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UTMC OTU/MOVA Handbook

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In the interests of health and safety, when using or servicing this equipment, the following instructions must be noted and adhered to:

- (i) Only Skilled or Instructed personnel with relevant technical knowledge and experience, who are also familiar with the safety procedures required when dealing with modern electrical or electronic equipment, are to be allowed to use and/or work on the equipment. All work shall be performed in accordance with the Electricity at Work Regulations 1989 and the relevant Highways Agency (DoT) procedures of test and maintenance.
- (ii) Such personnel must take heed of all relevant notes, cautions and warnings in this handbook, and any other documents and handbooks associated with the equipment including, but not restricted to, the following:
 - (a) The equipment must be correctly connected to the specified incoming power supply.
 - (b) The equipment must be disconnected / isolated from the incoming power supply before removing protective covers or working on any part from which protective covers have been removed.
 - (c) The equipment contains batteries that must be disposed of in a safe manner. If in doubt of the correct procedure, refer to the Siemens instructions.

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1. INTRODUCTION

1.1 PURPOSE

This document is intended to provide sufficient information to the Engineer to install, configure and maintain the UTMC OTU/MOVA product, which uses the Gemini² Generic Versatile Platform (GVP).

The unit looks like a normal Gemini² OMU with the “/999” variant Processor card with 8MB flash memory which the GVP software makes use of for its Flash file system.

1.2 SCOPE

This document covers how to setup, configure and use the hardware and software for the UTMC OTU and MOVA applications.

Access is required to the GVP Reference Manual when reading this handbook, since the GVP Reference Manual contains descriptions of facilities common to all GVP applications.

1.3 REFERENCE DOCUMENTS

1. GVP Reference Manual.....667/HB/31760/000
2. Gemini² Traffic Outstation Handbook667/HB/32600/000
3. Electromagnetic Compatibility - Road Traffic Signal System - Product Standard BS EN 50293:2001
4. UTMC V34 LEASED LINE HANDBOOK667/HB/42021/000
5. IR711 WH01 3G Router Third Party Approval Report..... 667-AY-46471-000
6. Digi Connect WAN 3G Router 3rd Party Approval Report...667-AY-46472-000
7. IP Router Installation Guide.....667-CI-45025-000
8. 3G OTU Communications Site Selection Guide.....667-AY-45025-002
9. MOVA TMA output and alerts – Detailed Req Spec.....TRL Limited

1.4 ABBREVIATIONS AND DEFINITIONS

| | |
|-------|---|
| AC | Alternating Current |
| ASCII | American Standard Code for Information Interchange |
| Bit | Binary Digit |
| BOOTP | Bootstrap Protocol |
| CCITT | International Co-ordinating Committee for Telephony and Telegraphy |
| CHAP | Challenge Handshake Authentication Protocol |
| chat | A scripting language for defining the dialogue between a computer and a modem |
| CMOS | Complementary Metal Oxide Semiconductor |
| CPU | Central Processing Unit |
| CSI | Controller Serial Interface |
| CSV | Comma Separated Value |

| | |
|----------|--|
| DC | Direct Current |
| DCE | Data Communication Equipment |
| DDNS | Dynamic DNS |
| DNS | Domain Name System |
| DSL | Digital Subscriber Line |
| DST | Daylight Saving Time |
| Dynamic | Application that can be overwritten by new files |
| EMC | Electromagnetic Compatibility |
| eCos | Embedded Configurable Operating System |
| FLASH | Non-volatile memory that may be programmed under software control |
| Full UTC | Full UTC MIB v1.0, also known as UTC type 2 or UG405 (UTMC ref: TS004.004:2008UM/008, Full UTC MIB) |
| GMT | Greenwich Mean Time |
| GPRS | General Packet Radio Service |
| GSM | Global System for Mobile Communication |
| GV | Generic Versatile |
| GVP | Generic Versatile Platform |
| IO | Input and Output |
| ICG | Inter-Cycle Gap - A Siespace Protocol Parameter |
| ICMP | Internet Control Message Protocol |
| IMG | Inter-Message Gap - A Siespace Protocol Parameter |
| IP | Internet Protocol |
| JFFS2 | Journaling Flash File System Version 2 |
| LAN | Local Area Network |
| LED | Light Emitting Diode |
| LMU | Lamp Monitoring Unit |
| MD5 | Message Digest 5 |
| MIB | Management Information Base |
| MIB-II | Management Information Base II (Two) |
| NTP | Network Time Protocol |
| OEM | Other Electrical Manufacturers |
| OSE | On Street Equipment |
| OSS | Outstation Support Server |
| OTU | Outstation Transmission Unit |
| PAP | Password Authentication Protocol |
| PC | Personal Computer |
| PCB | Printed Circuit Board |
| PIN | Personal Identification Number |
| PPP | Point-to-Point Protocol |
| PSTN | Public Switched Telephone Network |
| PSU | Power Supply Unit |
| RAM | Random Access Memory |
| ROM | Read Only Memory |
| ROMFS | ROM File System |
| RS232 | EIA Data Communications Interface - Level based serial communications standard |

| | |
|------------|--|
| RS485 | EIA Differential Data Communications Interface - Differential serial communications standard |
| SHA-1 | Secure Hash Algorithm 1 |
| Siespace | A Siemens car park guidance system |
| Simple | Simple UTC MIB v0.2, also known as UTC type 1 |
| UTC | (UTMC ref: TS004.004:2008 UM/004, Simple UTC MIB) |
| SNMP | Simple Network Management Protocol |
| SNMPv1 | SNMP Version 1 |
| SNMPv2 | SNMP Version 2 |
| SNMPv3 | SNMP Version 3 |
| SNTP | Simple Network Time Protocol |
| STC | Siemens Traffic Controls |
| Telnet | Telnet Protocol |
| TfL | Transport for London |
| TFTP | Trivial File Transfer Protocol |
| TMA | Traffic Management Act |
| TS | Siemens Traffic Solutions, Mobility Division (formerly Siemens Traffic Controls) |
| UDP | User Datagram Protocol |
| UMTS | Universal Mobile Telecommunications System |
| UTC type 1 | See Simple UTC |
| UTC type 2 | See Full UTC |
| UTMC | Urban Traffic Management and Control |
| UVMS | Urban VMS |
| VMS | Variable Message Sign |
| VPN | Virtual Private Network |
| XML | Extensible Markup Language |
| ZXO | A Zero Crossover Interface |

2. PRODUCT DESCRIPTION

2.1 INTRODUCTION

The UTMC OTU/MOVA Outstation is a 3U rack mounted unit which is normally located in roadside cabinets. The outstation is used to monitor and control a traffic controller and other on-street equipment. – see UTMC Guide Appendix D.

The outstation is controlled from a UTMC instation across an IP network. The IP network employed will be dependent on the system application and particular customer requirements – see UTMC Network Requirements Appendix E.

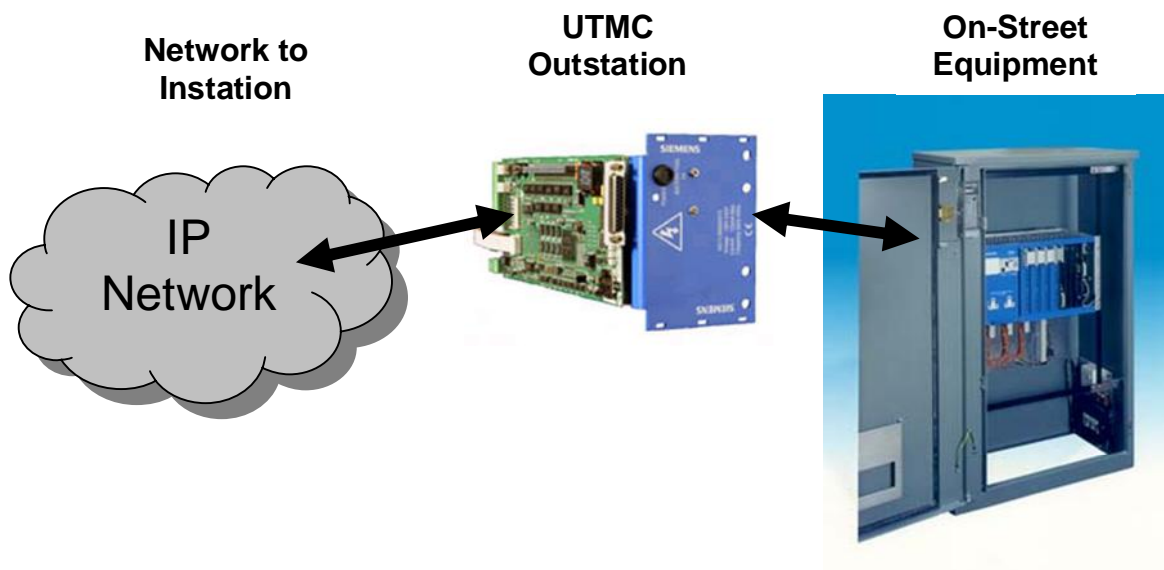


Figure 2.1 – Typical Outstation

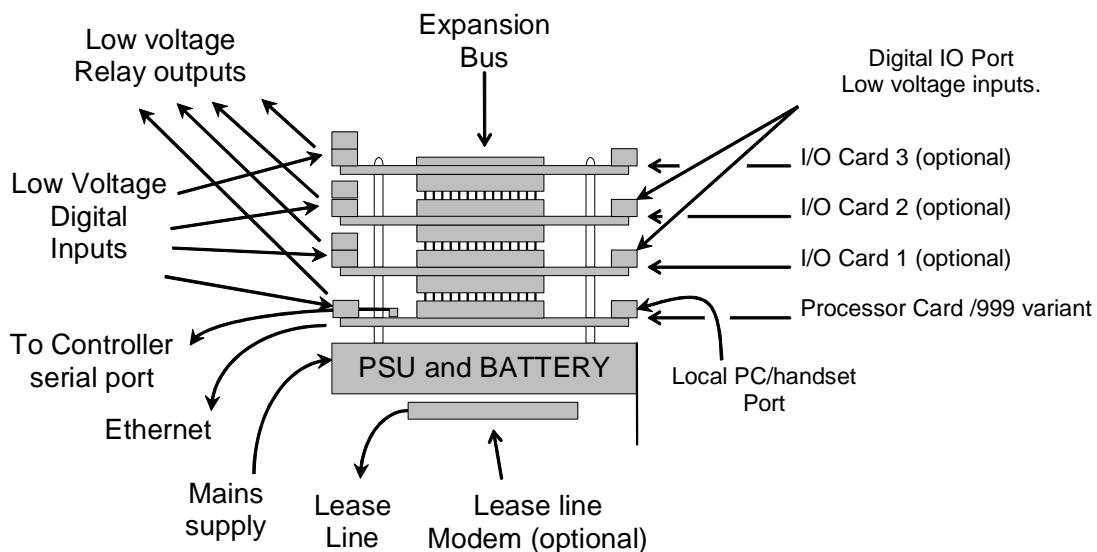


Figure 2.2 – Hardware Components

The UTMC OTU has the following features:-

- Implements the simple UTC MIB v0.2, also known as UTC type 1 (UTMC ref: TS004.004:2008 UM/004, Simple UTC MIB)
- Implements the full UTC MIB v1.0, also known as UTC type 2 or UG405 (UTMC ref: TS004.004:2008UM/008, Full UTC MIB)
- Freestanding and semi-integral versions (section 2.3)
- MOVA 6 or 7 (depending on variant), up to 4 streams (section 7)
- Web interface (see reference 1.3.1 and section 6.5 to 6.11 of this handbook)
- Remote handset to connected controller.
- Remote software upgrade (see reference 1.3.1)
- Automatic backup of OTU configuration to OSS (see reference 1.3.1)
- Extra features when used with ST700/750/800/900 family controllers:-
 - Upload/download of controller data (section 6.9)
 - Upload of IC4 file (section 6.9)
 - Web display of controller historic log (section 6.8)
 - SCOOT detectors can be connected via the controller (section 6.2.5)
- Network interface via Ethernet (section 3.7.4) or lease line modem (section 2.8.2)
- For outstation control/reply bit capacity, see Appendix I.



Front of UTMC OTU with 2U modem shelf and detector blanking panels

2.2 UTMC OTU SOFTWARE VERSIONS AND COMPATIBILITY

The UTMC OTU (16MB RAM) software package is 667/TZ/32370/000*. The software requires a CPU card fitted with 16MB SD RAM i.e. CPU 667/1/26608/999 issue 9 or later. This package incorporates MOVA 6.

*For MOVA 7 software package 667/TZ/32378/000 should be used, this also requires 16MB of SD RAM.

The UTMC OTU (4MB RAM) software package is 667/TZ/32369/000. Older Gemini² CPU cards, issue 8 or earlier, can run this software. This is a reduced version which does not support MOVA or full UTC (UTC type 2).

The UTMC OTU software will not run on the Gemini-1 processor card, due to memory constraints.

The outstation software package part number and issue state can be displayed as follows:-

- On the web interface, view the “system” web screen
- On the handset/telnet interface, use the ‘version` command

The latest releases of software can be obtained from the Siemens website, currently at <http://www.siemens.co.uk/traffic/en/index/downloads.htm>. Details of the upgrade procedure are included in the download .zip file.

2.2.1 Controller Compatibility

The UTMC OTU supports the semi-integral interface to ST700/750/800/900 family controllers running compatible firmware as follows:-

| Controller Firmware | Compatible Versions |
|---------------------|---------------------|
| PB800 | 24 or later |
| PB801 | all |

The UTMC OTU supports serial interface connection for remote handset access to the following controllers.

- Peek TRX
- Peek TSP
- Peek PTC-1
- TSEU Sentinel

Serial interface connection to other controllers may operate successfully, provided that the baud rate is supported and the controller operates a standard ASCII terminal (command line) interface.

2.3 UTMC OTU HARDWARE VERSIONS

The part number of the UTMC OTU is 667/1/31601/ETC. The following variants are available:-

/004 = UTMC OTU FREE STANDING NO RACK
/014 = UTMC OTU SEMI INTEGRAL NO RACK
/311 = 11" UTMC OTU - 11" RACK - NO MODEM TRAY 3U MTG 0DBP
/319 = 19" UTMC OTU - 19" RACK NO MODEM TRAY 3U MTG 0DBP
/511 = 11" UTMC OTU - 11" RACK + 2U MODEM TRAY 5U MTG 0DBP
/519 = 19" UTMC OTU - 19" RACK + 2U MODEM TRAY 5U MTG 0DBP

The most common variant is the /519 which has the following features:-

- Mounts in standard 19" wide OTU space within the controller cabinet.
- The 2U modem tray provides flexible space for different communications options, with 13A socket for modem power.
- Mounting space for detectors in the rack if required
- OTU can be configured for semi-integral (with a ST700/750/800/900 family controller) or freestanding via I/O card.

The outstation is mains powered and is fitted with a battery to support the unit in the event of a mains failure. Assuming the communication equipment is still powered, this allows the outstation to remain in communication with the instation when the mains fails.

The complete unit can fit within a standard Traffic Controller's Roadside Cabinet or within a single enclosure. It is designed to fit within an existing 3U detector rack, in an additionally supplied 3U rack, or directly onto the rack mounting uprights. It can be mounted in an ancillary housing if necessary.

When fully configured, the unit occupies 192mm of a standard 3U rack, and is of a modular design. The cards are interconnected by way of an expansion bus and up to 3 IO cards may be fitted. The main features of each individual card, assembly and the expansion bus are highlighted in the following sections.

2.4 SOFTWARE COMPONENTS

2.4.1 The GV Platform

The Outstation software package comprises a number of distinct layers as shown in Figure 2.3).

- **Redboot** takes control at startup and controls the boot-up sequence.
- **eCos** is the embedded operating system.
- **GVP** is an intermediate layer which provides common facilities (e.g. file system) and a common programming interface.
- **Applications** use the services provided by GVP and eCos to implement user functions e.g. MOVA and OTU.

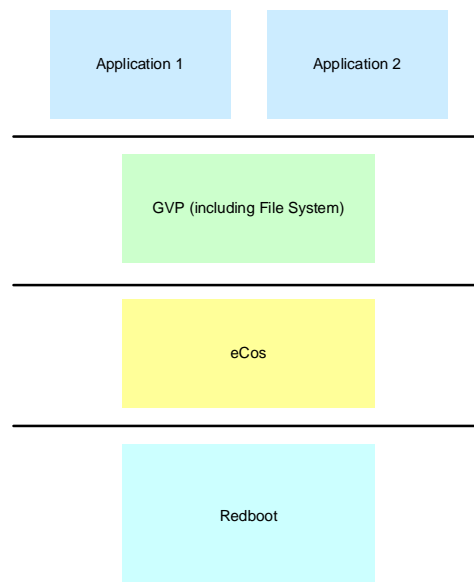


Figure 2.3 – Software Components

2.5 UTMC COMMUNICATIONS

The connection between Instation and Outstation is by an IP network. Refer to Appendix F for a guide to UTMC and refer to Appendix G for IP Network Requirements.

The connection of the Outstation to the network can be via the Gemini² modem port or via Ethernet. The Ethernet port could be directly connected to the IP network, or additional devices could provide access via DSL, private wires, fibre, wireless or UMTS mobile comms connections.

2.6 THE PROCESSOR CARD

The Processor card is a 3U 220mm long, 100mm wide and 17mm high extended Eurocard. It is a multi-layer PCB, using mostly surface mounted components. It provides the processing power required by the unit. The Processor is based on Motorola's Power PC range of 32-bit microprocessors (MPC850) with highly sophisticated on-chip peripheral capabilities.

The card provides the expansion bus that can extend the system using up to three IO cards. For details see section 2.10 on page 18.

2.6.1 Processor Card's Features

The main features of the Processor card are:

- a. Battery backup of the entire RAM (see Section 5.6.3).
- b. An Expansion Bus for fast card-to-card data transfers. The Processor card can address up to three IO cards.
- c. Three programmable RS232 Serial communications Ports:
 - Handset RS232 Port.
 - Auxiliary RS232 Port – for connection to controller.
 - Modem RS232 Port.
- d. A battery backed Real Time Clock.
- e. Flash memory for program storage and Journaling File system.
- f. 'Zero-Cross Over' signal derived from the associated PSU support PCB.
- g. Power Fail monitoring (low voltage inhibit)
- h. A Watchdog monitor
- i. Processor error indication
- j. Voltage Regulation (allowing a range of DC input)
- k. Power for the modem, with a choice of two voltages
- l. Status LED indicators (also see section 5.3 which starts on page 35)
- m. Power dissipation less than 100 mW.
- n. 10MB Ethernet

2.7 IO CARDS

2.7.1 BUS/MOVA IO Card

The BUS/MOVA IO card is a 3U extended Eurocard. It is a multi-layer PCB, using mostly surface mount components.

See section 5.6.1 for the part numbers and section 4.6.2 for connection details. The card is available in two variants, with and without the RS485 interfaces.

Each BUS/MOVA IO card has the following features:

- a. 48 x Digital Inputs
- b. 16 x Digital Outputs (relays)
- c. Expansion Bus connection
- d. Card address decode.
- e. 4 x RS485 serial channels (not used by UTMC OTU).

2.8 THE MODEM UNIT

The options available are: a DSL modem, a lease line modem or UMTS router

2.8.1 The DSL Modem Unit

The DSL modem is an OEM unit for DSL communications over a single pair of copper wires. The type of DSL modem may vary depending on customer requirements.

- a. Data speeds from 272 Kb/s to 2320 Kb/s
- b. Ethernet Interface – RJ45 Connection
- c. Line Interface – RJ45 Connection
- d. On line status indicators

Due to its size, it is not possible to mount this modem onto the back of the Gemini² PSU. During installation of the Outstation a suitable place should be found within the cabinet.

2.8.2 The Lease Line Modem Unit

The lease line modem is an OEM unit for V34 communications over a two-wire point-to-point lease line.

- a. Data speed 19.2 Kb/s using V34 transmission
- b. Outstation Interface: 25-Way D-Type Connection
- c. Line Interface: 2-wire Connection
- d. Line status and data indicators
- e. Powered by 12V DC from the CPU card.

Due to its small size, the modem can be mounted onto the back of the Gemini² PSU. See section 4.2.2 for connection instructions. See ref 1.3.4 for instation setup.

2.8.3 UMTS (3G) Mobile Router

An option is available to connect the OTU back to the instation via a UMTS mobile communication network. Viability of this option will depend on the outstation location, mobile network signal strength and service provider. In considering this option the 3G OTU Communications Site Selection Guide (667-AY-45025-002) should first be consulted.

The UMTS router is an OEM unit for communications over a UMTS mobile network. There are currently two devices approved for installation, the Digi Connect WAN 3G and InHand IR711 units. For further information see the respective third party approval documents – 667-AY-46472-000 and 667-AY-46471-000.

- a. Data speeds – dependent on connection but from 171Kbps to > 7Mbps
- b. Ethernet Interface – RJ45 Connection
- c. Line Interface – mobile network air interface
- d. On line status indicators

Due to its size, it is not possible to mount this modem onto the back of the Gemini² PSU. Connection of the mobile router will also require installation of an associated pole top antenna. Instructions for the complete setup can be found in the installation procedure 667-CI-45025-000

2.9 THE POWER SUPPLY UNIT (PSU)

The standard PSU is a 127mm long, 76.2mm wide and 37mm high OEM unit, which supplies the system with +13.65V.

The Outstation uses a float charged battery held within the PSU case to provide outstation backup in the event of mains failure.

2.9.1 PSU Features

The main features of the PSU are:

- (a) A wide range of AC input voltage
- (b) 3000V isolation from the mains
- (c) It can be powered by a 12V to 15V DC input supply
- (d) A single 12V sealed lead acid battery
- (e) Automatic switching to the battery support in the event of mains failure to the system
- (f) Automatic battery recharge on restoration of mains supply to the system
- (g) A minimum 3 year battery life
- (h) Zero Cross Over – mains supply voltage timing circuit
- (i) Two High Voltage photo-coupled isolated inputs.

2.10 THE EXPANSION BUS

The expansion bus is a set of 64 way expansion connectors. Each card plugs into the previous card.

All cards provide buffering for Address, Data and Control signals and distribute the logic supplies.

