELV | R |

415 Max Size Of Group 507 (excluding headers)

Group 508 - Rolling Log Data

| | | | | | | |
|-----|-----|------|---|--|-----|---|
| 348 | 508 | 12 | | Config EM Number | CIC | R |
| 411 | 508 | 6 | I | Rolling log information | LOG | R |
| 412 | 508 | 3200 |  | Rolling log records (800 records x 4 bytes each) | LOG | R |

3218 Max Size Of Group 508 (excluding headers)

Group 509 - Additional Handset Data*

| | | | | | |
|-----|-----|----|--------------------------|-----|---|
| 348 | 509 | 12 | Config EM Number | CIC | R |
| 176 | 509 | 1 | Engineering display base | BAS | 2 |
| 381 | 509 | 4 | Handset Phase Demands | PHD | 2 |
| 382 | 509 | 4 | Handset Phase Extensions | PHE | 2 |
| 384 | 509 | 1 | Handset Dim Override | DOV | 2 |
| 388 | 509 | 1 | OTU fitted | OTF | 3 |
| 422 | 509 | 1 | Lamp Monitor Enable | KLE | 3 |

24 Max Size Of Group 509 (excluding headers)

* It is recommended that Group 509 is only uploaded and the items within it are never downloaded back into the Controller. The information has been provided to allow IC4 to determine if these items have been modified using the handset commands from their default values (or the values loaded by IC4 if applicable).

The following items do not appear in any of the above Groups...

| | | | | | |
|-----|-----|------|---|-----|---|
| 40 | BIT | 1 | Local Link Override Mode (Binary) - use 376 | LKM | 2 |
| 116 | M/O | 1 | Requested Plan | RPL | 2 |
| 167 | BIT | 12 | DFM Enable/Disable (bit field - also see 373) | DFS | 2 |
| 173 | M/O | 1 | Accept detector fault | ADF | 2 |
| 182 | IMU | 8 | TCSU/TfL IMU Controller password | --- | 2 |
| 256 | M/O | 7 | Set RTC time | STM | 2 |
| 257 | M/O | 1 | Set RTC week number | WEK | 2 |
| 304 | M/O | 1 | Load clock | CKL | 2 |
| 305 | IMU | 1024 | IMU config data upload | --- | R |
| 306 | BIT | 12 | Handset I/O force 0 (bit field) | DET | 2 |
| 307 | BIT | 12 | Handset I/O force 1 (bit field) | DET | 2 |
| 308 | BIT | 12 | DFM fault action 0 (bit field) | DFA | 2 |
| 309 | BIT | 12 | DFM fault action 1 (bit field) | DFA | 2 |
| 310 | M/O | 1 | Reset DFM | RDF | 2 |
| 311 | M/O | 1 | Reset fault log | RFL | 2 |
| 339 | M/O | 4 | Time Switch Override (was 2 bytes on T400) | SWS | 2 |
| 386 | M/O | 1 | Remote Reconnect | RMR | 2 |
| 456 | IMU | - | IFC Polled Information | --- | 2 |
| 457 | IMU | - | IFC Current State | --- | R |
| 458 | IMU | - | IFC Time Of Day | --- | R |
| 774 | - | 52 | <i>RLM</i> Number Of RLM Channels Enabled | RLM | R |

3. ST800/TC12 Upload/Download Interface Tests

3.1 Upload Each Group

Objective:

To check that an upload request can be done for each group: 500 to 508, and that the correct data is uploaded to the UTC Instation.

Configuration:

Perform this test with the 2 different types of configuration:

- Maximum sizes configuration, i.e. 32-phase, stages, 8 Hurray Call etc. This will be called UDLMAX.
- Odd number of entries for configuration items, like phase, stages, Hurry Calls etc. This will be called UDLODD.
- Pelican Configuration.

Test:

1. Using UTC system MMI, request an upload of group 500
2. When data uploaded, check that each item in the group has been successfully uploaded. To do this, use the UTC upload/download editor to compare each configuration item's contents with those displayed on the handset at the ST800.
3. Repeat 1. And 2. For groups 501 to 508.

3.2 Download Each Group with Valid Data

Objective:

To check that after uploading a group it can be edited to valid alternative values using the UTC editor and downloaded again to the ST800.