3. SPECIFICATIONS

3.1 GENERAL

This Unit meets all the Environmental and EMC requirements as specified in TR2500 and BS EN50293:2001 respectively.

3.2 ELECTRICAL

3.2.1 Mains Supply

| | |
|--------------|---|
| Voltage: | 230V AC RMS, +15% to -20% |
| Frequency: | 46 - 54 Hz |
| Mains fused: | The recommended rating of this external fuse is 2A anti-surge. (The mains cable is rated to 6A, fuses up to 5A may be used) |

3.2.2 Power Supply

The unit incorporates its own internal power supply unit that provides the necessary supply voltages to all of the cards and assemblies associated with the complete unit. The cards operate from a single voltage regulated supply.

| | |
|----------------|--|
| Output Supply: | Regulated 13.65V DC |
| Rating: | 3.15A |
| Powering: | Processor card, IO card(s), Modem and Charging the Battery |

3.2.3 Power Dissipation

Low power CMOS devices are used throughout the unit to keep the power dissipation as low as possible.

| | |
|-------------------------|--|
| Total power consumption | 8.0 W typical (using maximum configuration of 3 x IO cards and battery float charging) |
| ELEXON code | 79 10 008 000 100 |

3.2.4 Support Batteries

The Outstation unit is fitted with a rechargeable battery which supports the entire unit, including the modem, for a minimum of four minutes under all conditions in order that the Outstation may inform the Instation of a mains power failure. This battery must not

be operated in the inverted position (i.e. with the terminals pointing downwards). See section 4.4.1 on page 28.

A Lithium coin cell battery is provided on the Processor card and supports the Real Time Clock during power failures for at least 7 months. This battery is plug-able to allow easy replacement.

The Processor card also has a 'Gold Cap' capacitor fitted that allows the Lithium coin cell battery to be changed without loss of power to the Real Time Clock. The Gold Cap device provides a minimum of 30 minutes support.

The two batteries have the following specifications:

| Battery | Type | Support |
|--------------|----------------------------|---|
| Unit Battery | 12V Lead Acid | 20 minutes (Typical) |
| RAM Battery | Lithium 418/4/53433/000 | At least 7 months after the main support battery has expired. |

3.3 MECHANICAL

The construction of the unit is based on the standard 3U high, IEC297 Eurocard rack system. The unit does not use the conventional backplane approach. Instead it uses an expansion bus (see section 2.10 on page 18), to interconnect the cards electrically. The rack does not need to have guide rails, but if present they need to be on 25.8mm spacing. Mechanically the cards are held in a stack, by four sets of pillars and fixings, and held in place on a mounting plate (see Figure 2.2 on page 11). The mounting plate also accommodates the modem and PSU assemblies, and is used to fix the total unit assemblies to the 3U rack, or enclosure mounting side angle bracket.

| DIMENSION | MINIMUM | MAXIMUM |
|-----------|---|---|
| Height | 130mm | 130mm |
| Width | 115mm for semi-integral unit with PSU and CPU | 192mm for freestanding unit with PSU, CPU and 3 I/O cards |
| Depth | 255mm, excl. cables | 300mm, incl. rear cables |

3.4 ENVIRONMENTAL

| | |
|-------------|-----------------------------------|
| Temperature | -15°C to +60°C ambient |
| Humidity | 20% to 95% non condensing at 40°C |

3.5 ISOLATED OUTPUTS

Outstation cards are each equipped with a number of relay isolated outputs, two change-over contacts on the Processor card and 16 change-over contacts on a Generic IO card. The following describes the electrical characteristics of these outputs:

| | Processor card Output | BUS/MOVA IO Card Output |
|-------------------------|---------------------------------|---------------------------------|
| “On” Output Impedance | $182\Omega \pm 1\%$, 0.1 Watts | $182\Omega \pm 1\%$, 0.1 Watts |
| “Off” Output Impedance | 100k Ω min. | 100k Ω min. |
| Continuous Current Sink | 50mA [†] | 50mA [†] |
| Breakdown Voltage | 1500V | 1500V |
| Isolated Voltage | 1500V | 1500V |
| Relay Type | Change-Over | Change-Over |

Notes:

[†] The continuous current sink is limited by the resistors.

3.6 DIGITAL INPUTS

The Processor card supports 8 x TR2523 (TR0141) compliant digital inputs. Each BUS/MOVA IO Card supports 48 x TR2523 (TR0141) compliant digital inputs. These digital inputs have the following input electrical characteristics:

| | Processor card Inputs | BUS/MOVA IO Card Inputs |
|-----------------------|-----------------------|-------------------------|
| Input Impedance | 4300 Ω * | 4300 Ω * |
| “Off” Threshold | > 50k Ω | > 50k Ω |
| “On” Threshold | < 600 Ω | < 600 Ω |
| Absolute Max. Voltage | +1kV / -7V | +1kV / -7V |
| Isolation Voltage | n/a | n/a |

* Referenced to 13.8V

3.7 COMMUNICATIONS

The Processor card has three serial RS232 and one Ethernet communication port. The serial interfaces are software programmable in terms of their transmission characteristic. The three RS232 and the single Ethernet communications interfaces are shown on 667/GA/32600/000 in Appendix A and listed in the following sections.

The RS485 interfaces on the I/O card are not used by UTMC OTU.

3.7.1 Communications Channel 1 (Controller Serial Port)

The Connector Type is a 25 Way 'D' Type on the end of a flying ribbon cable connected to Plug PL4. The serial port is used for communications with the associated controller.

3.7.2 Communications Channel 2 (Modem Port)

The Connector Type is a 9 Way 'D' Type on the end of a flying ribbon cable connected to Plug PL2.

3.7.3 Communications Channel 3 (Handset Port)

The Connector Type is a 25 Way 'D' Type on the front of the Processor Card. SK2.

3.7.4 Communications Channel 4 (Ethernet Port)

The Connector, SK4, is an RJ45 Socket on the back edge of the Processor Card. The Ethernet operates at 10MB.

4. INSTALLATION

WARNING

THIS EQUIPMENT MAY ONLY BE INSTALLED IN A RESTRICTED ACCESS LOCATION BY APPROPRIATELY TRAINED PERSONNEL.

ENSURE THAT THE UNIT IS NOT CONNECTED TO THE COMMUNICATIONS NETWORK DURING INSTALLATION AND SWITCH OFF ALL MAINS TO THE CABINET PRIOR TO STARTING.

THIS UNIT CONTAINS BATTERIES WHICH, UNDER FAULT CONDITIONS, MAY LEAK HAZARDOUS SUBSTANCES.

CARE MUST BE TAKEN WHEN FITTING BATTERIES OR HANDLING THE UNIT. FIT BATTERIES ONLY OF THE SPECIFIED OR EQUIVALENT TYPE. BATTERIES FITTED INCORRECTLY COULD CAUSE AN EXPLOSION.

4.1 USER RESPONSIBILITIES

It is the responsibility of the Engineer (or purchasing authority) to provide:

- (a) At least one auxiliary mains supply or suitable alternative mains supply outlet for the unit's PSU (supply capability to be at least 1A RMS, and fused at 5A or less).
- (b) A working communications connection, dependent on the system communications type.

PRE-INSTALLATION CHECKLIST

| STEP | FUNCTION | REFERENCE |
|------|---|-------------|
| 1 | Check unit supplied is as per works order | WORKS ORDER |
| 2 | Check unit contains correct IO cards. | WORKS ORDER |
| 3 | Check unit has the correct firmware loaded into the Flash memory. | 2.2 |

INSTALLATION CHECKLIST

| STEP | FUNCTION | REFERENCE |
|------|---|------------|
| 4 | Set up card address switches | 4.2.1 |
| 5 | Set up modem power selection | 4.2.2 |
| 7 | Set up 120/230V AC operation selection | 4.2.3 |
| 8 | Enable RTC battery and confirm the watchdog link is correctly installed | 4.2.4 |
| 9 | Install unit and connect safety earth lead to cabinet earth point | 4.3 to 4.5 |
| 10 | Connect digital IO | 4.6.2 |
| 11 | Complete post installation check | 4.6.3 |
| 12 | Identify all connectors/cable forms | 4.6.4 |
| 13 | Connect all connectors to the unit | – |
| 14 | Connect the unit to mains outlet | 4.6.5 |
| 15 | Switch on unit supply | – |
| 16 | Connect unit support battery | 4.6.6 |
| 17 | Commission the application | 6 and 7 |

THE REST OF SECTION 4 TAKES YOU THROUGH THE STEPS IN THE INSTALLATION CHECKLIST (above) IN MORE DETAIL...

Section 4.2 takes you through the steps that ‘configure’ the hardware before the unit is installed.

Sections 4.3, 4.4 and 4.5 take you through the steps to install the unit.

And finally, section 4.6 takes you through all the steps involved in connecting up all the various interfaces to the unit.

4.2 SET-UP

The unit, prior to its installation and commissioning, requires configuring for the type of application, either on site or at a depot.

The hardware has a number of options as follows, which require selection before power is applied to the unit...

4.2.1 IO Card Position Selection

| STEP | FUNCTION | REFERENCE |
|------|------------------------------|-----------|
| 4 | Set up card address switches | 4.2.1 |

Each BUS/MOVA IO Card has two 2-way DIL switches which provide the IO card with its own unique address within the Outstation unit.

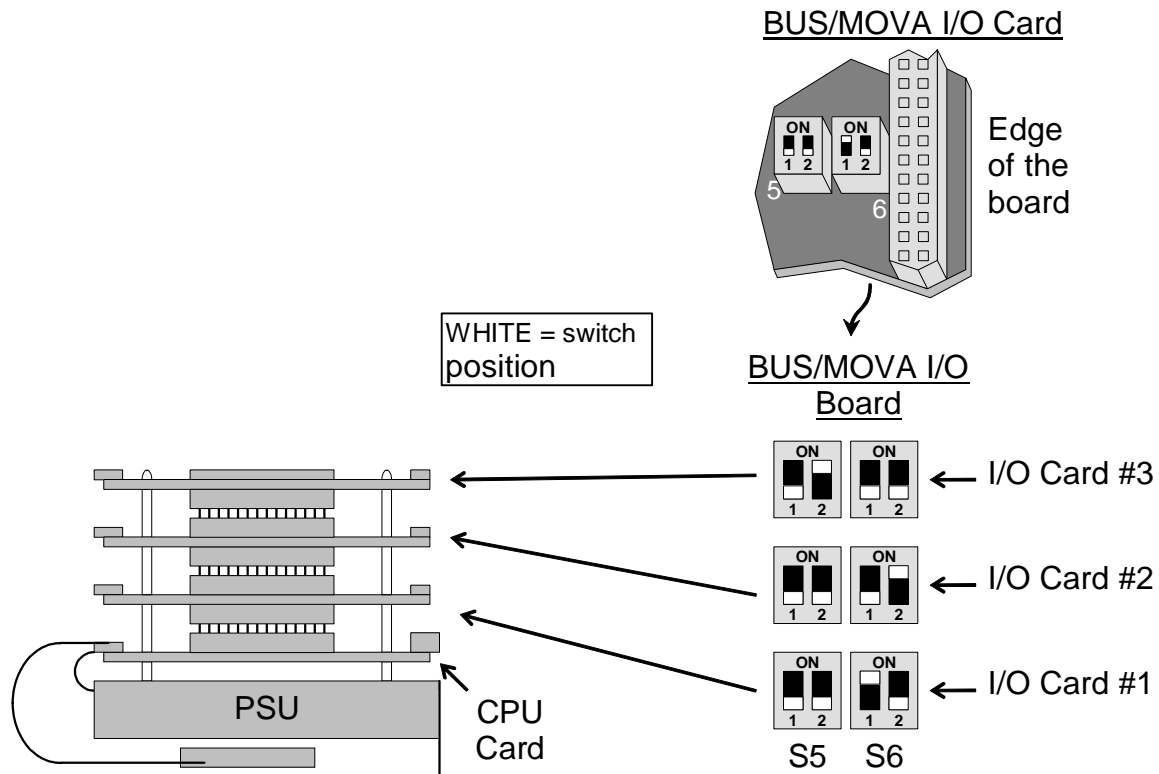


Figure 4.1 - IO Card(s)


⚠ : On each I/O card, only one of the three card address switches should be in the 'ON' position while the unit is powered.

4.2.2 Modem Power Supply Selection

| STEP | FUNCTION | REFERENCE |
|------|------------------------------|-----------|
| 5 | Set up modem power selection | 4.2.2 |

The Processor card normally provides the modem power. Two voltage supplies are available on this card: 5V (400mA) and 12V (1000 mA) connector PL3 as follows:-

| Cableform Position | Voltage Supply |
|--------------------|----------------|
| PL3 socket 3 | 5V Supply |
| PL3 socket 2 | 12V Supply |
| PL3 socket 1 | 0V Supply |

 : Before connecting the plug into the modem with the unit powered up, check with a multi-meter that the correct power supply selection has been made.

Connection of MultiTech MT5634IND Lease Line Modem

Wire the fused power cable to plug 531/4/03539/000 and insert into CPU card connector PL3. Check the voltage with meter before connecting to modem.

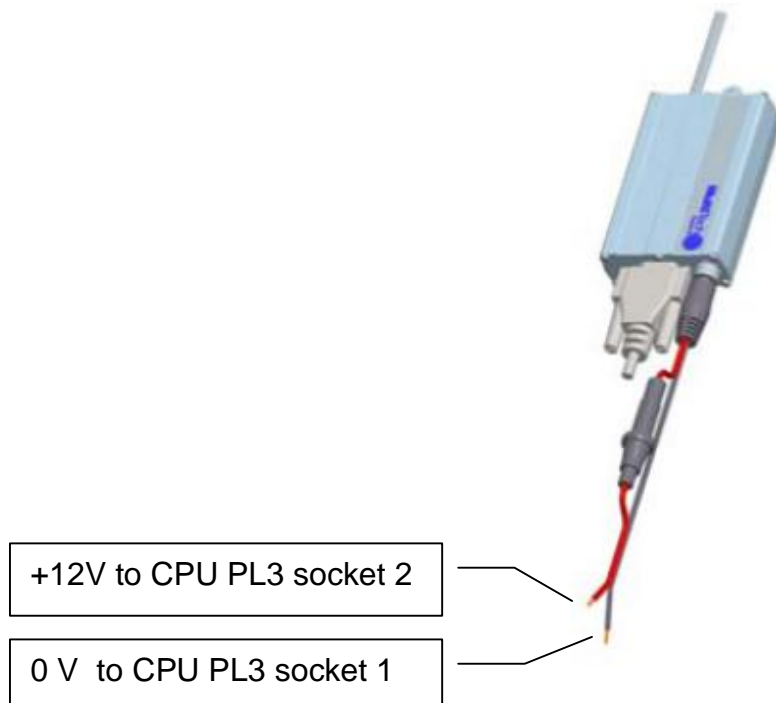


Figure 4.2 – Lease Line Modem Power Connections

Connect the modem line centre pair of wires (normally red and green) to the 2-wire lease line circuit.

Connect the modem serial port to 9-Way 'D' Type on ribbon cable connected to Plug PL2 on the CPU card.

4.2.3 120/230V AC Operation

| STEP | FUNCTION | REFERENCE |
|------|--|-----------|
| 7 | Set up 120/230V AC operation selection | 4.2.3 |

If the Outstation is connected to a 110V/120V supply then a wire link is required on the supply input connector (PL1 on supply unit) between pins 4 and 5 to provide the correct mains timing reference for ZXO.

The power supply itself operates from 85V to 265V AC and therefore needs no further modification.

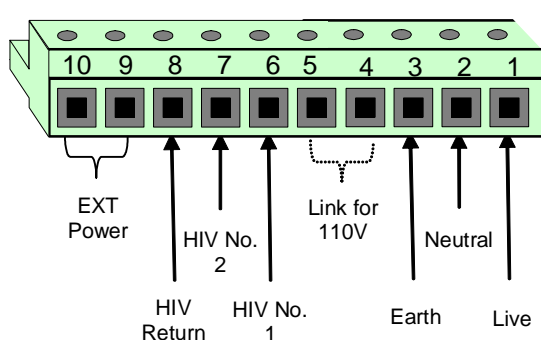


Figure 4.3 - PSU Connectors

| Connector Position | Description |
|--------------------|------------------------------------|
| 1 | Mains supply Live |
| 2 | Mains supply Neutral |
| 3 | Mains supply Earth |
| 4 | Link to 5 for 110V working |
| 5 | Link to 4 for 110V working |
| 6 | High voltage I/P No. 2 (not used) |
| 7 | High voltage I/P No. 1 (not used) |
| 8 | High voltage I/P Return (not used) |
| 9 | External Power (GND) |
| 10 | External Power (13.8V) |

Before applying the mains power, recheck the correct voltage setting has been selected for the Zero Crossover Mains' Input (ZXO Mains I/P).

4.2.4 RAM RTC Back-Up

| STEP | FUNCTION | REFERENCE |
|------|---|-----------|
| 8 | Enable RTC battery and confirm the watchdog link is correctly installed | 4.2.4 |

RTC Battery

The Processor card has a Lithium Coin Cell battery fitted to support the Real Time Clock during periods of mains failure. When dispatched from the factory this battery has

a small piece of film inserted between it and the associated holder. This must be pulled out to enable the battery to function.

Watchdog link

Ensure the watchdog link is installed across pins 1 and 2 of PL6 on the Processor card.

4.3 INSTALLATION INTRODUCTION

| STEP | FUNCTION | REFERENCE |
|------|---|------------|
| 9 | Install unit and connect safety earth lead to cabinet earth point | 4.3 to 4.5 |

A standard hardware installation, in terms of location and cable routing, is not possible, as different manufacturer's cabinets differ in size, model and occupancy. Use of the following guidelines provides a level of standardisation.

4.4 HARDWARE INSTALLATION

4.4.1 General Installation

The unit assembly is a 3U extended unit, requiring 192mm of 3U rack space. This, together with configurable cableforms, provides sufficient flexibility to install the hardware in most enclosures, in one of the three positions described below. Also see section 5.5 for details of part numbers.

- (a) The unit may occupy space in a suitable rack with sufficient space in a cabinet. See the bottom half of drawing 667/GA/26577/000, referenced in Appendix A.
- (b) If no suitable rack space exists as in (a), the unit rack mounting facility can be used (the M6 screws in rack angles) to allow the unit installation. See the top half of 667/GA/26577/000 drawing, referenced in Appendix A.
- (c) If options (a) and (b) are not available, then an alternative suitable method should be adopted, with the collaboration of Poole Engineering or use an Additional Outercase. If the Additional Outercase method is used, then additional installation work is required (see section 5.7 of the Gemini² Traffic Outstation Handbook for details).
- (d) If the unit is to be mounted in such a way that the 'Battery Warning Label' is visible on the top of the unit then the following modifications are necessary. This is to ensure that the battery is not operating upside down.
 - Ensure the Battery Fuse is **not installed**
 - Temporarily dismantle the PSU
 - Remove the metal cover (NB Do not remove any modem attached to this cover)
 - Disconnect the battery connection leads
 - Cut away the Battery retention tie wraps
 - Rotate the battery through 180 degrees

- Re-secure the battery using new tie wraps, ensuring that the other set of 4 holes is used (See Appendix A.2 (a) for the drawing)
- Replace the cover
- The Outstation is now ready for installation.

4.5 CABLE AND WIRING

It is not possible to adopt a standard cable routing, but the following guidelines should be adhered to:

- (a) Secure all cables to the controller frame or other suitable locations.
- (b) Cables should not obstruct the maintenance work on the controller, the unit being installed, or any other equipment fitted within the cabinet.

4.6 INTERFACING

4.6.1 RS232 Handset Interface

Type

Cannon DP 25-way socket. RS232C CCITT V24 and V28

Pin Allocation (see section B.4 for serial cable wiring)

Pin 1 – Protective ground
Pin 2 – Transmit data from terminal to controller
Pin 3 – Received data from controller to terminal
Pin 4 – Request to send
Pin 5 – Clear to send
Pin 6 – Data set ready
Pin 7 – Signal ground
Pin 9 – 5V supply *
Pin 10 – 5V supply *
Pin 18 – 5V supply return
Pin 19 – 5V supply return
Pin 20 – Data terminal ready

* Pins 9 and 10 are connected to the Outstation's 5V logic supply and can supply a maximum of 250mA.

Bit Format

7-bit, even parity, 1 stop bit.

Baud Rate

Auto-switching 57,600, 19200 and 1200 Baud.
NB: 115,200 Baud is used for ppp support.

Mode

Full duplex

4.6.2 Processor Card and IO Card Digital IO

| STEP | FUNCTION | REFERENCE |
|------|--------------------|-----------|
| 10 | Connect digital IO | 4.6.2 |

This section details the digital IO connections on the CPU and digital IO cards.

The tables following show the functions associated with the digital IO connectors on the Processor and IO cards. It shows the Buffered Inputs and Isolated Outputs numbering allocation for the first and second IO cards.

The cable form part number for the Processor card is listed in section 5.6.2.

There are different cable forms that may be connected to the PL1 and PL2 connectors of the BUS/MOVA IO card. These are to cover differing connection requirements. See section 5.6.2 for cable part numbers.



: The wire colouring for the cables connected to PL1 and PL2 on the BUS/MOVA IO card is identical, so ensure that wiring looms for PL1 and PL2 are clearly identified.

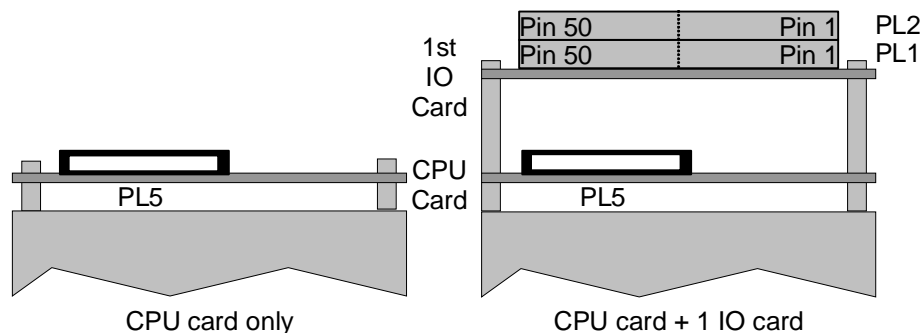
Processor Card Connector PL5 Connector Allocation

| Pin | Wire Colour | Processor PL5 |
|-----|----------------|----------------|
| 1 | Red / Orange | n/open O/P 1 |
| 2 | Red / White | common 1 |
| 3 | Orange / White | n/closed O/P 1 |
| 4 | Blue / Orange | n/open O/P 2 |
| 5 | Blue / White | common 2 |
| 6 | Orange / Slate | n/closed O/P 2 |
| 7 | White | I/P Common Ret |
| 8 | Blue | Buffered I/P 1 |
| 9 | Yellow | Buffered I/P 2 |
| 10 | Brown | Buffered I/P 3 |
| 11 | Violet | Buffered I/P 4 |
| 12 | Orange | Buffered I/P 5 |
| 13 | Slate | Buffered I/P 6 |
| 14 | Pink | Buffered I/P 7 |
| 15 | Blue / Green | Buffered I/P 8 |

BUS/MOVA IO Card Connector PL1 and PL2 Connector Allocation

| Pin | Wire Colour | Card 1 PL1 | Card 1 PL2 | Card 2 PL1 | Card 2 PL2 |
|-----|----------------|-----------------|-----------------|-----------------|-----------------|
| 1 | Blue | Buffered I/P 1 | Buffered I/P 25 | Buffered I/P 49 | Buffered I/P 73 |
| 2 | Yellow | Buffered I/P 2 | Buffered I/P 26 | Buffered I/P 50 | Buffered I/P 74 |
| 3 | Brown | Buffered I/P 3 | Buffered I/P 27 | Buffered I/P 51 | Buffered I/P 75 |
| 4 | Violet | Buffered I/P 4 | Buffered I/P 28 | Buffered I/P 52 | Buffered I/P 76 |
| 5 | Orange | Buffered I/P 5 | Buffered I/P 29 | Buffered I/P 53 | Buffered I/P 77 |
| 6 | Slate | Buffered I/P 6 | Buffered I/P 30 | Buffered I/P 54 | Buffered I/P 78 |
| 7 | Pink | Buffered I/P 7 | Buffered I/P 31 | Buffered I/P 55 | Buffered I/P 79 |
| 8 | Red / Blue | Buffered I/P 8 | Buffered I/P 32 | Buffered I/P 56 | Buffered I/P 80 |
| 9 | Red / Green | Buffered I/P 9 | Buffered I/P 33 | Buffered I/P 57 | Buffered I/P 81 |
| 10 | Red / White | Buffered I/P 10 | Buffered I/P 34 | Buffered I/P 58 | Buffered I/P 82 |
| 11 | Red / Brown | Buffered I/P 11 | Buffered I/P 35 | Buffered I/P 59 | Buffered I/P 83 |
| 12 | Red / Orange | Buffered I/P 12 | Buffered I/P 36 | Buffered I/P 60 | Buffered I/P 84 |
| 13 | Red / Slate | Buffered I/P 13 | Buffered I/P 37 | Buffered I/P 61 | Buffered I/P 85 |
| 14 | Blue / Green | Buffered I/P 14 | Buffered I/P 38 | Buffered I/P 62 | Buffered I/P 86 |
| 15 | Blue / White | Buffered I/P 15 | Buffered I/P 39 | Buffered I/P 63 | Buffered I/P 87 |
| 16 | Blue / Brown | Buffered I/P 16 | Buffered I/P 40 | Buffered I/P 64 | Buffered I/P 88 |
| 17 | Blue / Orange | Buffered I/P 17 | Buffered I/P 41 | Buffered I/P 65 | Buffered I/P 89 |
| 18 | Blue / Slate | Buffered I/P 18 | Buffered I/P 42 | Buffered I/P 66 | Buffered I/P 90 |
| 19 | Green / Orange | Buffered I/P 19 | Buffered I/P 43 | Buffered I/P 67 | Buffered I/P 91 |
| 20 | Green / Brown | Buffered I/P 20 | Buffered I/P 44 | Buffered I/P 68 | Buffered I/P 92 |
| 21 | Green / Slate | Buffered I/P 21 | Buffered I/P 45 | Buffered I/P 69 | Buffered I/P 93 |
| 22 | Brown / Slate | Buffered I/P 22 | Buffered I/P 46 | Buffered I/P 70 | Buffered I/P 94 |
| 23 | Orange / Brown | Buffered I/P 23 | Buffered I/P 47 | Buffered I/P 71 | Buffered I/P 95 |
| 24 | Orange / Slate | Buffered I/P 24 | Buffered I/P 48 | Buffered I/P 72 | Buffered I/P 96 |
| 25 | White | I/P Common Ret | I/P Common Ret | I/P Common Ret | I/P Common Ret |
| 26 | White | I/P Common Ret | I/P Common Ret | I/P Common Ret | I/P Common Ret |
| 27 | Blue | n/open O/P 1 | n/open O/P 9 | n/open O/P 17 | n/open O/P 25 |
| 28 | Yellow | n/closed O/P 1 | n/closed O/P 9 | n/closed O/P 17 | n/closed O/P 25 |
| 29 | Brown | common 1 | common 9 | common 17 | common 25 |
| 30 | Violet | n/open O/P 2 | n/open O/P 10 | n/open O/P 18 | n/open O/P 26 |
| 31 | Orange | n/closed O/P 2 | n/closed O/P 10 | n/closed O/P 18 | n/closed O/P 26 |
| 32 | Slate | common 2 | common 10 | common 18 | common 26 |
| 33 | Pink | n/open O/P 3 | n/open O/P 11 | n/open O/P 19 | n/open O/P 27 |
| 34 | Red / Blue | n/closed O/P 3 | n/closed O/P 11 | n/closed O/P 19 | n/closed O/P 27 |
| 35 | Red / Green | common 3 | common 11 | common 19 | common 27 |
| 36 | Red / White | n/open O/P 4 | n/open O/P 12 | n/open O/P 20 | n/open O/P 28 |
| 37 | Red / Brown | n/closed O/P 4 | n/closed O/P 12 | n/closed O/P 20 | n/closed O/P 28 |
| 38 | Red / Orange | common 4 | common 12 | common 20 | common 28 |
| 39 | Red / Slate | n/open O/P 5 | n/open O/P 13 | n/open O/P 21 | n/open O/P 29 |
| 40 | Blue / Green | n/closed O/P 5 | n/closed O/P 13 | n/closed O/P 21 | n/closed O/P 29 |
| 41 | Blue / White | common 5 | common 13 | common 21 | common 29 |
| 42 | Blue / Brown | n/open O/P 6 | n/open O/P 14 | n/open O/P 22 | n/open O/P 29 |
| 43 | Blue / Orange | n/closed O/P 6 | n/closed O/P 14 | n/closed O/P 22 | n/closed O/P 30 |
| 44 | Blue / Slate | common 6 | common 14 | common 22 | common 30 |
| 45 | Green / Orange | n/open O/P 7 | n/open O/P 15 | n/open O/P 23 | n/open O/P 31 |
| 46 | Green / Brown | n/closed O/P 7 | n/closed O/P 15 | n/closed O/P 23 | n/closed O/P 31 |
| 47 | Green / Slate | common 7 | common 15 | common 23 | common 31 |
| 48 | Brown / Slate | n/open O/P 8 | n/open O/P 16 | n/open O/P 24 | n/open O/P 32 |
| 49 | Orange / Brown | n/closed O/P 8 | n/closed O/P 16 | n/closed O/P 24 | n/closed O/P 32 |
| 50 | Orange / Slate | common 8 | common 16 | common 24 | common 32 |

Viewed from Rear



4.6.3 Post Installation Checks

| STEP | FUNCTION | REFERENCE |
|------|----------------------------------|-----------|
| 11 | Complete post installation check | 4.6.3 |

(a) Routing of cables

Signals for the following groups may be bunched together but must not be grouped to other cables or other cabinet signals to reduce the occurrence of extraneous signals causing interference.

- Group 1 – Digital Level Signals
- Group 2 – Mains Voltage Signals

(b) Earth Continuity

The EARTH CONTINUITY RESISTANCE must not exceed 0.5 Ω on exposed metal parts of the unit when measured with reference to the EARTHING TERMINATION POINT of the cabinet.

4.6.4 Cable Form Identification

| STEP | FUNCTION | REFERENCE |
|------|-------------------------------------|-----------|
| 12 | Identify all connectors/cable forms | 4.6.4 |
| 13 | Connect all connectors to the unit | — |

The label sleeve attached to all Monitoring Cable Form Assemblies, with the specific purpose of identifying the I/O Board and connector to which the cable form assembly is connected, should be marked with a permanent marker pen to identify its connector ID and board location, as follows:

For example: 'PL1/1' = Plug 1 – Board 1
 'PL4/3' = Plug 4 – Board 3

All the cables should be connected to the unit at this point.

4.6.5 Mains Supply Connection

| STEP | FUNCTION | REFERENCE |
|------|----------------------------------|-----------|
| 14 | Connect the unit to mains outlet | 4.6.5 |
| 15 | Switch on unit supply | – |



: IMPORTANT: The wires in the mains lead are coloured as follows:

BROWN – LIVE

BLUE – NEUTRAL

GREEN / YELLOW – EARTH.

Mains power is supplied to the unit through 6A rated cables.

Normally the unit is powered from an auxiliary mains supply provided within the enclosure. In enclosures without this facility or if this is not convenient, a suitable alternative mains supply must be provided, being careful not to compromise the safety of the controller. A suitable disconnect device must be provided for this supply. (Refer to Poole Engineering if in doubt).

Mains fused: The recommended rating of this external fuse is up to 5A anti-surge.

4.6.6 Connect Unit Support Battery

| STEP | FUNCTION | REFERENCE |
|------|------------------------------|-----------|
| 16 | Connect unit support battery | 4.6.6 |

To connect the Unit Support Battery, the fuse (Part Number 518/4/90285/008 supplied separately), is inserted in the Battery Fuse Holder. If the unit is to be left not powered after installation, this fuse should be removed and stored in a safe place, ready for insertion during commissioning.

5. MAINTENANCE

WARNING

THE MAINS SUPPLY TO THE UNIT MUST BE SWITCHED OFF PRIOR TO ANY MAINTENANCE WORK BEING CARRIED OUT ON THE UNIT.

ANY UNAUTHORISED USE OF COMPONENTS OR MODIFICATIONS OR ENHANCEMENTS WITHOUT PRIOR APPROVAL BY SIEMENS COULD RESULT IN INVALIDATION OF THE TYPE APPROVAL OF THIS PRODUCT.

THIS EQUIPMENT MAY ONLY BE MAINTAINED BY APPROPRIATELY TRAINED PERSONNEL.

THIS UNIT CONTAINS BATTERIES WHICH, UNDER FAULT CONDITIONS, MAY LEAK HAZARDOUS SUBSTANCES. CARE MUST BE TAKEN WHEN REPLACING BATTERIES OR HANDLING THE UNIT.

REPLACE BATTERIES WITH ONLY THE SAME OR EQUIVALENT TYPE. DISPOSE OF USED BATTERIES BY RETURNING TO POOLE SITE OR DEPOT. BATTERIES REPLACED INCORRECTLY COULD CAUSE AN EXPLOSION.

5.1 INTRODUCTION

Only skilled or instructed personnel with relevant technical knowledge and experience, who are also familiar with the safety procedures required when dealing with modern electrical/electronic equipment, are to be allowed to use and/or work on the equipment. All work shall be performed in accordance with the Electricity at Work Regulations 1989 or the relevant local, state and government regulations.

5.2 FIRST LINE

The authorised agent is restricted to first line maintenance work only. Maintenance work beyond first line should be referred to Siemens.

The authorised agent may replace the following:

- (a) Card
- (b) Fuse
- (c) Connector
- (d) Interface Cable
- (e) Battery
- (f) Modem
- (g) PSU

5.3 FAULT FINDING

The unit is a modular design, which simplifies fault finding to a card or assembly level. Section 6, which starts on page 38, provides guidelines to fault finding and repair to modular level. The status LED indicators on the Processor card provide a visual identification of the fault condition existing on the unit.

The software has a diagnostic routine which, when accessed by the handset, can identify many other types of fault conditions.

5.3.1 LED Indications

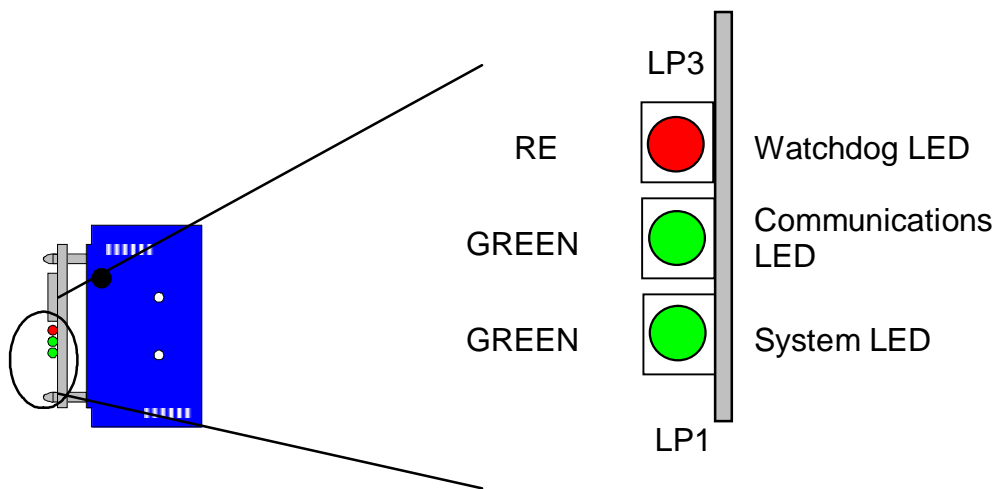


Figure 5.1 - LED Indicators

The three LED indicators on the Processor card give the following status or fault indication:

| LED Name | State | Indication |
|----------------------------|---|---|
| System LED (GREEN) | OFF | No power or Processor error |
| | Slow Flash (on for 1 sec, off for 2 sec) | Normal operation |
| | Fast Flash (on for 1/4 sec, off for 1/2 sec) | A fault has been detected – check the Fault Table screen on the web interface. |
| | Heart Beat (two flashes in 1 second, then off for 1 second) | Main software not executing. Running bootloader and waiting local software update. |
| | Fading up and down in brightness | Main software not executing. Running 'launcher' program and waiting local software update. |
| | ON Steady | Processor error |
| Communications LED (GREEN) | OFF | No data being received from the network |
| | Brief flashes | Communications traffic |
| | ON with brief flashes OFF | Communication established and under control of the instation |
| Watchdog LED (RED) | OFF | The Processor is running and keeping the watchdog triggered. |
| | ON | The hardware watchdog has timed out sometime in the past. When illuminated, this does not mean that the unit is currently in a watchdog state. To clear: Hold down the Processor card Reset button for 2 seconds. |

5.4 ROUTINE MAINTENANCE

Units only require annual maintenance, which can be performed at the same time as the inspection of other equipment. On these visits, trained personnel must switch off the mains power to the controller and the unit.

5.4.1 Annual Maintenance

The following battery capacity test is only required if the outstation is powering the modem directly. The battery capacity test is not required when the modem is mains powered.

Switch the mains power off and check the outstation and modem is supported by the battery for a minimum of 5 minutes. Do this by checking that the System LED continues to flash and that the modem power LED remains illuminated. This tests the condition of the Unit Support battery, and if the unit loses support within 5 minutes, the battery must be replaced.

Remove the mains power and the battery fuse, which will power down the unit and carry out all the following procedures:

- (a) General inspections of the unit in situ for any contamination, overheating of components, corrosion or battery leakage. Rectify where necessary.
- (b) Check the tightness of all interface cables and re-tighten where necessary.
- (c) Check the condition of the interface cables; making sure there is no chafing of the insulation and that the general condition of the insulation is good. Replace any damaged or worn cables.
- (d) Check the mechanical tightness of the main securing screws of the unit and re-tighten where necessary.
- (e) Replace the battery fuse, restore mains power to the controller and the unit.

This completes the annual maintenance of the unit.

5.4.2 5-Yearly Maintenance

It is recommended that every five years, in addition to the annual maintenance routine described above, all batteries be replaced. See Section 5.6.3 for battery part numbers.

5.5 PART NUMBERS

| | |
|---|-----------------|
| Gemini ² CPU PCB..... | 667/1/26608/999 |
| Gemini ² PSU PCB Assembly | 667/1/32604/000 |
| Gemini ² Aux PSU PCB Assembly | 667/1/26560/000 |
| Basic Gemini ² Outstation (Processor & PSU only, no modem) | 667/1/32605/000 |
| OTU 19" rack (2U modem tray) – see 2.3 for other variants | 667/1/31601/519 |
| ST4S Detector..... | 667/1/27663/000 |
| 24V 50VA Transformer kit..... | 667/1/27853/002 |
| Detector Cable Termination kit..... | 667/1/15854/000 |
| Digital IO Expansion kit | 667/1/26580/003 |
| Traffic Outstation mounting kit..... | 667/1/26577/000 |
| Gemini Battery kit..... | 667/1/30615/000 |

5.6 SPARES

The authorised maintenance agent should hold the following spares. Some of the parts listed in Section 5.5 above are also available as spares. Contact Siemens Poole for details.

5.6.1 General

| | |
|---------------------------------|-----------------|
| BUS/MOVA IO Card Assembly | 667/1/27881/000 |
|---------------------------------|-----------------|

| | |
|--|-----------------|
| BUS/MOVA Digital IO Card Assembly (no RS485) | 667/1/27881/001 |
| Freestanding MOVA I/O Kit Any Controller | 667/1/28855/001 |
| Generic IO Card Assembly..... | 667/1/31124/001 |
| PSU I/P 85-264V AC O/P 13.65V 3A | 667/7/30613/000 |

5.6.2 Interface Cables

| | |
|---|-----------------|
| CPU IO Cable | 667/1/30607/000 |
| Ethernet Cable | 998/4/88323/000 |
| Gemini mains cable..... | 667/1/30609/000 |
| Controller Serial Cable Standard..... | 667/1/26579/000 |
| Controller Serial Cable Peek/C3000/TCL/Monitron | 667/1/26579/001 |
| Controller Serial Cable Microsense | 667/1/26579/002 |
| BUS/MOVA I/O Cable (no Terminal Blocks) | 667/1/26585/005 |
| BUS/MOVA I/O Cable (with Terminal Blocks) | 667/1/26585/003 |

5.6.3 Batteries

| | |
|---|-----------------|
| RTC Back-up Battery – 3V Coin Cell..... | 418/4/53433/000 |
| Outstation Back-up Battery – 12V Sealed Lead Acid | 418/4/42314/010 |

Note:

1. Lead Acid Batteries have a one-year shelf life, if stored at below 20°C, at which stage they must be recharged to maintain their efficiency. Consult the manufacturer's data for this recharge procedure. It is recommended that batteries should not be held as spares, but ordered as and when required from Siemens Poole.
2. When replacing the battery take particular note of its orientation. The battery must not be installed upside down (i.e. the connections tags must be pointing upwards). See section 4.4.1 on page 28.

5.6.4 Fuses

| | |
|--|--------------------|
| Lead Acid Battery Fuse (5mm x 20mm – 5A 250V QB) | 518/4/90285/008 |
| Processor (5mm x 20mm – 250mA 250V QB) | 516/4/90285/011 |
| BUS/MOVA IO Card (5mm x 20mm – 250mA 250V QB) | 518/4/90285/011 |
| Fuse Holder for BUS/MOVA IO Card Fuse | 516/4/97060/000 |
| MT5634IND Modem Fuse (6.35 x 31.75 – 2.5A 250V) | LittleFuse 31302.5 |

6. UTMC OTU

6.1 INTRODUCTION

The features of the UTMC OTU are outlined in section 2.1 and the available software and hardware versions are described in sections 2.2 and 2.3 respectively. The OTU uses IP network ports and services as described in Appendix E, section E.2

The information in this section is organised as follows:-

- How to configure a semi-integral OTU – see 6.2
- How to configure a freestanding OTU – see 6.3
- How to switch from Full UTC (UTC Type 2) to Simple UTC (UTC Type 1) – see 6.4
- How to use the Remote Handset – see 6.5
- Descriptions of the OTU and MOVA web screens – see 6.6 to 6.11

6.2 ACTIONS TO CONFIGURE A SEMI-INTEGRAL OTU

This section describes typical sequence of operations to be carried out when configuring a semi-integral UTMC OTU. The actions to configure a freestanding OTU are described in section 6.3.

It is assumed that:-

1. The controller has already been installed and configured for serial UTC control
2. The junction data has been defined and entered into the UTC instation
3. The “CSV” file for the junction has been exported from the UTC instation and is available. The CSV file defines the control and reply bit functions required on the outstation equipment.
4. The OTU has been installed and loaded with the correct firmware (see 2.2)
5. The OTU is the semi-integral version with serial link to the ST700/750/800/900 family controller for UTC control, reply and SCOOT detectors.
6. The outstation network settings (IP Address etc) have been provided by the network administrator – either the customer or the relevant IP provider’s organisation

6.2.1 Putting the OTU onto the Network

1. Power up the OTU
2. Connect a terminal to the handset port (57600baud, 7 bits, even parity).
3. Press <CR> key until SIEMENS appears.
4. Enter username and password.

Use WIZ command and navigate the menus using keys as follows:-

1,2,3,4 select the menu option

<CR> back up one level

+ more menu options (where more than 4 available)

- move back to previous menu options (where more than 4 available)

Enter the IP address of the Outstation using:

2> Config/Status - 1> Basic Config - 2* Eth IP Address

Enter the Ethernet IP Netmask using:

3> Ethernet IP Netmask

Move to the next set of options using the **+** key:

+

Enter the Ethernet IP Gateway (if required) using:

1- Ethernet IP Gateway

Enter the Site name using:

2> Site Name usually the SCN e.g. X11990



: The site name should match the SCN used to reference the site at the instation.

Move back to the first set of options using the **-** key:

-

Enable Ethernet using:

1* Eth IP Mode and select "1" for Manual.

5. Use the ping command to check that the instation IP address is accessible from the OTU.
6. The OTU should now be accessible on the network
7. The remaining configuration can be performed via the web interface (either locally or remotely).