Configuration:

UDLMAX

Test:

1. Using the UTC system MMI, request an upload of group 500.
2. When data uploaded, use the UTC upload/download editor utility to edit several of the items in the group, i.e. first item, 2 middle position items, and the last item in the group.
3. Using the UTC system MMI, request a download of the group.
4. Using the relevant ST800 handset command, check that the altered data is correctly displayed on the handset.
5. Repeat steps 1 to 4. For groups 501 to 508.

3.3 Download Group with Out of Range Values or Access Failure

Objective:

To check that if group 501 is uploaded and an item is edited, using the UTC editor, to values that are outside the range limits for that particular item, the download of that group to the ST800 will fail due to range errors.

Objective:

To check that if group 501 is uploaded and an item is edited, using the UTC editor, to alternative valid values for that particular item, the download of that group to the ST800 will fail due to a 'level 3' access error.

Configuration:

Any configuration as long as level 3 access is configured. This is required to allow download of data that has level 3 access. (UDLMAX or UDLODD)

Another configuration of any size, but with level 3 access NOT configured. (UDLNL3)

Test:

1. Using the UTC system MMI, request an upload of group 501.
2. When data uploaded, use the UTC upload/download editor utility to edit items the extra clearance times (item 50) to 52.
3. Using the UTC system MMI, request a download of the group.
4. Check that the download request of group 501 fails and the appropriate error message is returned.
5. Repeat steps 1 and 2, only alter the intergreen times (item 418) to 200.
6. Request upload of group 501, but with UDLNL3 configuration at ST800 controller.
7. When data uploaded, use the UTC upload/download editor utility to edit items the extra clearance times (item 50) to 20.
8. Using the UTC system MMI, request a download of the group
9. Check that the group 501 download request fails with a level-3 access error, i.e. level-3 item cannot be written to when no level-3 access configured.

3.4 Download Group 501 with too much Data for an Item

Objective:

To check that if group 501 is uploaded and an item is edited with valid data, but the configuration on the ST800 is changed to a smaller config, e.g. was a 32-phase controller down to 3 then the download will not be accepted due to too much data.

Configuration:

2 configurations required, starting with the maximum size config, i.e. UDLMAX and then move to the smaller size, i.e. one with 3 phase and stages, i.e. UDLODD.

Test:

1. Using the UTC system MMI, request an upload of group 501.
2. When data uploaded, edit the min greens, i.e., item 41, to another valid value.
3. Change the configuration at the ST800 from the UDLMAX to the UDLODD.
4. Using the UTC system MMI, request a download of the group.
5. Check that the download fails, due to too much data being downloaded.

3.5 Upload of Configuration Answer File

Objective:

To check that the configuration answer file can be uploaded to the UTC instation.

Configuration:

The following test should be run on both configurations: UDLMAX and UDLODD.

Test:

1. Request an upload of the answer file for config UDLODD by requesting groups 480 to 499.
2. Check that the answer file is uploaded in blocks of 3K until the end.
3. Check also that when all the groups have been uploaded the file created at the UTC system is the same as the original answer file.
4. Repeat this test for config UDLODD.

3.6 Remote Handset Commands

Objective:

To check that the remote handset can be used at the UTC Instation both for Read only and Level 2 commands, but NOT for Level 3 commands.

Configuration:

Any config.

Test:

Local Handset

1. Connect the local handset to the ST800 and enter <return> to establish connection.
2. Enter PME=249 to get Level 2 access.
3. Check that Phase A MAX time can be changed to 5secs.
4. Check that Phase A MIN time can not be changed due to access level.
5. Press button on controller, then repeat MIN A=50
6. Check that the MIN time can now be changed.

Remote Handset

1. Connect the Remote handset and enter LOG. Check that this fails and a message indicating that the "local handset is in use" is displayed.
2. Disconnect the local handset from the handset port at the ST800.
3. Repeat step 1 and check that the LOG command will now work.
4. Check that Level 2 or 3 access is not available by trying to set MIN and MAX times for phase A. Both should fail with *A (access).
5. Enter PME=249 at the remote handset and retry altering the MIN and MAX times for phase A.
6. Check that the MAX time can be changed successfully and the MIN can NOT, due to 'Level 3' access error.

• • End of the ST800/TC12 Upload/Download Interface Specification • •