6.2.2 Configuring the OSS and IP Gateway

1. Using a PC on the network or via the ppp interface (see Appendix B), point a browser to the outstation IP address or use the “OTU Webpage” link on the instation Data Preparation screen.
2. Enter the web username and password.
3. Select the “StatusConfig” screen from the top menu.
4. Expand “Basic Config” by clicking +
5. Select “DSL/Fiber” where the outstation is connected via Ethernet and then enter data as follows:-

SIEMENS Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config

GVP Gemini Outstation

DSL/Fiber

Ethernet IP Mode ?

Ethernet IP Address ?

Ethernet IP Netmask ?

Ethernet IP Broadcast ?

Ethernet IP Gateway ?

Site Name ?

OSS Address ?

Enable OSS interface ? ☒

Enable OSS backup ? ☒

Click “Save” to apply changes

Enter IP Gateway address if provided

For remote update and configuration backup, enter the OSS address and enable OSS interface & backup.

For detailed information on the fields, see reference 1.3.1

6.2.3 Importing the CSV file

The CSV file is generated at the instation and defines the control and reply bits to be used on the OTU. See Appendix G for example CSV file content.

The screenshot shows the Siemens GVP Gemini Outstation OSE Config screen. The top navigation bar includes links: Home, SiteLog, FaultTable, Upgrade, ConfigImportExport, SystemLog, System, StatusConfig, Controller Log, Controller Files, UTC Override, and OSE Config. The main content area is divided into three panes. The left pane, titled 'Import CSV File?', contains a 'Browse...' button, radio buttons for 'Freestanding OTU' (selected) and 'Semi-Integral OTU', an 'Import' button, a 'Go to UD Options' button with a question mark, and an 'Add Site' button with a question mark. The middle pane, titled 'Please Select A Site', contains the text 'Use the pane to the left to select a site'. The right pane, titled 'Import CSV File', contains instructions: 'Import a CSV file, generated at the instation, to define the mapping of UTC/MOVA control and reply bits to the controller.' and 'To import:' followed by a list of steps: 'Press the 'Browse' button, and navigate to select an in-station CSV file from your computer.', 'Press 'Import' to upload the selected file.', and 'Add Uni Directional Loops if required using "Go to UD Options" button.'.

1. Select the OSE Config screen from the top menu

2. Select Browse, navigate to the location of the csv file and select Open

3. Select either the Freestanding OTU or Semi-Integral OTU radio button as appropriate

4. Click Import to process the csv file and create one or more Sites on the left-hand pane

6.2.4 Modifying and Saving the I/O Bit Mapping

1. Select the Site to edit.

NB: UTC offsets start at 1. Values of 0 are used for locally generated signals.

2. Control and reply bits are given a default mapping from the csv file. This mapping can be changed if required.

3. Use "Submit" to save the changes on each screen.

4. Check SCOOT detector mapping (see following page).

5. Use "Save to File" to activate and store all changes.

Site Name ? : J11991

Edit Site Contents: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert |
|-------|------|-------------|------------|-------------------|------|--------------------------|
| TC | - | 0 | Output | csi.utc.to.out.1 | 1 | <input type="checkbox"/> |
| F | 1 | 1 | Output | csi.control.out.1 | 1 | <input type="checkbox"/> |
| F | 2 | 2 | Output | csi.control.out.1 | 2 | <input type="checkbox"/> |
| G | 1 | 1 | Input | csi.reply.in.1 | 1 | <input type="checkbox"/> |
| G | 2 | 2 | Input | csi.reply.in.1 | 2 | <input type="checkbox"/> |
| DF | - | 4 | Input | csi.reply.in.1 | 4 | <input type="checkbox"/> |

Add Bits Table:?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? |
|-------|------|-------------|------------|------------|--------------|
| | | auto | 0 | auto | busmov1.in.1 |

Submit ?

Save to File ?

Revert Changes ?

Getting Started

This screen allows configuration of the mapping between UTC/MOVA control and reply bits, and the controller interface.

CSV files generated by the instation can be imported here, to define the bit mappings. Alternatively, a new configuration can be created and the bit mappings entered individually.

When updating the configuration, first use the "Submit" button to hold the results of the edits to each site in turn, then use the "Save to File" button to make all changes permanent and active.

Any changes (including CSV import) will not be applied until the "Save to File" button is pressed.

6.2.5 SCOOT Detector Mapping via Controller Serial Link

The controller can be configured to pass SCOOT detectors to the OTU via the serial link. This is configured on the IC4 “serial MOVA/UTC” screen. It is recommended that SCOOT loop 1 is allocated to detector 64, SCOOT loop 2 is allocated to detector 63, etc to avoid clashing with MOVA detectors, which are allocated from 1 upward.

1. Select the SCOOT detector site to edit.

2. Modify the detector bit numbers to match the detector allocations on the IC4 “Serial MOVA” screen.

3. SCOOT detectors are routed via the controller using port “csi.det.in.1”.

4. Use "Submit" to save the changes to the screen and then when all changes completed use “Save to File”.

SIEMENS Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config

GVP Gemini Outstation

Site Name ? : X11990

Edit Site Contents: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? | DFM Act? (min) |
|-------|------|-------------|------------|--------------|------|--------------------------|----------------|
| VS | 1 | 17 | Input | csi.det.in.1 | 64 | <input type="checkbox"/> | 0 |
| VS | 2 | 21 | Input | csi.det.in.1 | 63 | <input type="checkbox"/> | 0 |
| VS | 4 | 29 | Input | csi.det.in.1 | 61 | <input type="checkbox"/> | 0 |

Bit

Indicates how this item is wired to the controller in the case of IOCard, or the serial bit it is assigned in the case of Serial Link

Add Bits Table: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? |
|-------|------|-------------|------------|------------|---------------|---------|
| | | auto | 0 | auto | busmova1.in.1 | 0 |

Submit ?

Save to File ?

6.2.6 SCOOT Detector Mapping via OTU I/O Card

Where an existing Gemini OTU is being upgraded, the SCOOT detector wiring would normally be retained i.e. detectors connected directly to the OTU rather than the controller.

1. Select the SCOOT detector site to edit.

2. Modify the SCOOT bit numbers to match the OTU detector wiring – numbers start at 1.

3. SCOOT detectors can be routed via the OTU I/O using port "busmova1.in.1". for I/O card 1 etc

4. Use "Submit" to save the changes to the screen and then when all changes completed use "Save to File".

6.3 ACTIONS TO CONFIGURE A FREESTANDING OTU

This section describes typical sequence of operations to be carried out when configuring a freestanding UTMC OTU.

6.3.1 Putting the OTU onto the Network

As for semi-integral OTU - see section 6.2.1.

6.3.2 Configuring the OSS and IP Gateway

As for semi-integral OTU - see section 6.2.2.

6.3.3 Importing the CSV file

As for semi-integral OTU - see section 6.2.3.

6.3.4 Configuring the controller serial link

1. Go to the Status Config web page and select the Controller Serial Link Screen (see section 6.6.5 for screenshot).
2. De-select 'Enable Semi-Integral Link to Siemens Controller'
3. Select the correct baud rate for the controller from the pull-down list.
4. Save the settings.
5. To check the link, start a handset session either via Telnet or direct terminal connection; then type in XXC and once connected, type in the controller commands and check for the expected response.
6. If there is no response, unplug the outstation from the controller and start a direct terminal connection to the controller. Check the baud rate with that selected on the Controller Serial Link Screen.
7. Some controller require use of an alternative variant serial cable with part number 667/1/26579/001 (C3000 & TLC) or 667/1/26579/001 (Microsense).

6.3.5 Modifying and Saving the I/O Bit Mapping for Freestanding OTU

1. Select the Site to edit.

NB: UTC offsets start at 1. Values of 0 are used for locally generated signals.

2. All reply bits, except SCOOT, should be inverted.

3. Control and reply bit mapping must match the controller interface wiring. Numbers start at 1 not 0.

4. Use "Submit" to save the changes on each screen.

5. Use "Save to File" to activate and store all changes.

Site Name ? : J11991

Edit Site Contents: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? |
|-------|------|-------------|------------|---------------|------|-------------------------------------|
| TC | - | 0 | Output | busmov1.out.1 | 16 | <input type="checkbox"/> |
| F | 1 | 1 | Output | busmov1.out.1 | 1 | <input type="checkbox"/> |
| F | 2 | 2 | Output | busmov1.out.1 | 2 | <input type="checkbox"/> |
| G | 1 | 1 | Input | busmov1.in.1 | 1 | <input checked="" type="checkbox"/> |
| G | 2 | 2 | Input | busmov1.in.1 | 2 | <input checked="" type="checkbox"/> |

Add Bits Table: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? |
|-------|------|-------------|------------|--------------|------|
| | auto | 0 | auto | busmov1.in.1 | 0 |

Submit ?

Save to File ?

Getting Started

This screen allows configuration of the mapping between UTC/MOVA control and reply bits, and the controller interface.

CSV files generated by the instation can be imported here, to define the bit mappings. Alternatively, a new configuration can be created and the bit mappings entered individually.

When updating the configuration, first use the "Submit" button to hold the results of the edits to each site in turn, then use the "Save to File" button to make all changes permanent and active.

6.3.6 SCOOT Detector Mapping via OTU I/O Card

As for semi-integral OTU - see section 6.2.6.

6.3.7 Interfacing with a PEEK Instation

Scout data optimisation should be disabled, see 'Optimise Data Transmission' in section 6.6.6 OTU Advanced Config Screen

6.4 ACTIONS TO SWITCH TO SIMPLE UTC

By default, the OTU configuration is set to run full UTC (UTC type 2). This section describes typical sequence of operations to be carried out in order to switch from full UTC to simple UTC (UTC type 1) operation. This may be required, for example, in order to operate with an instation which has not yet been upgraded to support full UTC.

1. Go to the Status Config web page and select the NTP Screen
2. De-select 'Enable NTP'
3. Save the settings.

SIEMENS

GVP Gemini Outstation

Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System |
StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config

Basic Config

- DSL/Fiber
- LeaseLine
- GPRS
- Basic Status
- ▢ Advanced Config
- ▢ Network
 - Ethernet
 - ▢ DNS
 - OSS
 - Interface
 - **NTP**

NTP

Enable NTP ?
☐

NTP Server ?

NTP Port (Not Set)?

Error Interval (Not Set)?

Summary: Enable NTP

Description: Enable or Disable the Network Time Interface

Default: false

4. Go to the System web page and proceed as follows:-

SIEMENS

GVP Gemini Outstation
Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config

System

Package Partnumber: 667/TZ/32370/000
Package Version: 2.0

To switch to Type 1 UTC,
- Click Type 1 "Start"
- Click Type 2 "Stop"

Applications:

| Name | Description | Part Number | Issue | State | Control |
|---------------|---|------------------|-------|-------------|---------|
| Tester | App to test drivers, etc.. | 000/TZ/00000/000 | 0.0.0 | Not Running | Start |
| Mova1 | MOVA (M6.0.3) application | 667/TZ/32375/000 | 1.2.4 | Not Running | Start |
| Mova2 | MOVA (M6.0.3) application | 667/TZ/32375/000 | 1.2.4 | Not Running | Start |
| Mova3 | MOVA (M6.0.3) application | 667/TZ/32375/000 | 1.2.4 | Not Running | Start |
| Mova4 | MOVA (M6.0.3) application | 667/TZ/32375/000 | 1.2.4 | Not Running | Start |
| UTMCSimpleUTC | UTMC Type 1 UTC (Simple) Application | 667/TZ/32374/000 | 1.2.1 | Not Running | Start |
| UTMCFullUTC | UTMC Type 2 UTC (full) Application | 667/TZ/32373/000 | 1.2.1 | Running | Stop |
| OSEWebConf0 | On Street Equipment (OSE) Web Configuration | 667/TZ/32376/000 | 1.4.1 | Running | Stop |

When the simple UTC application is started and receiving SNMP messages from the instation then UTC control will be activated and the comms LED will be illuminated, flashing off each time an SNMP message is received.

Check the UTC Override Screen (see section 6.10) shows force and reply bits. If no force bits are being activated, check with the instation operator that the outstation is on-control and not isolated. Also check that the outstation configuration of control and reply bits matches the instation.

6.5 REMOTE HANDSET TO CONTROLLER

The user can switch from the outstation terminal through to the controller handset by using the xxc command. No parameters are required. Any further characters entered are passed through to the controller handset and the replies displayed on the terminal screen.

When the session is finished, the user can switch back to the outstation by using the xxo command.

See section 2.2.1 for controller types supported

6.6 OTU & MOVA CONFIG STATUS SCREENS

The following sections detail the additional Config Status screens which are related to the OTU and MOVA applications. These screens are in addition to the general Config Status screens described in reference 1.3.1.

6.6.1 OTU Status Screen

The OTU Status screen displays the current status and transmission statistics for the OTU function. The information for simple UTC (type 1) and full UTC (type 2) is displayed on a single screen. The information will only be populated for the active type – either simple UTC or full UTC.

SIEMENS

GVP Gemini Outstation

Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig |
Controller Log | Controller Files | UTC Override | OSE Config

- Basic Config
 - DSL/Fiber
 - LeaseLine
 - GPRS
- Basic Status
- Advanced Config
 - Network
 - Terminal
 - Digital IO
 - TCL
 - Date and Time
 - OTU Status**
- MOVA Config
 - MOVA
 - Advanced Config
- Controller Serial Link
- OTU Advanced Config

OTU Status

| | |
|---|------------|
| Type 1 UTC connection status (Not Set)? | IDLE |
| Type 1 UTC Good Set Messages (Not Set)? | 0 |
| Type 1 UTC Bad Set Messages (Not Set)? | 0 |
| Type 1 UTC Good Get Messages (Not Set)? | 0 |
| Type 1 UTC Bad Get Messages (Not Set)? | 0 |
| Type 1 UTC Control Timeouts (Not Set)? | 0 |
| Type 2 UTC connection status ? | UTCCONTROL |
| Type 2 UTC reply By exception Active ? | true |
| Type 2 UTC Good Set Messages ? | 16945 |
| Type 2 UTC Bad Set Messages ? | 0 |
| Type 2 UTC Good Get Messages ? | 4245 |
| Type 2 UTC Bad Get Messages ? | 0 |
| Type 2 UTC Good Inform Messages ? | 254134 |
| Type 2 UTC Bad Inform Messages ? | 0 |
| Type 2 UTC synchronisation via NTP ? | true |

Summary: Type 1 UTC
Good Get Messages

Description: Number of valid UTM type 1 UTC Get messages received since last restart

Read Only

http://172.16.100.96/config/frame_body.cgi?group=26
Internet

Type 1 UTC connection status

Indicates if the outstation is currently receiving type 1 UTC Set messages.

Values are:-

IDLE: no messages currently being received.

STARTING: first Set message received.

ACTIVE: messages being received i.e. on-control from instation.

Type 1 UTC Good Set Messages

Number of valid SNMP UTMC type 1 UTC Set messages received since last restart.

Type 1 UTC Bad Set Messages

Number of invalid SNMP UTMC type 1 UTC Set messages received since last restart.

Type 1 UTC Good Get Messages

Number of valid SNMP UTMC type 1 UTC Get messages received since last restart.

Type 1 UTC Bad Get Messages

Number of invalid SNMP UTMC type 1 UTC Get messages received since last restart.

Type 1 UTC Control Timeouts

Number of UTMC type 1 UTC control timeouts since last restart i.e. the number of times missing Set control messages have caused the controller drop off UTC and revert to local control.

Type 2 UTC connection status

Indicates if the outstation is currently receiving type 2 UTC Set messages.

Values are:-

STANDALONE: In standalone mode all output bits are set to zero. Reply bits are not sent but can be polled.

MONITOR: In monitor mode all output bits are set to zero. The OTU sends informs to the instation if enabled in the MIB.

UTCCONTROL: instation control messages being received i.e. on-control from instation.

Type 2 UTC reply By exception Active

Indicates if "reply by exception" operation is currently active:-

true indicates that the outstation is sending timestamped informs to the instation when changes are detected.

false indicates that only polling of inputs is available..

Type 2 UTC Good Set Messages

Number of valid SNMP UTMC type 2 UTC Set messages received since last restart.

Type 2 UTC Bad Set Messages

Number of invalid SNMP UTMC type 2 UTC Set messages received since last restart.

Type 2 UTC Good Get Messages

Number of valid SNMP UTMC type 2 UTC Get messages received since last restart.

Type 2 UTC Bad Get Messages

Number of invalid SNMP UTMC type 2 UTC Get messages received since last restart.

Type 2 UTC Good Inform Messages

Number of SNMP UTMC type 2 UTC Inform messages sent to the instation without requiring retry, accumulated since last outstation restart.

Type 2 UTC Bad Inform Messages

Number of SNMP UTMC type 2 UTC Inform messages sent to the instation that required retransmission, accumulated since last outstation restart.

Type 2 UTC synchronisation via NTP

This field Indicates if the outstation time is currently being synchronised via NTP (Network Time Protocol). NTP synchronisation is required for timestamping of events.

Reload

Press 'Reload' to refresh the data on the screen.

6.6.2 MOVA Config Screen

SIEMENS

GVP Gemini Outstation

Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig |
Controller Log | Controller Files | UTC Override | OSE Config

- Basic Config
 - DSL/Fibre
 - LeaseLine
 - GPRS
- Basic Status
- Advanced Config
 - OTU Status
 - MOVA Config
 - MOVA
 - Advanced Config
 - Controller Serial Link
 - OTU Advanced Config

MOVA Config

Licence Number (LIN part 1) ?

Licence Number (LIN part 2) ?

Licence Facility Code (LIF) ?

MOVA Site 1 Name ?

MOVA Site 2 Name ?

MOVA Site 3 Name ?

MOVA Site 4 Name ?

Base IP Port Number ?

Summary: Licence Number (LIN part 1)

Description: This licence number is required to enable MOVA. Enter the first 4 digits of the value supplied by Poole. The value 9999 in each number can be used to temporarily enable facilities while a permanent licence number is obtained. The temporary licence will expire after 7 days.

Default: 0000

Licence Number (LIN part 1)

This licence number is required to enable MOVA. Enter the first 4 digits of the value supplied by Poole. The value 9999 in each number can be used to temporarily enable facilities while a permanent licence number is obtained. The temporary licence will expire after 7 days.

Licence Number (LIN part 2)

This licence number is required to enable MOVA. Enter the second 4 digits of the value supplied by Poole. The value 9999 in each number can be used to temporarily enable facilities while a permanent licence number is obtained. The temporary licence will expire after 7 days.

Licence Facility Code (LIF)

This licence code is required to enable MOVA. Enter the 6-character string supplied by Poole.


MOVA Site 1 Name

MOVA Site 2 Name

MOVA Site 3 Name


MOVA Site 4 Name

Alpha-numeric string identifying MOVA stream site 1 (or 2 or 3 or 4).

 : This **must** be the same site name as defined on the OSE Config screen for the OTU, or MOVA will not have access to any force and confirm bits.

Base IP Port Number

The MOVA IP listening ports are controlled by this value, e.g. for base of 12000, MOVA 1 uses port 12001, MOVA 2 uses port 12002 etc.. Range 0 to 65535.

 : Change with care as the port number is used by MOVAcmm.

6.6.3 MOVA Advanced Config Screen

The screenshot displays the Siemens MOVA Advanced Config screen. The top navigation bar includes links for Home, SiteLog, FaultTable, Upgrade, ConfigImportExport, SystemLog, System, StatusConfig, Controller Log, Controller Files, UTC Override, and OSE Config. The left sidebar lists various configuration categories, with 'MOVA Advanced Config' highlighted. The main content area is titled 'MOVA Advanced Config' and contains the following settings:

- MOVA Password: AVOMIN
- MOVA Error Threshold for MF Bit: 20
- MOVASIM Compatibility: 0
- MOVA Output Priority: 30

Buttons for 'Save' and 'Reload' are located below the input fields.

MOVA Password

Alpha-numeric string defining the MOVA logon password, controlling access to the MOVA user interface. Default avomin. The password is not case sensitive.

MOVA Error Threshold for MF Bit

MOVA error count required to set the UTC MF reply bit. Range 1 to 50, default 20. Applies to each MOVA stream.

MOVASIM Compatibility

Set this value to 123 to enable operation with TRL MOVASIM via the Semi-Integral controller serial interface. Any other value will select normal operation. For Siemens engineering use only.

MOVA Output Priority

Priority of the MOVA force bits, relative to other force bits such as those from UTC. Range 0 to 50, with 50 being the highest priority. The default is 30. Where a UTC MO bit is configured, this priority should be set higher than UTC (see 6.6.6 for UTC priority setting), so that MOVA can gain control when permitted by UTC.

6.6.4 TMA Log Auto-export Config Screen

This screen is not available in MOVA 6. It allows the start time and period at which TMA logs will be exported to the outstation support server to be configured.

TMA log export start date-time (UTC)

Allows the date and time at which log export starts. This enables a point in the future to be selected – useful after initial installation to prevent logs with minimal data being exported. Where immediate export is required set a date and time equal to or before the current.

Format: dd:mm:yy-hh:nn(UTC) where dd = day 01-31, mm = month 01-12, yy = year 00-37, hh = hour 00-23, nn = minutes 00-59.

Default value is set to:- 01:01:12-00:00

TMA log export period

After log export starts this will set the subsequent period at which they are transmitted.

Format: dd:hh:mm where dd = days (00-31), hh = hour 00-23, mm = minutes 00-59. For example 00:23:00 for 23 hours, 01:12:00 for 36 hours, 00:01:00 for one hour, 00:00:30 for 30 minutes etc. The minimum period is 15 minutes.

Default value is set to a week:- 07:00:00

NB: Changes to the TMA log export period will take affect on completion of the current period ie. if there are 6 days left before the next export occurs and the export period is changed to 1 day it will be 6 days before exports start occurring

every day. If a new logging period is required to start immediately then the export start date-time should be changed to the current time.

6.6.5 Controller Serial Link Screen

Enable Semi-Integral Link to Siemens Controller

Select to Enable the Semi-Integral Link to Siemens Controller. The semi-integral link carries data for UTC, MOVA, detectors, faults and controller handset. Disable for freestanding OTU. Default Enabled.

Freestanding Controller Serial Port Baud Rate

Select the baud rate for the serial handset interface to a freestanding controller. For Semi-Integral Link to Siemens ST700/750/800/900 family controllers, the value is not used.

Controller Diagnostics Upload Interval

Defines the time interval between each retrieval of the controllers Current Fault Flags, and Historic Fault Log. Range 5 to 1440 minutes. Current fault flags are asserted in the main Gemini Fault Table. The Historic Fault Log may be found in the Controller Log tab. Default 10 minutes.

Controller Settings Files Upload Interval

Defines the time interval between each automatic retrieval of the controllers 8UL file and UDD file. Range 10 to 10080 minutes. The 8UL file is an IC4 compatible compressed version of the original controller configuration file, for back up purposes. The UDD file contains a subset of controller settings, and may be viewed and edited in Convert. It may then be sent back to the controller to effect settings changes. Default 1440 minutes (24 hours).

6.6.6 OTU Advanced Config Screen

The settings on this screen should not normally need to be changed.

SIEMENS GVP Gemini Outstation

Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | TMA Logs | OSE Config

- HTTP
- Terminal
- Digital IO
- TCL
- Date and Time
- ▢ License
- System
 - License
- Facilities
- System
- Monitor
- OTU Status
- ▢ MOVA Config
 - MOVA
 - Advanced Config
 - TMA Log Auto-export
- Controller Serial Link
- OTU Advanced Config

OTU Advanced Config

Simple UTC Output Priority ?

UTC Type 2 Output Priority ?

UTC Type 2 instation is NTP server ? ☒

UTC Type 2 Past Command window (seconds) ?

UTC Type 2 Future Command window (seconds) ?

UTC Type 2 Required NTP accuracy (milliseconds) ?

UTC Type 2 optimise data transmission ? ☒

Simple UTC Control Timeout (seconds) ?

Simple UTC Output Priority

Priority of the Simple UTC force bits, relative to other force bits such as those from MOVA. Range 0 to 50, with 50 being the highest priority. The default is 21.

UTC Type 2 Output Priority

Priority of the UTC Type 2 force bits, relative to other force bits such as those from MOVA. Range 0 to 50, default 20.

UTC Type 2 instation is NTP server

When this item is Enabled, the instation IP address is used to set the NTP server address. When Disabled, the NTP server address is defined on the "StatusConfig - Advanced Config - Network - NTP" screen. Default Enabled.

UTC Type 2 Past Command window (seconds)

This is the earliest time difference from now for which SNMP SET requests will be accepted. Commands received with timestamp of more than this number of seconds before the current time will be ignored and an out-of-time-range error will be placed in the system log. Range 1 to 300 seconds. Default 10 seconds.

UTC Type 2 Future Command window (seconds)

This is the latest time difference from now for which SNMP SET requests will be accepted. Commands received with timestamp of more than this number of

seconds after the current time will be ignored and an out-of-time-range error will be placed in the system log. Range 4 to 600 seconds. Default 30 seconds.

UTC Type 2 Required NTP accuracy (milliseconds)

This is the synchronisation accuracy which must be achieved by NTP before the outstation will start timestamped control-reply operation. Range 100 to 1000mS. Default 500 mS.

UTC Type 2 Optimise Data Transmission

When enabled the OTU will not transmit successive duplicate SCOOT data. When connected to a Siemens instation this should be enabled. When connected to a PEEK instation it should be disabled.

Simple UTC Control Timeout (seconds)

Simple UTC control message timeout, in seconds. If no control message is received from the instation for this period of time, then the outstation drops off UTC control. Range 3 to 30 seconds. Default 4 seconds.

6.7 FAULT TABLE SCREEN

This screen displays currently active faults on the outstation and on monitored street equipment. When the outstation is connected to an ST800/900 controller, the active controller faults are displayed (i.e. as provided by the FFS controller command).

Entries can be made in the table by each running application. The applications currently running are displayed on the 'System' screen.

Additional information on fault timing and fault history can be obtained by examination of the 'System Log' screen and, in the case of ST800/900 etc. controllers, the 'Controller Log' screen.

Siemens Outstation - Microsoft Internet Explorer provided by CAT@Siemens UK Furth V1.1

Address: http://172.16.100.96/

SIEMENS Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config

Fault Table

This page displays all the currently active faults.

| Key | Description |
|----------------------------------|---|
| faulttable/ControllerFLF/12 | Controller Fault - DFM Failure. FLF 12:255 |
| faulttable/mova2/mova_disabled | MOVA disabled |
| faulttable/ControllerFLF/38 | Controller Fault - No Dim/Bright ChangesFLF 38:255 |
| faulttable/ControllerFLF/60 | Controller Fault - UTC Force Bit Watchdog Failure. FLF 60:255 |
| faulttable/csi/espfail | controller enhanced serial link fail |
| faulttable/oseZ11991GP1/dfmFault | input Z11991GP1 failed DFM |

Reload

Done Local intranet

Reload

Pressing 'Reload' will update the fault table information.

6.8 CONTROLLER LOG SCREEN

This screen allows the user to display historic information transferred from an attached Siemens ST700/750/800/900 family controller. The log is updated periodically (default 10 minutes).

The log text is generated with the same format as that used on the controller handset in response to the 'LOG' command. Details of the fault numbers and mnemonics are contained in the controller handbook.

SIEMENS GVP Gemini Outstation
Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig |
Controller Log | Controller Files | UTC Override | OSE Config

Controller Log

This page display the outstation log file

Lines:

08-SEP-09 16:15:26: LMU RESET, CONTROL'R INI,
01-SEP-09 10:24:56: DFM L2 CHNGD,
21-AUG-09 02:18:11: DFM L2 IN9H,
20-AUG-09 15:51:49: NDIM FLF 38:255,
20-AUG-09 09:16:34: UTCF FLF 60:0, NDIM FLF 38:0,
14-AUG-09 15:52:22: NDIM FLF 38:255,
14-AUG-09 14:25:38: UTCF FLF 60:255, UTC F1 AC200S,
13-AUG-09 15:52:23: PBUS FLF 2:0,
13-AUG-09 15:52:01: NDIM FLF 38:0,
11-AUG-09 16:40:38: PBUS FLF 2:10, FLD 10:0, FLD 11:0,

Lines

This field sets the number of lines to be displayed on each page. Use 'Update Page' to apply the new setting.

Newest at top

Select this field to order the log entries so that the more recent events are at the top of the page. Use 'Update Page' to apply the new setting.

Oldest at top

Select this field to order the log entries so that the more recent events are at the bottom of the page and the older events are at the top of the page. Use 'Update Page' to apply the new setting.

Older

Change to the next oldest page of log entries.

Newer

Change to the more recent page of log entries.

Newest

Change to the most recent page of log entries.

Export Log File

Press 'Export Log File' and then 'Save' the file in the desired location on the user PC. Files are named as:-

Ctrl-Log_<Site Name>_<date>-<time>.wri

e.g. Ctrl-Log_GEM06_2009-09-21-15-45-05.wri

6.9 CONTROLLER FILES SCREEN

This screen allows the user to save the IC4 configuration file and the current controller data settings as retrieved from the Siemens ST700/750/800/900 family controller via the serial link.

The data is retrieved periodically (default 24 hours – see 6.6.5).

SIEMENS GVP Gemini Outstation
Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig |
Controller Log | **Controller Files** | UTC Override | OSE Config

Controller Files

IC4 File Export:
Last Retrieved: 2009-09-21-15-28-30
Export
Controller Data File Export:
Last Retrieved: 2009-09-21-15-29-37
Export
Import New
> Browse... Import

Status
ESP Link Status: Idle
Controller Data Import Status: 2009-09-18-14-35-37: Initialized

IC4 File Export

Use this interface to save the IC4 file to the users PC.

Last Retrieved

This is the date and time when the IC4 configuration file was last transferred from the controller to the outstation.

Export

Press 'Export' and then 'Save' the file in the desired location on the user PC. Files are named as

IC4_<Site Name>_<date>-<time>_config.8UL

e.g. IC4_GEM06_2009-09-21-15-28-30.8UL

Controller Data File Export

Use this interface to save the Controller Data file to the users PC.

Last Retrieved

This is the date and time when the Controller Data was last transferred from the controller to the outstation.

Export

Press 'Export' and then 'Save' the file in the desired location on the user PC. Files are named as

xCtrlData_<Site Name>_<date>-<time>_config.UDD

e.g. xCtrlData_GEM06_2009-09-21-15-29-37.UDD

Import New

Use this interface to import an updated Controller Data file from the users PC to the controller.

Browse

Press 'Browse' and then navigate to the Controller Data file to be loaded.

Import

Press 'Import' to load the selected Controller Data file from the users PC to the controller.



: The imported Controller Data file updates the controller level 2 access timings etc and so should be used with care. Ensure that, where several Controller Data files are available, the correct file for the site is selected.

ESP Link Status

This interface shows the current file transfer activity taking place on the serial link to the controller. Typical displays are:-

Idle
Transferring Controller Data File
Transferring IC4 File
Transferring Historic Log File
Link Down

Controller Data Import Status

This display shows the status of the controller data import facility. Prior to any import, the status will show:-

2009-09-15-15-55-39: Initialized

A typical import operation will give a sequence of displays:-

2009-09-21-16-32-54: Transfer in progress

2009-09-21-16-33-24: Transfer complete

6.10 UTC OVERRIDE SCREEN

This screen displays the UTC and MOVA control and reply bit values from the controller interface. The control bits can be overridden to test the interface during commissioning. Any overrides are automatically deactivated after a timeout which is 5 minutes.

SIEMENS
[Home](#) | [SiteLog](#) | [FaultTable](#) | [Upgrade](#) | [ConfigImportExport](#) | [SystemLog](#) | [System](#) | [StatusConfig](#) | [Controller Log](#) | [Controller Files](#) | **UTC Override** | [OSE Config](#)

GVP Gemini Outstation

[UTC Bits](#)

UTC Manual Override

| Control Bits | | | | | | | | |
|-------------------|--------|--------|----------|----------|-------|-----------------------|-----------------------|----------------------------------|
| Port | Bit No | Site | Function | Instance | Value | 0 | 1 | release |
| csi.control.out.1 | 1 | J12981 | Fn | 1 | 0 | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| csi.control.out.1 | 2 | J12981 | Fn | 2 | 0 | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| csi.control.out.1 | 3 | J12981 | Fn | 3 | 0 | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| csi.control.out.1 | 4 | J12981 | Fn | 4 | 0 | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| csi.control.out.1 | 5 | J12981 | Fn | 5 | 1 | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| csi.control.out.1 | 9 | J12981 | MO | - | 0 | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |
| csi.utc.to.out.1 | 1 | J12981 | TC | - | 1 | <input type="radio"/> | <input type="radio"/> | <input checked="" type="radio"/> |

| Reply Bits | | | | | |
|----------------|--------|--------|----------|----------|-------|
| Port | Bit No | Site | Function | Instance | Value |
| csi.reply.in.1 | 1 | J12981 | Gn | 1 | 1 |
| csi.reply.in.1 | 2 | J12981 | Gn | 2 | 1 |
| csi.reply.in.1 | 3 | J12981 | Gn | 3 | 1 |
| csi.reply.in.1 | 4 | J12981 | Gn | 4 | 1 |
| csi.reply.in.1 | 5 | J12981 | Gn | 5 | 1 |
| csi.reply.in.1 | 9 | J12981 | MR | - | 1 |
| csi.reply.in.1 | 10 | J12981 | ML | - | 1 |
| csi.reply.in.1 | 11 | J12981 | MF | - | 1 |

To override, select '1' or '0' for each output then 'Apply/Reload'

Apply/Reload

This control forces each output to the '1' or '0' state where this has been selected and then refreshes the screen data values. Any outputs which have not been forced, i.e. with 'release' selected, will remain under control of UTC (or MOVA). On later versions of firmware (issue 3.0 and above), control outputs which have been overridden are displayed in **bold** in the table.

Release All

This control sets all overrides back to the 'release' state and then refreshes the screen data values.



The WIZ handset command can be used to access a continuously updated display of the control, reply and detector bits on a port-by-port basis.

6.11 OSE CONFIG SCREENS

This section describes the operations available on the OSE Config screens. These screens are used to configure the I/O mapping to the On Street Equipment (OSE). These screens effectively define which UTC control and reply bits exist on the outstation, what function they perform and how they are routed to the controller or other equipment e.g. SCOOT detectors. The screens are also used for the mapping of MOVA forces, confirms and MOVA detectors.

6.11.1 Site Creation and Input/Output Mapping

SIEMENS Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config

Import CSV File ?

Browse...

☒ Freestanding OTU
☐ Semi-Integral OTU

Site ? Del?

| | | |
|--------|--------------------------|-------------------------------------|
| J11991 | <input type="checkbox"/> | <input type="button" value="Edit"/> |
| X11990 | <input type="checkbox"/> | <input type="button" value="Edit"/> |

Site Name ? : X11990

Edit Site Contents: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? | DFM Act? (min) | DFM Inact? (hrs) | Delete? |
|-------|------|-------------|------------|--------------|------|--------------------------|----------------|------------------|--------------------------|
| VS | 1 | 17 | Input | csi.det.in.1 | 64 | <input type="checkbox"/> | 0 | 0 | <input type="checkbox"/> |
| VS | 2 | 21 | Input | csi.det.in.1 | 63 | <input type="checkbox"/> | 0 | 0 | <input type="checkbox"/> |
| VS | 3 | 25 | Input | csi.det.in.1 | 62 | <input type="checkbox"/> | 0 | 0 | <input type="checkbox"/> |

Add Bits Table:?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? | DFM Act? (min) | DFM Inact? (hrs) | |
|----------------------|------|-------------|------------|-------------------|------|--------------------------|----------------|------------------|---|
| <input type="text"/> | auto | 0 | auto | csi.control.out.1 | 0 | <input type="checkbox"/> | 0 | 0 | N |

Getting Started

This screen allows configuration of the mapping between UTC/MOVA control and reply bits, and the controller interface.

CSV files generated by the instation can be imported here, to define the bit mappings. Alternatively, a new configuration can be created and the bit mappings entered individually.

When updating the configuration first use the "Submit" button

?

Pressing the ? next to a field will bring up help text in the right-hand window pane.

Import CSV file

Use this interface to import a CSV (Comma Separated Value) file, generated at the instation, to define the mapping of UTC/MOVA control and reply bits to the controller.

To import:

- Press the 'Browse' button, and navigate to select an instation CSV file from your computer.
- Select either:-
 - 'Freestanding OTU' – where the control and reply bits are wired to the controller via individual I/O signals or
 - 'Semi-integral OTU' – where the control and reply bits are passed across the serial interface to a Siemens controller.
- Press 'Import' to upload the selected file.
- Add Uni Directional Loops if required using "Go to UD Options" button
- Edit each site and update the configuration as required to match the installation.
- Press "Save to File" to make the settings permanent and active

Go to UD Options

Opens the Uni Directional Loop options page, where UD loops can be added to the configuration and edited.

Add Site

This button adds a site with a default site name to the configuration. The site name should match that used by the UTC instation.

Edit (site)

To view or edit the contents of a site, press the 'Edit' link next to its name

Rename or Delete

To change the site name, edit the name in the text box, then press 'Rename or Delete' before continuing.

To delete a site, select the tick box next to the site name, and press 'Rename or Delete'.

Save to File

No settings are written to the Gemini, or take effect until the 'Save to File' button is pressed.

Over the course of the edit session, press 'Submit' on each page to hold changes, until all edits are completed.

When 'Save to File' is pressed, the entered configuration is first validated. If all settings are correct, the configuration shall be saved permanently, and take effect on the operation of the outstation.

If invalid settings are found, they and the site in which they are contained are highlighted red. A configuration containing mistakes will **not** be saved.

Revert Changes

'Revert Changes' cancels all submitted changes from the current editing session and the configuration data is re-loaded.

Func

This field dictates the function UTMC is configured to perform on the controller or other street equipment via the selected bit.

This field can only be changed when the bit is being added using the 'Add Bit Table'

The available UTC control functions are:-

| Item | Use |
|------|--|
| CP | Close Car Park |
| Dn | Stage Demand |
| DX | Common demand |
| EP | Bus Extension Permit |
| FF | Signals Flashing |
| FM | Fallback Mode (inhibit CLF) |
| Fn | Stage Force |
| GO | Gap Out |
| HI | Hurry Call Inhibit |
| LL | Local Link Inhibit |
| LO | Signals On |
| MO | MOVA Override |
| PV | Hold Vehicle |
| PX | Pedestrian Demand |
| SFn | Switch Facility |
| SG | CLF Group Sync |
| SO | Solar Override (to bright) |
| TC | Transmit Confirm – This bit is set to '1' by the OTU while UTC messages are being received from the instation. |
| TO | Take Over |
| TS | Time Sync |

The following output functions are generated locally, for use with MOVA:-

| | |
|------------|--|
| MOVATO | MOVA Take Over |
| MOVAES1LIn | MOVA end of saturation flow type 1 on link |
| MOVAES2LIn | MOVA end of saturation flow type 2 on link |
| MOVAES3LIn | MOVA end of saturation flow type 3 on link |
| MOVAES4LIn | MOVA end of saturation flow type 4 on link |
| MOVAES5LIn | MOVA end of saturation flow type 5 on link |
| MOVAES6LIn | MOVA end of saturation flow type 6 on link |
| MOVAES7LIn | MOVA end of saturation flow type 7 on link |
| MOVAES8LIn | MOVA end of saturation flow type 8 on link |
| MOVAES9LIn | MOVA end of saturation flow type 9 on link |
| MOVAESLIn | MOVA end of saturation flow (any type) on link |
| MOVAOSATn | MOVA oversaturation on lane |

The available UTC Reply functions are:-

| Item | Use |
|--------------------|---|
| BDn | Bus Detected |
| CA | Car Park Occupancy Threshold Exceeded |
| CF | Controller Fault Indication |
| CG | CLF Group Timer Sync Confirm |
| CL | Car Park Closed |
| CO | Cabinet Door Open |
| CR | Queue At Car Park Reservoir |
| CS | Time Synchronisation Confirm |
| CSn | Car Park Information |
| DF * ¹ | Detector Fault |
| EC | Bus Extension Confirm |
| EV | Emergency Vehicle |
| FC | FallBack Selection Confirm |
| FR | Signals Flashing Confirm |
| Gn | Stage Green Confirm |
| GPN | General Purpose Reply |
| GR1 | Group 1 Indication |
| GX | Vehicle Green Confirm |
| HC | Hurry Call Confirm or Request |
| LC | Local Link Inhibit Confirm |
| LE | Signal Aspects Extinguished Indication |
| LFn | Signal Aspect Failure |
| MC | Manual Control |
| MF * ¹ | MOVA Fault |
| ML * ¹ | MOVA Online |
| MR * ¹ | MOVA Override Reply/Local MOVA Ready |
| PC | Pedestrian Stage Green Confirm |
| PR | Puffin Pedestrian Clearance Period |
| RF1 | Vehicle Red Signal Aspect Failure 1 |
| RF2 | Vehicle Red Signal Aspect Failure 2 |
| RR | Remote Reconnect |
| SB | Solar Bright Confirm |
| SCn | Switch Facility Confirm |
| SDn | Stage Demands |
| TF * ² | Controller Handset Connected |
| TPn | RTIG Traffic Light Priority Trigger Point |
| VC * ³ | Vehicle Count |
| VO * ³ | Vehicle Occupancy |
| VQ * ³ | Queue Detector |
| VSn * ³ | SCOOT Detector Output |
| WI | Wait Indicator Confirm |

*¹ These reply bits are controlled by the OTU when **Card/Port** is set to 'internal'.

*² On firmware 32370 issue 3 and above, the TF reply bit can be controlled by the OTU by setting **Card/Port** to 'ctrl.handset.in.1' and **Bit** to 1. In this case, TF will be activated each time XXC is used to connect to the controller, either locally or remotely.

*³ These reply bits are controlled by processing within the OTU. See section 6.11.3 for additional Count and Occupancy configuration and 6.11.4 for additional Queue configuration. The SCOOT inputs are sampled 4 times per second and can be mapped to either OTU inputs, a UD unit or controller detectors via the controller serial interface.

The following input functions are used locally with MOVA control:-

MOVACRB MOVA Controller Ready Bit
 MOVADETn MOVA Detectors

No.

Instance Number: Where the function operates on a group of bits, this field identifies which stage, detector, SCOOT unit, etc, being controlled or monitored by the item.

Numbering starts from One.

A '-' indicates that only one instance of this function should be used on each site.

UTC Offset

This field indicates the ordering of bit functions at the UTC Instation. When running full UTC (UTC type 2), this field is for information only. When running simple UTC (UTC type 1), this field is used to control the position of bits in the control and reply words.

The numbering starts at One. Note that on the Siemens instation MONI screen the bit displays are numbered from zero so that for example bit 004 on MONI would be given a UTC offset of 5.

Functions which are only local to the outstation such as MOVATO and TC should be given an offset of zero.

Direction

This field indicates whether the item is an output (Control) or input (Reply).

Card/Port

Select the IO Port, or serial connection to be used:-

| | |
|----------------|--|
| cpu.in.1 | 8 inputs on CPU card |
| busmova1.in.1 | 48 inputs on I/O card 1 |
| busmova2.in.1 | 48 inputs on I/O card 2 |
| busmova3.in.1 | 48 inputs on I/O card 3 |
| csi.reply.in.1 | 32 inputs from controller serial interface |
| csi.det.in.1 | 64 detector states from controller serial interface |
| csi.cond.in.1 | 16 conditioning inputs from controller serial interface |
| csi.crb.in.1 | 1 controller ready bit from controller serial interface |
| UD1, 2 etc | Uni-direction unit 1, 2 etc. when configured on UD Options screen. |

| | |
|---|--|
| ctrl.handset.in.1 | Status of the controller handset link:- Bit 1 is set to 1 while XXC command active (available on both semi-integral and freestanding units with firmware 32370 issue 3 and above) |
| cpu.out.1 | 2 control outputs on CPU card |
| busmova1.out.1 | 16 control outputs on I/O card 1 |
| busmova2.out.1 | 16 control outputs on I/O card 2 |
| busmova3.out.1 | 16 control outputs on I/O card 3 |
| csi.control.out.1 | 32 control outputs to controller serial interface |
| csi.utc.to.out.1 | 1 UTC Transmission Confirm output to controller serial interface |
| csi.mova.to.out.1 | 4 MOVA Take Over outputs to controller serial interface, one for each MOVA stream |
| csi.cond.out.1 | 16 conditioning outputs to controller serial interface |
| The following are only available in MOVA 7 or later | |
| mova1.alerts.in.1 | TMA alert input for stream 1 |
| mova2.alerts.in.1 | TMA alert input for stream 2 |
| mova3.alerts.in.1 | TMA alert input for stream 3 |
| mova4.alerts.in.1 | TMA alert input for stream 4 |

Bit

Indicates the I/O bit number to be wired to the controller in the case of I/O Card, or the serial message bit assigned in the case of the Controller Serial Interface.

Invert

This field indicates whether the signal should be inverted or not. Select the checkbox to invert the signal.

The reply bits for a freestanding OTU should generally be inverted and all other signals left in their normal sense.

DFM Act

Time in minutes that the detector may be Active before a Detector Fault is asserted. Intended for use with detector inputs which are not already monitored by the controller.

Valid timeouts range from 1 to 5460 minutes. A typical value is 30 minutes. A value of zero disables DFM.

DFM Inact

Time in hours that the detector may be InActive before a Detector Fault is asserted. Intended for use with detector inputs which are not already monitored by the controller.

Valid timeouts range from 1 to 96 hours . A typical value is 18 hours. A value of zero disables DFM.

Delete Row

To delete an item, select the tick box in it's delete column, and press the Submit' button.

Description

This text field is available in the Add Bits Table to enter a short description for the item use. The text is displayed by hovering the mouse over the Function in the table.

Add Bits Table

To add an item to the site manually, select a function from the list, and enter the item's configuration values. Then press 'Submit'.

Submit

Pressing submit holds changes without saving them permanently, or causing them to take effect. This allows a series of changes on different pages to be created and verified before 'Save to File' is pressed, causing them to take effect.

You must press 'Submit' to save changes made to a page before navigating away from it.

6.11.2 Uni-Direction Loops

SIEMENS
[Home](#) | [SiteLog](#) | [FaultTable](#) | [Upgrade](#) | [ConfigImportExport](#) | [SystemLog](#) | [System](#) | [StatusConfig](#) | [Controller Log](#) | [Controller Files](#) | [UTC Override](#) | [OSE Config](#)

GVP Gemini Outstation

Import CSV File ?

Browse...

☒ Freestanding OTU
☐ Semi-Integral OTU

Import

Go to UD Options ?

Add Site ?

Site ? Del?

| | | |
|--------|---|------|
| J11991 | ❑ | Edit |
| X11990 | ❑ | Edit |

Rename or Delete ?

Save to File ?

UD Options

Number of Associated UD Loops:

2

UD 1

| Func? No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? | DFM Act (min)? | DFM Inact (hrs)? |
|------------|-------------|------------|--------------|------|---------|----------------|------------------|
| A | - | Input | csi.det.in.1 | 2 | ❑ | 0 | 0 |
| U | - | Input | csi.det.in.1 | 3 | ❑ | 0 | 0 |

UD 2

| Func? No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? | DFM Act (min)? | DFM Inact (hrs)? |
|------------|-------------|------------|---------------|------|---------|----------------|------------------|
| A | - | Input | busmova1.in.1 | 1 | ❑ | 0 | 0 |
| U | - | Input | busmova1.in.1 | 2 | ❑ | 0 | 0 |

Submit ?

Go To Uni Directional Loop Options

Opens the Uni Directional Loop options page, where UD loops can be added to the configuration and edited.

Number of Associated UD Loops

Enter the number of Uni-direction units required on the outstation and then press 'Submit'. The UD units are numbered automatically from 1 upward.

UD Facility

Each UD unit comprises an A-loop and a U-loop. The A-loop is the main loop and is installed so that traffic travelling in the normal forward direction will activate the A-loop first. The U-loop is installed so that traffic travelling in the reverse direction will activate the U-loop first.

The output of the UD unit is activated only if the vehicle is travelling in the normal forward direction.

Where it is required to monitor the reverse direction as well, then an additional UD unit can be configured with A and U loop inputs swapped over.

The output of the UD unit can be mapped to SCOOT, vehicle counting, vehicle queue and vehicle occupancy functions by selecting the UDn entry in the Card/Port field.

6.11.3 Count and Occupancy Loops

SIEMENS Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config

GVP Gemini Outstation

Site Name ? : D11991

Counter

UTC Offset: ? 12 Weighting Factor: ? 5 Delete: ☐

| Func No. | UTC Offset | Direction | Card/Port | Bit | Invert | DFM Act (min) | DFM Inact (hrs) |
|----------|------------|-----------|---------------|-----|--------------------------|---------------|-----------------|
| VC - - | - | Input | busmoval.in.1 | 12 | <input type="checkbox"/> | 0 | 0 |
| VC - - | - | Input | Unused | 0 | <input type="checkbox"/> | 0 | 0 |
| VC - - | - | Input | Unused | 0 | <input type="checkbox"/> | 0 | 0 |
| VC - - | - | Input | Unused | 0 | <input type="checkbox"/> | 0 | 0 |

Occupancy

UTC Offset: ? 13 Weighting Factor: ? 6 Delete: ☐

| Func No. | UTC Offset | Direction | Card/Port | Bit | Invert | DFM Act (min) | DFM Inact (hrs) |
|----------|------------|-----------|---------------|-----|--------------------------|---------------|-----------------|
| VO - - | - | Input | busmoval.in.1 | 12 | <input type="checkbox"/> | 0 | 0 |
| VO - - | - | Input | Unused | 0 | <input type="checkbox"/> | 0 | 0 |
| VO - - | - | Input | Unused | 0 | <input type="checkbox"/> | 0 | 0 |
| VO - - | - | Input | Unused | 0 | <input type="checkbox"/> | 0 | 0 |

Getting Started

This screen allows configuration of the mapping between UTC/MOVA control and reply bits, and the controller interface.

CSV files generated by the installation can be imported here, to define the bit mappings. Alternatively, a new configuration can be created and the bit mappings entered individually.

When updating the configuration, first use the "Submit" button to hold the results of the edits to each site in turn, then use the "Save to File" button to make all changes permanent and active.

Any changes (including CSV import) will not be applied until the "Save to File" button is used.

?

Pressing the '?' next to a field will bring up help text in the right-hand window pane.

Counter

One Counter function (VC) can be configured for each site. The count bit changes state each time a certain number of vehicles, determined by the Count Weighting Factor, have been detected.

The simplest Counter function has a single input configured, which would count on a single lane (N-counting). Three inputs can be configured for counting the vehicles on two lanes together (N+1 counting). This arrangement handles vehicles which straddle both lanes by special placement of the loop detectors and provides a more accurate count. Also, four inputs can be configured for counting the vehicles on three lanes.

A count input can be mapped to a UD unit output (see section 6.11.2).

Count Weighting Factor

The Count Weighting Factor is used to define the number of counts required to cause the reply bit to change state, as shown in the table below. The value required depends on the maximum vehicle flow rate at each count site. Generally a weighting factor of approximately twice the maximum flow will be required.

| Weighting Factor | | Count for Reply Bit Change |
|------------------|---|----------------------------|
| 1 | - | 1 |
| 2 | - | 2 |
| 3 | - | 4 |
| 4 | - | 8 |
| 5 | - | 16 (default) |
| 6 | - | 32 |
| 7 | - | 64 |
| 8 | - | 128 |

Occupancy

One Occupancy function (VO) can be configured for each site. The reply bit changes state when a certain vehicle occupancy has been accumulated, as determined by the Occupancy Weighting Factor.

The simplest Occupancy function has a single input configured, which would monitor occupancy on a single lane (N). Three inputs can be configured for monitoring occupancy on two lanes together (N+1). This arrangement handles vehicles which straddle both lanes by special placement of the loop detectors and provides a more accurate occupancy data. Also, four inputs can be configured for monitoring three lanes.

An occupancy input can be mapped to a UD unit output (see section 6.11.2).

Occupancy Unit Weighting Factor

This is used to define the number of internal occupancy counts required to cause the reply bit to change state. The internal count rate is 25 Hz for 100 percent occupancy so a weighting factor of 6 is normally used, giving a change of state every 1.28 seconds max, representing 100 percent occupancy.

Range 1 to 8.

Default: 6

6.11.4 Queue Loops

One Queue function (VQ) can be configured for each site. The Queue function has a single input.

Call Delay

Period in seconds for which a loop must be active before a queue is deemed to exist and the VQ reply bit set to '1'.

Range from 0 to 300 (i.e. 5 minutes). Default 3 seconds.

Cancel Delay

Period in seconds for which a loop must be inactive before a queue is deemed no longer to exist and the VQ reply bit cleared to '0'.

Range from 0 to 300 (i.e. 5 minutes). Default 3 seconds.

7. MOVA

7.1 MOVA INTRODUCTION



BEFORE LOADING ANY CONFIGURATION DATA, REFER TO SECTION 7.3.8 ON PAGE 84.

This section covers the installation and commissioning steps for MOVA. The outstation is capable of running up to four MOVA streams simultaneously, for additional information on this option see section 7.6.

What is MOVA? The following is an extract from the introduction of AG44.

MOVA (Microprocessor Optimised Vehicle Actuation) is the signal control strategy researched and developed by TRL Limited for use at isolated (uncoordinated) road traffic intersections. MOVA caters for all traffic conditions from very low flows through to a junction that is overloaded. For nonoverloaded junctions, MOVA minimises delay; if any approach becomes overloaded, a capacity maximising procedure is used. MOVA is also able to operate at a wide range of junctions.

Also refer to the Highways Agency Installation Guide for MOVA (MCH 1542) and the TRL manuals AG44 and AG45. These documents complement this handbook by covering the design of MOVA intersections, such as determining the location of the vehicle loops and the construction of the MOVA site data, as well as commissioning the completed MOVA intersection.

See section 4 for the installation and section 5 for maintenance details.

The MOVA facility requires the use of a licence code in order to be activated. See section 7.3.5, on page 81.

MOVA Maximum Capabilities per Stream

| Feature | Maximum |
|-------------------------|---------|
| Detector Inputs | 64 |
| Confirm Inputs | 32 |
| Controller Ready Inputs | 1 |
| Force Bit Outputs | 10 |
| Take Over Output | 1 |

The above maximums may be further restricted where facilities are shared, e.g. where detector inputs are also used by SCOOT, or where only one I/O card is fitted. Additionally MOVA 6 can handle at most 64 distinct detector inputs across all streams, eg. 16 on each or 64 on a single stream installation. This total has been increased to 128 in MOVA 7 (see section 7.7.4 and Appendix G)

The control and detector lines used by MOVA can be connected to the Gemini unit via one or more BUS/MOVA I/O cards (parallel interface), via the controller serial link or a combination of the two. When used with a Siemens controller the serial interface would normally be used. When connecting to another manufacturer's controller it will be necessary to use the parallel interface.

The controller serial interface can convey at most the state of 64 detectors so in the case of an installation requiring more than 64 detectors the balance will have to be connected directly via a Bus/MOVA card even when using a Siemens OTU and controller.

For parallel interconnection see Appendix K

7.2 MOVA COMMISSIONING CHECKLIST

The following checklist should be used to commission MOVA. The steps are expanded upon in the sections referenced.

| Step | Section | Action to be Performed |
|------|---------|---|
| 1) | 4 | Check that the outstation has been installed correctly. |
| 2) | - | Switch on the outstation's mains supply. |
| 3) | 5.3.1 | Check that the System LED (LP1) is flashing. |
| 4) | 7.3.1 | Start the MOVA applications. |
| 5) | 7.3.2 | Use the appropriate MOVA Comm shortcut to connect to the required MOVA stream. |
| 6) | 7.3.3 | If MOVA is to use a Bus / MOVA (Digital) I/O Board, check that the correct type of I/O boards have been detected, using the 'cards' command. If MOVA is to use the serial link to an ST700/750/800/900 family controller check that the link is active – View the 'Controller Files' web screen and check that the ESP link status is not 'link down'. |
| 7) | 7.3.4 | Set the time and date in the outstation. |
| 8) | 7.3.5 | Enter the correct MOVA licence codes. |
| 9) | 7.4.1 | For MOVA 7 if log file export to an OSS logging is to be used set up the export start time and period and enable the OSS |
| 10) | 7.4.3 | For MOVA 7 enable alerts if required |
| 11) | 7.3.6 | Configure the MOVA site Names |
| 12) | 7.3.7 | Import MOVA detector and control/reply bit mapping |
| 13) | 7.3.8 | Download the site data into the MOVA unit from the PC. |
| 14) | 7.3.9 | Use the commissioning screen to check for following. a) MOVA is currently not enabled (MOVA enabled = 0) b) The Controller is ready* (CRB = 1) c) The Confirm bits are all set to '1', except for the current stage which should be set to '0'. Watch the controller perform at least one complete cycle to check that each stage and phase confirm bit is being activated correctly by the controller. * If UTC is active, request the MO bit to be set to allow MOVA control (or else apply local UTC override) since UTC will inhibit the 'Controller Ready Bit'. |

| Step | Section | Action to be Performed |
|------|---------|---|
| 9) | 7.3.9 | Use the commissioning screen to check the operation of each detector is correct. MOVAComm uses highlighting to indicate detector active. Also check that vehicles in adjacent lanes do not activate the loop. |
| 10) | 7.3.9 | Important: The following causes the MOVA unit to take control of the Intersection and care should be taken to avoid undue disruption to traffic flows. Still using the commissioning screen, force each stage in turn and check that the controller moves to the required stage and that the correct stage / phase confirm bits are activated. |
| 11) | 7.3.10 | Check that the Error Log contains no unexpected entries and then clear the error log. |
| 12) | 7.3.11 | Again using the commissioning screen, put the MOVA unit on control: a) Set the 'MOVA enable' flag to '1' * b) Close communications ('FI' from the menu) c) On the outstation web interface, 'System' screen, stop the MOVA application and then start it again. d) Restart MOVAComm and return to the commissioning screen |
| 13) | 7.3.11 | Check that as the controller changes from stage to stage that the 'Warm-up Count' increments. When this count reaches the number of stages plus one (e.g. 6 on a 5-stage controller) the MOVA unit will put itself on control. Check : a) The 'On Control' flag changes from '0' to '1'. b) The 'TO' bit changes from '0' to '1'. c) The MOVA unit demands the current (or next) stage. d) The 'Error Count' remains at zero. e) The UTC 'MR' and 'ML' reply bits are active. |
| 14) | 7.3.11 | Examine the operation of the controller under MOVA control to ensure that reasonable operation is achieved, e.g. no demands are been ignored and no excessive queues build-up, and that no faults have been generated and the error count remains at zero. |
| 15) | 7.3.12 | This completes the commissioning steps. Restore the UTC MO signal to its normal state and check that UTC takes control of the junction. The MOVA unit can, depending on the client's instructions and the validity of the data, be left operational. Note that for highly critical junctions where the loss of a detector without the historical flow data could result in serious complications, it may be necessary to leave the MOVA disabled for one week. When the unit has built-up this back-up data, the unit can be enabled. Note that the unit can be enabled remotely if a telephone line is fitted. |

Siemens MOVA Commissioning Complete

7.2.1 Re-initialising MOVA

If it is required to clear the MOVA data sets and working data, then the `movaini` command can be used:

| | | |
|-----------------------|---|------------------------------------|
| <code>movaini1</code> | - | this will initialise MOVA stream 1 |
| <code>movaini2</code> | - | “ “ “ stream 2 |
| <code>movaini3</code> | - | “ “ “ stream 3 |
| <code>movaini4</code> | - | “ “ “ stream 4 |

If the command is not recognised, the MOVA application for that stream must be started running (to view running applications, use the web interface and display the “System” web screen).

When the command is executed, the MOVA data sets, MOVA working data, MOVA error logs, flow logs and assessment logs for that MOVA stream are restored to the first time start-up state. Other MOVA streams will be unaffected.

In the case of MOVA 7 the OTU should then be rebooted to ensure clean erasure of TMA log data from the file system and working memory.

7.3 MOVA COMMISSIONING DETAIL

This section expands on the steps in the commissioning checklist from the previous section.

| Step | Section | Action to be Performed |
|------|---------|---|
| 1) | 4 | Check that the outstation has been installed correctly. |
| 2) | - | Switch on the outstation's mains supply. |
| 3) | 5.3.1 | Check that the System LED (LP1) is flashing. |
| 4) | 7.3.1 | Start the MOVA applications. |

7.3.1 Start the MOVA Applications

Connect to the outstation web server – see Appendix B for the PC setup required. On the outstation web 'System' screen, click the 'Start' button for each MOVA stream which is required. Note MOVA streams do not run by default.

Once a MOVA stream has been started, the MOVA application can be accessed via MOVAComm.

7.3.2 Communicating Locally via MOVA Comm

| | | |
|----|-------|--|
| 5) | 7.3.2 | Use the appropriate MOVA Comm shortcut to connect to the required MOVA stream. |
|----|-------|--|

Use this sequence when located at the outstation. If the PC connection has already been established, the steps 1 and 2 can be skipped.

1. Connect the PC to the outstation front 25-way D-type handset connector.
2. From the Windows Start menu select "Start->Settings->Network Connections->Gemini Connection. If the PC has not been configured for direct IP communications refer to Appendix B.
3. Select the shortcut for stream 1, 2, 3 or 4 as required to initiate MOVAComm. If the shortcuts have not yet been set up, then complete the steps in Appendix B.5.

7.3.3 I/O Card or Serial Link Checking

| | | |
|----|-------|---|
| 6) | 7.3.3 | If MOVA is to use a Bus / MOVA (Digital) I/O Board, check that the correct type of I/O boards have been detected, using the 'cards' command. If MOVA is to use the serial link to an ST700/750/800/900 family controller check that the link is active – View the 'Controller Files' web screen and check that the ESP link status is not 'link down'. |
|----|-------|---|

The Outstation has the option of using the controller serial interface to an ST700/750/800/900 family traffic controller. Through this link the OMCU receives information such as the detector and green states to remove the need for external wiring.

To use the serial link, the controller must be fitted with the appropriate firmware and be configured to use 'Serial MOVA'. The serial link must be enabled on the outstation as described in section 6.6.5. If the serial link is enabled but there is a problem with the communications then an entry will be placed in the outstation fault table.

7.3.4 Setting the Time and Date

| | | |
|----|-------|--|
| 7) | 7.3.4 | Set the time and date in the outstation. |
|----|-------|--|

Check if the date and time on the outstation is already being set via the NTP service – check on the StatusConfig – Advanced Config – Network – NTP screen.

If not being set by NTP, then the date and time can be set manually using the date command (see reference 1.3.1) and Daylight Saving can be configured via the StatusConfig web screens – StatusConfig – Advanced Config - Date and Time.

7.3.5 MOVA Licence Codes

| | | |
|----|-------|--|
| 8) | 7.3.5 | Enter the correct MOVA licence codes. |
| 9) | 7.4.1 | For MOVA 7 if log file export to an OSS logging is to be used set up the export start time and period and enable the OSS |
| 10 | 7.4.3 | For MOVA 7 enable alerts if required |

The software licence codes are supplied from Poole and before this can be done the Serial Number of the Outstation Processor must be obtained. This can be found by either looking on the card itself or using the Handset command 'version -f' or reading the 'System' web screen, in the 'Platform' table.

Poole will then supply LIN and LIF codes to be entered on the MOVA Config screen, see section 6.6.2.

In cases of emergency when it is not possible to contact Poole for licence codes the following 'Emergency Code' can be used

LIN part 1 – 9999

LIN part 2 – 9999

This will enable MOVA for a period of 7 days.

Once a licence number has been issued for the unit, it should be written down and kept in the controller cabinet.

Note that the license code for MOVA7 will not be valid for MOVA6 or preceding versions and vica versa.

7.3.6 MOVA Site Names

| | | |
|-----|-------|--|
| 11) | 7.3.6 | Configure the MOVA site Names |
| 8) | 7.3.5 | Enter the correct MOVA licence codes. |
| 9) | 7.4.1 | For MOVA 7 if log file export to an OSS logging is to be used set up the export start time and period and enable the OSS |
| 10 | 7.4.3 | For MOVA 7 enable alerts if required |

On the MOVA Config screen (see section 6.6.2), enter the Site Name for each MOVA stream. This must be the same site name as defined on the OSE Config screen (see section 6.11.1) for the OTU.



: MOVA uses the site name to access it's force and reply bits, so if it is not correct then MOVA will not operate correctly.

7.3.7 MOVA Detector and Stage Control/Reply Bit Mapping

The relationship between the OTU I/O and MOVA detectors and control/reply bits is flexible and configurable in the Gemini OTU. The mapping between the two can be setup manually via the OSE Config screen (see 6.11) or more easily by importing a configuration file.

Control / Reply Bits

MOVA needs to be able to override control of the junction by the traffic controller, to do this it has its own stage control and confirm bits to control the junction plus some general control lines to handle the interface with the controller. These must be setup prior to operation and can be done manually or by generating a configuration file at a

UTC instation if available. See 6.2.3 and 6.2.4 for an explanation of how to import a configuration file and / or configuring individual bits.

For an outstation connected to a UTC instation the following is the minimum required:-

| Name | Function Description |
|---------|--|
| TC | UTC Transmission Confirm output to controller serial interface |
| MOVATO | MOVA Take Over |
| MO | MOVA Override |
| MOVACRB | MOVA Controller Ready Bit |
| MR | MOVA Override Reply/Local MOVA Ready |
| ML | MOVA Online |
| MF | MOVA Fault |
| Fn | Stage Control |
| Gn | Stage confirm |

See section 7.7 for a description of how these control lines interwork.

Detectors

The detector assignment can either be entered manually or by importing default mappings defined in a CSV file. The config can then be adjusted if necessary. A number of default csv files are available to suit the particular type of installation:-

- A semi-integral installation – OTU connected to the controller via the serial interface for up to 64 detectors.
- Free standing (parallel interface) installation for up to 64 detectors.
- Where more than 64 detectors are required a separate config is required per stream.

These files are described in Appendix K

- On the OSE Config screen (see section 6.11.1) use the 'Browse' button and select the appropriate MOVA detector CSV file.
- Select 'Freestanding OTU' or 'Semi-integral OTU' as appropriate or in the case where there are more than 64 detectors leave as default.
- Click 'Import' to import the CSV file. This will create either
 - a new site named 'MOVA' which contains all of the MOVA detector mapping for the four streams
 - a per stream site (MOVA1...4) containing only the mapping for individual streams.
- Display the MOVA detector data and check that the detectors are mapped to inputs as required.
- Click 'Save to File' to update the outstation configuration with the new data.

7.3.8 Download New Site Data

| | | |
|----|-------|--|
| 13 | 7.3.8 | Download the site data into the MOVA unit from the PC. |
|----|-------|--|



: If the new site data contains a different number of links, lanes or stages, or different time-of-day data then MOVA must be re-initialised – see section 7.2.1. Only if the configuration is the same as the configuration currently running in the MOVA unit (except for minor changes to timing values), can the new site data be downloaded without initialising the unit.

Site data is not compatible between different versions of MOVA. The appropriate TRL version of MOVA Setup will convert between the differing formats, e.g. MOVA Setup M7.0 will convert MOVA 6 data sets to MOVA 7.

MOVA Site Data Loading

New site data can be downloaded into the MOVA unit using the 'Data Set' option – 'DS' from the MOVA main menu, followed by the 'R' command.

Up to four 'plans' can be loaded into the MOVA unit's memory. Normally, only plan 1 will be used. However, it is possible to configure the MOVA unit to switch between the plans at different times of day. Hence up to four plans, numbered 1 to 4, may have to be downloaded.

The MOVA site data file name is usually suffixed by the '.MDS' extension.

When the download of a plan is complete, the MOVA unit enters a dialogue sequence, as shown on the following page.

Download finished

```
File name: . . . . . NEWPARLEY.MDS
Version: . . . . . M6.0
Creation time & date: 9:45 29/10/ 4
Title: . . . . . NEW PARLEY WITH LANE TEN
Stage/links/lanes: . . 5 /14 /10
```

Enter repository plan number to place this download data:
1,2,3 or 4, (or 99 to reject this download)

1

Plan number 1 selected

Area 1 is empty. To confirm that you want to place the downloaded dataset in this area, select 'Y'.
Else, select 'N' to place the dataset in a different area.
Do you want to place the dataset in this area? (Y/N)
Y

This plan has been placed in repository area 1
and will be loaded as active data

| | Filename | St/Lk/Ln |
|---|---------------|----------|
| A | HUGEMOVA.MDS | 10/24/20 |
| 1 | NEWPARLEY.MDS | 5/14/10 |

Press <ENTER> to Continue

The MOVA unit will now reboot in order to clear all of its working data, load the new site data and begin monitoring the intersection.

Note: MOVA will be initially disabled. Use the "Look" screen to put MOVA back on-control after a warm-up cycle.

Press [Return] to reconnect to the unit after it reboots...

Checking the Site Data

When new site data has been loaded, check it by displaying the site data using the 'L', 'T' and 'D' options.

If more than one plan has been downloaded, the 'L' option allows one of the plans to be loaded into the working area. The 'T' option shows the names of the plans loaded into each of the three backup stores and the name of the plan that currently resides in the working area. If there are no time of day changes, i.e. only one plan has been loaded then the MOVA unit will automatically load that plan into its working area.

The 'D' option displays all the site data of the plan currently residing in the working area. The MOVA unit pauses after each section, so that the data does not scroll off the top of the screen.

flags and the **‘Warm-up’** and **‘Error counts’** are described in more detail in section 7.3.11.

For inputs on the Bus MOVA I/O card, black background = input open circuit, red background = input short circuit.

For semi-integral MOVA, the input sense can be inverted or not, dependant on the controller configuration.

The **‘Multistage’** flag is set to ‘1’ if the confirm inputs indicate more than one stage is active, e.g. when the controller has failed or the I/O cables have been disconnected from the back of the MOVA unit.

The **‘Demanded stage’** entry shows the stage that MOVA is currently demanding, or would try to demand if it was on control.

The **‘Watchdog’** count should normally increment every half a second and remain in the range 0 to 20. It is used internally by the MOVA software to ensure that the various MOVA sub-systems are functioning correctly.

While the commissioning screen is active (and the description of these keys is being displayed), the state of the **‘MOVA enabled’** flag and the **‘On Control’** flag can be toggled by simply pressing ‘M’ or ‘C’ respectively. Similarly, the **‘Error Count’** can be cleared back to zero by simply pressing ‘Z’.

| | | |
|-----|-------|---|
| 10) | 7.3.9 | <p>Important: The following causes the MOVA unit to take control of the Intersection and care should be taken to avoid undue disruption to traffic flows.</p> <p>Still using the commissioning screen, force each stage in turn and check that the controller moves to the required stage and that the correct stage / phase confirm bits are activated.</p> |
|-----|-------|---|

(Remember to press <SPACE> to display the ‘Screen Keys’ before attempting to use any of the ‘single key’ commissioning screen commands)

To test the force bits and the confirms from the controller, the MOVA unit should first be switched off-line, i.e. if the **‘MOVA Enabled’** flag is set to ‘1’, press ‘M’.

To force a stage simply press the number of the required stage, e.g. press ‘1’ for stage 1 and then press ‘2’ when stage 2 is required.

The MOVA unit will keep forcing the selected stage for about one minute after the key is pressed. To end the test, press ‘0’.

Pressing ‘X’ will exit the commissioning screen and the MOVA Main Menu will be displayed.

Pressing the space bar toggles between the single key press commands and the MOVA Main Menu (which may vary between different versions of MOVA):

Typical MOVA Main Menu Screen

| SIEMENS MOVA COMMISSIONING SCREEN: J12345 | | | | | | | | | | | | | | | | |
|--|-----------------------------|----|----|----|------------------------|----|----|----|----|----|----|----|----|----|----|----|
| Detectors: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 |
| | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
| Confirms: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| CRB | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | |
| Force Bits: | HI/TO | | | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | | |
| MOVA enabled. . . 1 Warmup. 6 Multi stage . . 0 On control. . . 1 Demanded stage . . . 1 Watchdog . . . 9 Error count . . . 0 | | | | | | | | | | | | | | | | |
| SIEMENS MOVA MAIN MENU | | | | | | | | | | | | | | | | |
| DS - DataSet menu | VM - View MOVA Messages | | | | DF - Display Flows | | | | | | | | | | | |
| for operations: | DE - Display Error log | | | | CF - Clear Flows | | | | | | | | | | | |
| Display, Load | CE - Clear Error log | | | | LF - Look at/set Flags | | | | | | | | | | | |
| Download, Upload | DA - Display Assessment log | | | | CT - Check/set Time | | | | | | | | | | | |
| | CA - Clear Assessment log | | | | FI - FInish | | | | | | | | | | | |
| Press a Key: | | | | | | | | | | | | | | | | |
| --- Press a key listed above or Press <Space> for Main Menu --- | | | | | | | | | | | | | | | | |

While the MOVA Main Menu is being displayed, enter the two-letter menu option required and press 'Return'. When the required option completes, the main screen will automatically re-appear.

7.3.10 The Error Log (DE and CE)

| | | |
|-----|--------|---|
| 11) | 7.3.10 | Check that the Error Log contains no unexpected entries and then clear the error log. |
|-----|--------|---|

To display the error log, enter 'DE' from the main menu,

This displays time stamped reports of any warnings or errors detected by the MOVA unit. This log may help diagnose the reason why the MOVA unit has gone off control for example.

At the end of the log, the MOVA unit will display some debug information that can normally be ignored:

| | | | | |
|-----------------|---|------|---|---|
| CRASH(1-4)= | 0 | 0 | 0 | 0 |
| TERM= 0 RCV(2)= | 0 | ABO= | 0 | |

To clear the error log, enter 'CE' from the main menu.

It is recommended that the error log be cleared after each site visit if all entries can be explained and the unit is functioning normally. Then the engineer making the next visit to site will only see faults that have occurred since the last visit.

7.3.11 Enabling MOVA Control

| | | |
|-----|--------|---|
| 12) | 7.3.11 | Again using the commissioning screen, put the MOVA unit on control: a) Set the 'MOVA enable' flag to '1' * b) Close communications ('FI' from the menu) c) On the outstation web interface, 'System' screen, stop the MOVA application and then start it again. d) Restart MOVAComm and return to the commissioning screen |
| 13) | 7.3.11 | Check that as the controller changes from stage to stage that the 'Warm-up Count' increments. When this count reaches the number of stages plus one (e.g. 6 on a 5-stage controller) the MOVA unit will put itself on control. Check : a) The 'On Control' flag changes from '0' to '1'. b) The 'TO' bit changes from '0' to '1'. c) The MOVA unit demands the current (or next) stage. d) The 'Error Count' remains at zero. e) The UTC 'MR' and 'ML' reply bits are active. |
| 14) | 7.3.11 | Examine the operation of the controller under MOVA control to ensure that reasonable operation is achieved, e.g. no demands are been ignored and no excessive queues build-up, and that no faults have been generated and the error count remains at zero. |

This section describes in the more detail the '**MOVA Enabled**' and '**On Control**' flags and their interaction with the '**Error Count**' count and the '**Warm-up**' count.

Both flags must be set to '1' before MOVA will attempt to control the junction. If either flag is set to '0', then MOVA will not attempt to control the junction at that time, but may still be monitoring the traffic flows over its detectors.

The '**MOVA Enabled**' flag is normally only changed by the user, not by the MOVA unit itself. It is this flag which must be set to '1' by the user to allow the MOVA unit to take control of the junction and should be set to '0' to disable the MOVA unit for a long period of time.

Note that the OMCU will log the fault 'MOVA Disabled' in the fault table when MOVA is disabled, i.e. when the '**MOVA Enabled**' flag is set to 0.

The '**On Control**' flag is normally only changed by the MOVA unit itself, although the user can change its state manually. If the '**MOVA Enabled**' flag is set, then following the warm-up cycle, the MOVA unit will set the '**On Control**' flag and start to control the junction.

During the warm-up cycle, the MOVA unit will increment the warm-up count on the commissioning screen every time a new stage starts. When this count reaches the number of stages plus one (e.g. 6 on a 5-stage junction) then the warm-up cycle is said

to be complete. This warm-up cycle allows the MOVA unit to gather information about the junction before it takes control.

Following various fault conditions, the MOVA may put itself off control by clearing the '**On Control**' flag and incrementing its '**Error Count**'. Depending on the nature of the fault, the MOVA unit will increment the '**Error Count**' by one, two or five.

Every hour on the hour the MOVA unit decrements the '**Error Count**' unless it has reached the value of 20 when the unit will reset the '**MOVA Enabled**' flag back to 0.

7.3.12 Completing MOVA Commissioning

To close communications with the MOVA unit, type 'FI' at the main menu. This will allow the MOVA unit to tidy-up and close the communications. On MOVAComm, pressing F10 will close the application.

7.4 TMA LOGGING AND ALERTS

MOVA7 provides an extended logging facility to enable traffic managers to monitor the performance of a MOVA site in detail. The following logs are available for each stream:-

- Lane flow
- Occupancy
- Stage count and length
- Pedestrian Level-of-Service
- End-sat
- Oversaturated Cycles
- Suspect Detector History

Normally direct access to these logs would be provided via the MovaComm terminal program however because of the quad stream capability of the Gemini OTU platform access has been provided via the OTU web interface. When accessed via the web interface all data in the logs will be available for viewing or saving on the local browser machine.

Additionally the logs can be downloaded automatically to an Outstation Support Server (OSS) if available and the facility is enabled on the OTU. This is an additional feature not available through MovaComm. Logs will be exported to the OSS at a configurable interval with only data collected since the last upload being transmitted. A complete history will be available therefore in consecutively loaded log files.

The logs collect and record data in intervals of 15, 30, 45, 60 or 90 minutes, as configured by the MOVA data set. In total 672 records (one weeks worth at 15 minute intervals) rounded up to the nearest number of whole days will be recorded.

7.4.1 OSS Access

To enable transmission of log files to the OSS the facility must first be enabled on the OTU. This is done on the StatusConfig.DSL/Fibre configuration screen. See 6.3.2 for details. (Note this can also be done on the StatusConfig.AdvancedConfig.Network.OssInterface screen. See Figure 7.1 TMA Log Auto-Export Screen.

There are also two time items that can be set to configure TMA log export to the OSS at suitable times for the installation:-

- TMA Log Export Start Time which designates a time and date at which TMA logging starts. Setting this enables the logging to be programmed to commence some time in the future. See section 6.6.4 for further details.
- TMA Log Export Period which designates the period between successive log exports after the start time. See section 6.6.4. The minimum period is 15 minutes, values below this will create an error message in the system log and the previous period will be retained.

Figure 7.1 TMA Log Auto-Export Screen

SIEMENS Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | TMA Logs | OSE Config

TMA Log Auto-export

TMA log export start time ? 2012-11-10:00:00
TMA log export period ? 00:00:31
Save Reload

Left Menu:

- Basic Config
 - DSL/Fibre
 - LeaseLine
 - GPRS
- Basic Status
- Advanced Config
 - Logging Level
 - Network
 - Network Status
 - Ethernet
 - DNS
 - OSS Interface
 - NTP
 - PPP
 - TFTP Client
 - SNMP
 - Services
 - Telnet Server
 - SysCtl
 - Firewall
 - LwTunnel
 - HTTP
 - Terminal
 - Digital IO
 - TCL
 - Date and Time
 - License System
 - License Facilities
 - System Monitor
 - OTU Status
 - MOVA Config
 - MOVA Advanced Config
 - TMA Log Auto-export
 - Controller Serial Link
 - OTU Advanced Config

On enabling the OSS and setting the export times the logs will now be periodically exported and can be viewed on the OSS see Figure 7.2 OSS Screen Shot

Figure 7.2 OSS Screen Shot

SIEMENS Home | Outstations | Packages | Admin | About
Licensed to SiemensMOVA7 Test, Expires December 2012

Left Menu:

- Outstation List
- Outstation Map
- Register
- Upload Default

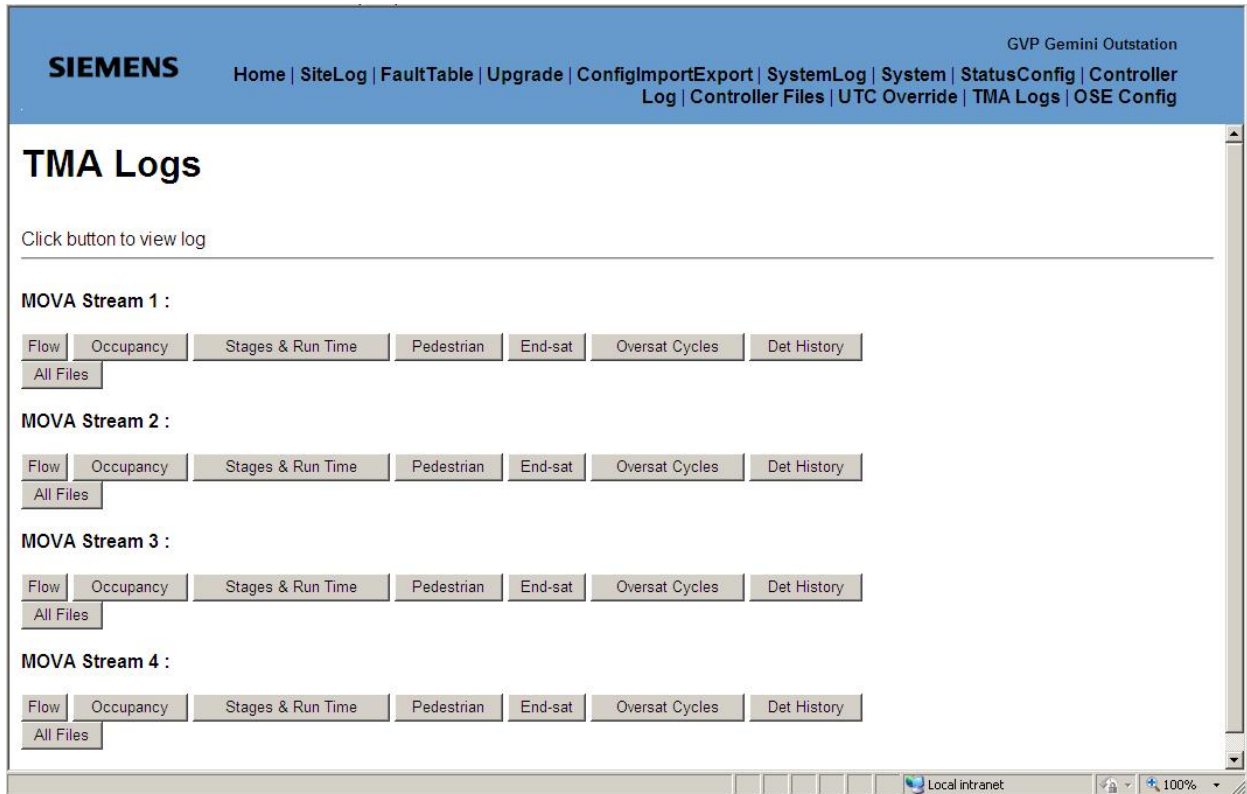
| Filename | Date | delete | view | export |
|--------------|------------------------------|--------|------|--------|
| Flow0619.log | Tue Jun 19 19:37:43 BST 2012 | delete | view | export |
| Flow0619.log | Tue Jun 19 20:37:48 BST 2012 | delete | view | export |
| Flow0619.log | Tue Jun 19 21:37:53 BST 2012 | delete | view | export |
| Flow0619.log | Tue Jun 19 22:37:57 BST 2012 | delete | view | export |
| Flow0619.log | Tue Jun 19 23:38:02 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 00:38:07 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 01:38:12 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 02:38:16 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 03:38:20 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 04:38:24 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 05:38:29 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 06:38:33 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 07:38:38 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 08:38:42 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 09:38:46 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 10:38:47 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 11:38:55 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 12:38:59 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 13:39:04 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 14:39:09 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 15:39:18 BST 2012 | delete | view | export |
| Flow0620.log | Wed Jun 20 16:54:21 BST 2012 | delete | view | export |
| Flow0621.log | Thu Jun 21 08:28:45 BST 2012 | delete | view | export |
| Flow0621.log | Thu Jun 21 08:29:46 BST 2012 | delete | view | export |
| Flow0621.log | Thu Jun 21 09:29:33 BST 2012 | delete | view | export |
| Flow0621.log | Thu Jun 21 10:00:34 BST 2012 | delete | view | export |
| Flow0621.log | Thu Jun 21 10:31:35 BST 2012 | delete | view | export |
| Flow0621.log | Thu Jun 21 11:02:35 BST 2012 | delete | view | export |
| Flow0621.log | Thu Jun 21 11:33:36 BST 2012 | delete | view | export |
| Flow0621.log | Thu Jun 21 12:04:36 BST 2012 | delete | view | export |

New Refresh

7.4.2 Browser Access

The log data held within the OTU can also be accessed directly via the browser – menu item TMA Logs. This will provide a row of buttons for each log for each stream. Selecting a button will present a choice as to whether to view the log immediately or to save it to the local machine. See Figure 7.3 TMA Logs Screen Shot below. There is also an option to save the complete set on the local machine.

Figure 7.3 TMA Logs Screen Shot



7.4.3 TMA Alerts

MOVA7 also introduces 'alerts'. The intention of alerts is to bring exceptional or unusual conditions at a junction to the attention of the traffic manager. The MOVA kernel comes with the alert functionality embedded and an API to allow MOVA resellers to interface it to their equipment.

The alerts implemented in MOVA 7 are:-

- Oversaturation alert
- Exit blocking alert
- Occupancy Alert

See MOVA documentation (reference 9) for a description of these.

In order to bring the alerts to the attention of the traffic manager they will be transmitted back to a connected UTC instation when they occur. It is a prerequisite that the MOVA outstation be connected to a UTC instation for the alert functionality to work.

The alert API within the MOVA kernel has been used to set virtual input port bits `mov1.alerts.in.1`, `mov2.alerts.in.1`, etc. These in turn need to be mapped back to the UTC instation, as General Purpose reply bits `GPn`), where the operator can define an action to execute on their occurrence.

To engage the alerts they should be mapped to a general purpose bit within the OTU using the GP function as follows:-

| Stream | Alert type | Function | Card / Port | Bit |
|--------|----------------|----------|-------------------------------|-----|
| 1 | Any | GPn | <code>mov1.alerts.in.1</code> | 1 |
| 1 | Oversaturation | GPn | <code>mov1.alerts.in.1</code> | 2 |
| 1 | Exit blocking | GPn | <code>mov1.alerts.in.1</code> | 3 |
| 1 | Occupancy | GPn | <code>mov1.alerts.in.1</code> | 4 |
| | | | | |
| 2 | Any | GPn | <code>mov2.alerts.in.1</code> | 1 |
| 2 | Oversaturation | GPn | <code>mov2.alerts.in.1</code> | 2 |
| 2 | Exit blocking | GPn | <code>mov2.alerts.in.1</code> | 3 |
| 2 | Occupancy | GPn | <code>mov2.alerts.in.1</code> | 4 |
| | | | | |
| 3 | Any | GPn | <code>mov3.alerts.in.1</code> | 1 |
| 3 | Oversaturation | GPn | <code>mov3.alerts.in.1</code> | 2 |
| 3 | Exit blocking | GPn | <code>mov3.alerts.in.1</code> | 3 |
| 3 | Occupancy | GPn | <code>mov3.alerts.in.1</code> | 4 |
| | | | | |
| 4 | Any | GPn | <code>mov4.alerts.in.1</code> | 1 |
| 4 | Oversaturation | GPn | <code>mov4.alerts.in.1</code> | 2 |
| 4 | Exit blocking | GPn | <code>mov4.alerts.in.1</code> | 3 |
| 4 | Occupancy | GPn | <code>mov4.alerts.in.1</code> | 4 |

7.5 MOVA COMMUNICATIONS NOTES

This section provides information on setting up communications with MOVA over IP and describes some of the MOVAComm options, which may be useful once MOVA is functioning normally. See the TRL MOVAComm User Guide for full descriptions.

7.5.1 Starting Remote Communications

To communicate remotely with the MOVA unit, use the link on the UTC instation screen as shown below:-

UTC Data Preparation - Microsoft Internet Explorer provided by CAT@Siemens UK Furth V1.1

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites

Address http://172.16.100.17/utc-bin/html_dbas/utmcossndat?utmcossndat_action=edit&utmcossndat_index1=X99110 Go

SIEMENS Logged in as user SIEMENS | Home | Process | Logout | Find

UTMC Outstation Data

| All Outstations | TC8 Outstations | TC12 Outstations | **UTMC Outstations** |

SCN: [X99110] TCC: [A]

Description: [4 stream Mova]

Valid: ☒

Hostname or IP address: [172.16.100.96]

☐ Siemens(UTMC Type 1)

MIB: ☐ Peek(UTMC Type 1)

☒ UTMC Type 2

Communications Profile: [2]

Control Bytes: [4]

Reply Bytes: [4]

External Outstation Links:

The following links require the particular service to be supported by the OTU and for a network route to exist between this client and the OTU

[OTU Webpage](#)

[Telnet \(for controller handset\)](#)

[Movacomm for stream1 2 3 4](#)

[Display the OTU Equipment Allocation](#)

[Download OTU Mapping CSV file](#)

Click here to launch MOVA Comm to communicate with this outstation for MOVA stream 1 (or 2 or 3 or 4)

Local intranet

The users PC must be set up as follows:-

1. Install the MOVAComm URL Handler distributed with the PCSCOOT software version 29.0 or later. This includes the TRL MOVAComm application.
2. Ensure the PC is connected on the network and has routing access to the outstation. Please refer to the network system administrator for assistance as each different network can have it's own configurations for routing and firewalls.

MOVA uses TCP on the following port numbers:-

- MOVA stream 1 – IP port 12001
- MOVA stream 2 – IP port 12002
- MOVA stream 3 – IP port 12003
- MOVA stream 4 – IP port 12004

If the outstation IP address is known, then MOVAComm application can be launched manually from a DOS prompt using the command format:-

```
MOVAComm.exe /pcmov TCP <IP-address>:12001
```

Where <IP-address> is the IP address of the outstation

```
e.g. MOVAComm.exe /pcmov TCP 172.16.100.96:12001
```

The command can be pasted into a shortcut for ease of use.

After a short delay, the MOVA unit will ask for the password to validate access. The password is defaulted to 'AVOMIN' although it can be changed.

Once the password has been accepted, the MOVA unit communicates remotely in exactly the same way as it does locally.

To end communications, select the 'FI – Finish' option from the MOVA main menu. Then press F10 to close the MOVAComm application.

7.5.2 MOVA Flags (LF and SF)

The MOVA flags can be viewed, and then changed, using the LF (Look at Flags) option from the main menu:

| stage force bits | | | | | | | | | | BST | | | | | | FLAG(29-32) | | | | | | | |
|--|---|------|---|-----|---|------|---|------|----|------|-----|-------|-------|-------|---|-------------|---|-------|--|-----|--|--------|--|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | HI | TO | Mar | Oct | MARK1 | MARK2 | | | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 23 | 15 | 1234 | 0 | 0 | 0 | 0 | 0 | | | | | | |
| error phone watch con- MOVA ready hour stage stage assess error 0=VA | | | | | | | | | | | | | | | | | | | | | | | |
| count | | home | | dog | | trol | | mess | | flag | | flow | | stuck | | dmnded | | -ment | | log | | 1=MOVA | |
| 0 | | 0 | | 13 | | 0 | | 0 | | 1 | | 0 | | 0 | | 1 | | 1 | | 0 | | 0 | |
| Do you want to Set Flags <S> | | | | | | | | | | | | | | | | | | | | | | | |
| Look at Flags <L> | | | | | | | | | | | | | | | | | | | | | | | |
| Clear force bits <C> | | | | | | | | | | | | | | | | | | | | | | | |
| set Force bits <F> | | | | | | | | | | | | | | | | | | | | | | | |
| or Return to MAIN MENU <R> ? | | | | | | | | | | | | | | | | | | | | | | | |

The majority of these flags can be ignored, either because they are more easily viewed and changed using the commissioning screen for example, or because the flags are set directly by other options from the main menu.

The Look Flags sub-menu gives five options. In reverse order these are:

Return to MAIN MENU <R>

The fifth and final option is used to return to the main menu.

Set Force bits <F>

Clear force bits <C>

The third and forth options allow force bits to be tested. This option is only provided for backward compatibility as it is recommended that the commissioning screen be used to test the force bits.

Look at Flags <L>

The second option displays all the flags and the menu again. Use this option to 'refresh' the display, e.g. when looking for a change of state of a particular flag.

Set Flags <S>

The first option can also be called directly from the main menu by typing 'SF' rather than 'LF'. This option allows some of the flags to be changed:

| | | |
|---------------------------------|--------------------------------|-----|
| SET FLAGS : | | |
| Flag(17) | ERROR COUNT | <X> |
| Flag(18) | PHONE HOME | <L> |
| Flag(20) | ON CONTROL FLAG {1=ON CONTROL} | <C> |
| Flag(21) | MOVA MESSAGE LOG {note 1} | <M> |
| Flag(23) | HOURLY FLOW LOG {note 2} | <F> |
| Flag(26) | ASSESSMENT LOG {note 2} | <A> |
| Flag(27) | ERROR LOG {note 1} | <E> |
| Flag(28) | VA {=0} / MOVA {=1} FLAG | <V> |
| | for HELP {notes} enter | <H> |
| ENTER CHOICE (or Q to quit) ... | | |

The '**error count**' and the '**on control**' and '**VA/MOVA**' flags are more easily modified using the commissioning screen which is described in section 7.3.11.

The MOVA messages, hourly flow, assessment and error log flags should not need to be changed as viewing these logs should be performed using the explicit options from the main menu. However, the logging of hourly flow and assessment data can be switched on and off using these flags. By default, the MOVA unit records both normal assessment data and hourly flow data in its assessment log. Changing the setting of these two flags can alter this.

For example, to get the MOVA unit to also record hourly flow data in its assessment log, type 'F' and press 'Return'. The MOVA unit will then display the current value of the flag and ask for the new value. At this point, enter '1' followed by 'Return' to set the hourly flow flag to '1'. This can be confirmed when the MOVA unit displays all the flags again.

```
ENTER CHOICE (or Q to quit) ... F
FLAG(23) = 0 Enter new value =
```

7.5.3 Phone Home Flag

The '**phone home flag**' is not used directly. MOVA indicates a serious fault by setting the UTC MF reply bit and so the 'phone home flag' is not required.

7.5.4 View MOVA Messages (VM)

The commissioning screen is mainly concerned with checking the I/O connections to the MOVA unit. To aid diagnosis of run-time problems with the MOVA algorithm, MOVA produces a series of output messages.

To view these MOVA messages, select the 'VM - View MOVA Messages' option from the main menu:

```
ENTER OPTION . . . VM

Enter number of minutes messages output for <1-9> or 0 for continuous
(NB - Press ANY key to pause messages) ENTER NUMBER ...

Abandon messages now ? (y/n)Y

Return to continue
```

Enter '0' so that the MOVA unit outputs messages continuously since the messages can be stopped at any time by simply pressing any key and then pressing 'Y' to confirm that you do wish to stop the messages. The main menu will re-appear after 'Return' is pressed.

The messages themselves are by no means self-explanatory because it is essential to minimise the amount of text within each message.

Once the messages start appearing, press the 'F3' key and the MOVA Communications application will show a full screen display of the information it receives in the messages in a much more understandable form.

To exit view messages, press the 'F4' key to close down the full screen displays and then press any key to inform the MOVA unit that no more messages are required.

7.5.5 MOVA Detector Status Output

The detector status area of the MOVA Commissioning screen is capable of displaying the status of up to 64 detectors. It should be noted that this is the true detector state only where the detector is designated in the MOVA configuration data set. Where a detector is not designated it will be displayed as inactive. Care should therefore be taken when verifying a MOVA installation, if a detector is displayed as inactive when a vehicle crosses it then this may be because the MOVA configuration is wrong and not that the detector is defective. The detector operation should be double checked on the controller with the IOP handset command.



: If the controller DFM has timed out the detector will may be forced active or inactive on the MOVA Commissioning screen. View the controller fault log to check this.

7.6 MULTIPLE MOVA STREAMS

Up to four traffic streams can be controlled, each with its own copy of MOVA and its own MOVA data set loaded separately. The controller interface can be one of the following:-

- via the serial interface, where a ST800 family controller is available
- via BUS/MOVA I/O cards, where a free standing installation is required.

7.6.1 Serial Interface to Controller

The serial protocol from the controller to Outstation provides a status message supporting up to 64 detector status bits and 32 green confirms. In the Outstation to controller direction there is a capacity for up to 32 force bits. This capacity must be shared by all the MOVA streams.

7.6.1.1 Detector Inputs

The 64 detector bits can be allocated as required across the streams assuming the total does not exceed 64.

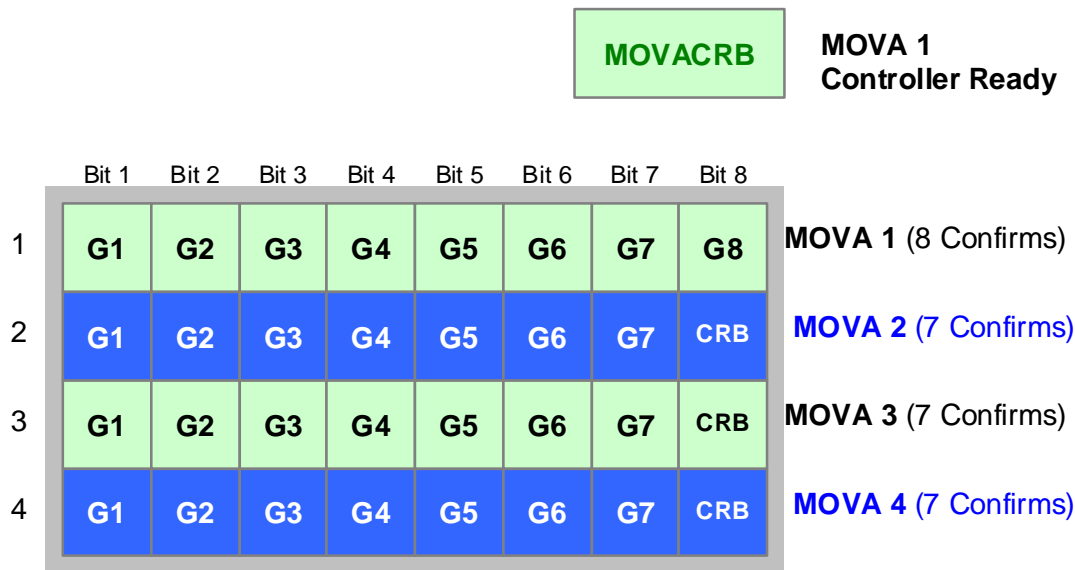
CAUTION: The 64 detector inputs are shared by all streams and so the MOVA configurations should reflect this i.e. In MOVA Setup the detectors for MOVA1 should be allocated to different detector numbers to those for MOVA2.

7.6.1.2 Stage Confirms

The stage confirms can be mapped as required on the OSE Config screens, within the limits of the 32 reply bits sent from the controller. The mapping of the stage confirms must match the configuration of the controller reply bits. It is recommended to start the stage confirm bits for each stream on a byte boundary, so that the limit of each stream is easier to see, but this may not always be possible on a large controller.

The Controller Ready Bit (CRB) for MOVA stream 1 is in the message header, as for a single stream installation. The CRB for additional streams must be set by special conditioning in the controller, where these are required.

Figure 7.4 – Example 4 Stream MOVA: Stage Confirm Bits



7.6.1.3 Force Bits and MOVA TO bits

The stage force bits can be mapped as required on the OSE Config screens, within the limits of the 32 control bits sent from the outstation. The mapping of the stage force bits must match the configuration of the controller. It is recommended to start the stage force bits for each stream on a byte boundary, so that the limit of each stream is easier to see, but this may not always be possible on a large controller.

It is recommended that a MOVA take-over bit is allocated for each stream from within the total 32 control bits available. Following the controller convention for numbering streams from 0, these would be called MOVATO0, MOVATO1 in IC4. The take-over bit for a stream should be configured in the outstation and driven by the MOVATO function for that stream. The bit will be activated by the outstation when MOVA is in control. The bit can be used in special conditioning in the controller to differentiate between MOVA and UTC control e.g. to light a LED on the manual panel when MOVA is active or to provide demands for demand dependent forces (see 7.7.1).

The outstation automatically controls the TO bit in the message header so that the IC4 special conditioning items 'MOVATO' and 'SUTCTO' in the controller will be true when any stream TO bit is active.

In the latest version of IC4, additional conditioning bits are set as shown below. The bits are controlled by the serial link software and no bit mapping is required in the outstation to achieve this functionality.

'SUTCTOMOVA' - MOVA is active on one or more streams

'SUTCTOUTC' - UTC is active on all streams

Conditioning in the controller will need to implement any UTC force bit timeouts required, for those streams which remain under UTC control while others are running MOVA.

Note also when running the IC4 controller simulator, disabling the common TO bit will disable the UTC / MOVA mode on all controller streams. To simulate disabling of a single MOVA stream the individual TO1 to TO4 bit must be deactivated.

Figure 7.5 – Example 4 Stream MOVA: Force Bits

| | Bit 1 | Bit 2 | Bit 3 | Bit 4 | Bit 5 | Bit 6 | Bit 7 | Bit 8 | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|--------|
| 1 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | TO1 | MOVA 1 |
| 2 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | TO2 | MOVA 2 |
| 3 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | TO3 | MOVA 3 |
| 4 | F1 | F2 | F3 | F4 | F5 | F6 | F7 | TO4 | MOVA 4 |

7.6.2 Free Standing Interface

A free standing installation will be limited by the capacity of the available I/O on the BUS/MOVA cards fitted. Within these limits, the control and reply functions can be mapped as required, using the OSE Config screens – see section 6.11.1.

7.6.3 MOVA Linking

In certain installations it may be of benefit to allow one stream to have some knowledge of traffic flow in the other. To fulfil this requirement the MOVA lane over-saturation (SAT) and link end of saturation (ESLI) codes have been made available to the control bit mapping.

The outputs can be mapped and passed to the controller, either via the 16 conditioning bits (csi.cond.out.1) or as spare control bits (csi.control.out.1), see section 6.11.1.

7.6.3.1 MOVA Over-saturation (per lane)

Over-saturation is defined as "the condition when a lane is left with a significant queue at the end of green". MOVA outputs an over-saturation bit for each lane (up to 30), indicating a '0' if the previous cycle was not over-saturated and a '1' if it was.

Enter the OSE Config field information as follows:-

| Field | Value | Notes |
|-----------|---|--|
| Func | MOVAOSATn | Selected from pulldown list. |
| No. | Lane number | Lane number is from 1 to N where N is the max configured lane number |
| Card/Port | csi.cond.out.1 or csi.control.out.1 | To match the controller conditioning |
| Bit | As required | to match the controller conditioning |

7.6.3.2 MOVA End Saturation Marker (per link)

MOVA provides 'end of saturation flow' outputs indicating when link saturation flow has ended. Several outputs are provided to indicate the different reasons for end of saturation flow having been reached. The output functions are as shown in the following table.

MOVA End Saturation Outputs

| ESLI Function | Meaning when set |
|--|---|
| MOVAES1LIn | Normal end of saturation |
| MOVAES2LIn | End of saturation due to a combination of codes 5 and 6 if link persistently over-saturated (> 1 cycle) |
| MOVAES3LIn | End of saturation due to a queue on the X detector; green being wasted |
| MOVAES4LIn MOVAES5LIn MOVAES6LIn | End of saturation when link is over-saturated due to various capacity – maximising decisions. See MOVA documentation AG 44 4.2, 4.3 |
| MOVAES7LIn | End of saturation link maximum reached. |
| MOVAES8LIn | End of saturation after green calculated from historical flows because detector faulty (AG 44 9,2d) |
| MOVAES9LIn | End of saturation because bonus green >= lost time etc. |
| MOVAESLIn | Any of the above end of saturation flow conditions. |

Enter the OSE Config field information as follows:-

| Field | Value | Notes |
|-----------|---|--|
| Func | MOVAESxLin | Selected from pulldown list, depending on the End Saturation conditions to be detected as detailed in the table above. |
| No. | Link number | Link number is from 1 to N where N is the max configured link number |
| Card/Port | csi.cond.out.1 or csi.control.out.1 | To match the controller conditioning |
| Bit | As required | to match the controller conditioning |

7.7 CONFIGURATION OF MOVA WITH UTC

The junction can be operated with either UTC or MOVA as the normal mode of control. This is achieved by the UTC MO control bit which allows MOVA to be brought on-control in preference to UTC – see section 7.7.5.

If UTC is unavailable e.g. because of network fail or UTC instation fail, then MOVA will take control.

Since UTC and MOVA both control the junction using F-bits, the most efficient configuration is for UTC and MOVA to use the same control and reply bit definitions.

7.7.1 Demand-Dependent Forces

F-bits which are demand dependent under UTC need to be modified under MOVA so that they are effectively not demand dependent. This can be achieved by controller special conditioning to activate the demand when MOVA is in control and the F-bit is activated.

7.7.2 Green Confirms

Both MOVA and UTC can have the same stage green confirms, but MOVA will require extra phase green confirms where there are phase overlaps. These extra confirms would normally be configured after the stage confirms. The extra confirms should be configured in the UTC database so that they can be monitored and checked even though they are not required for UTC SCOOT control.

7.7.3 Detector Inputs – MOVA 6

For the semi-integral OTU, there is a maximum of 64 detectors available from the controller across the serial link. These are shared between MOVA and SCOOT.

It is recommended that the SCOOT detectors are allocated from detector 64 downward. This allows MOVA detectors to be allocated from detector 1 upward.

7.7.4 Detector Inputs – MOVA 7

For MOVA 7 the number of available detectors has been extended to 128

Detectors can be defined globally across all streams as per MOVA 6 which will limit the total to 64, or on a per stream basis. In the per stream method a separate site is required for each stream (eg. MOVA1, MOVA2...) and the config function chosen from MOVA1DETn, MOVA2DETn, MOVA3DETn or MOVA4DETn according to the stream – see Appendix G.

7.7.5 MO: MOVA Override Control Bit

Condition '1' will enable MOVA to send force bits to the traffic controller in place of the UTC control bits.

Condition '0' will select normal UTC operation i.e. all the UTC control bits will be sent to the traffic controller.

If MOVA is not available then UTC will remain in control.

7.7.6 MR: MOVA Override Reply Bit

Condition '1' confirms that the MO bit is being actioned by the outstation.

Condition '1' can also mean that MOVA has been told to override UTC control by a local source.

NB: There may be local conditions which mean that although MO is active and MR has been returned, MOVA is not actually controlling the controller e.g. MOVA may not have been configured, MOVA is in its warm-up cycles or MOVA is off-line.

The ML bit will confirm that MOVA is in the on or off-line condition.

7.7.7 ML: MOVA Online Reply Bit

Condition '1' means that MOVA is on-line and controlling the traffic controller.

If MOVA is not available, this value is set to '0'.

7.7.8 MF: MOVA Fault Reply Bit

Condition '1' means that MOVA has detected a fault, this is equivalent to the MOVA Phone-Home condition.

The MOVA unit will report this fault when the MOVA error count has exceeded the fault threshold, which is 20 by default.

7.7.9 Switching From UTC to MOVA

While UTC is controlling the junction, the UTC TC bit is active and the F-bits are driven by UTC. Then when UTC sets the MO bit, this enables MOVA to take control, provided that the controller is setting MOVACRB active. The sequence is:-

- MO activated from UTC
- MOVA activates MR reply bit to UTC
- MOVACRB returned as active (provided that the controller is ready to accept MOVA control i.e. lamps on and no higher priority mode active)
- MOVA waits for next stage change
- MOVA activates MOVATO and appropriate F-bit to the controller

- MOVA activates ML reply bit to UTC

MOVA will also take control if the outstation drops off UTC control e.g. because of network failure.

7.7.10 UTC and MOVA TO bit Mapping

See section 7.6.1.3.

7.8 EXAMPLE MOVA CONFIGURATION

This example is a semi-integral outstation with 4 MOVA streams. The F-bits and G-bits can be used by UTC or MOVA.

MOVA Stream 1:-

SIEMENS Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config

GVP Gemini Outstation

Site Name ? : J99111

Edit Site Contents: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? |
|---------|------|-------------|------------|-------------------|------|--------------------------|
| TC | - | 0 | Output | csi.utc.to.out.1 | 1 | <input type="checkbox"/> |
| MOVATO | - | 0 | Output | csi.control.out.1 | 4 | <input type="checkbox"/> |
| F | 1 | 1 | Output | csi.control.out.1 | 1 | <input type="checkbox"/> |
| F | 2 | 2 | Output | csi.control.out.1 | 2 | <input type="checkbox"/> |
| MO | - | 17 | Output | csi.control.out.1 | 17 | <input type="checkbox"/> |
| MOVACRB | - | 0 | Input | csi.crb.in.1 | 1 | <input type="checkbox"/> |
| G | 1 | 1 | Input | csi.reply.in.1 | 1 | <input type="checkbox"/> |
| G | 2 | 2 | Input | csi.reply.in.1 | 2 | <input type="checkbox"/> |
| MR | - | 17 | Input | internal | 17 | <input type="checkbox"/> |
| ML | - | 18 | Input | internal | 18 | <input type="checkbox"/> |
| MF | - | 19 | Input | internal | 19 | <input type="checkbox"/> |

Function

This field dictates the function UTMC is configured to perform on the controller or other street equipment via the selected bit.

This field can only be changed when the bit is being added using the 'Add Bit Table'

The controller can use the MOVATO bit to distinguish between MOVA and UTC (1 = MOVA on control). The bit number to use is defined in the controller configuration.
NB: OTU bit numbering starts at 1.

The MO function is generally mapped to a bit which is not used by the controller. The MO bit is used internally by the OTU to switch between MOVA & UTC (0 = UTC, 1=MOVA).

667 NB: The controller should not use the MO bit directly as it will default to 0 if UTC comms fails.

MOVA Stream 2:-

SIEMENS
[Home](#) | [SiteLog](#) | [FaultTable](#) | [Upgrade](#) | [ConfigImportExport](#) | [SystemLog](#) | [System](#) | [StatusConfig](#) | [Controller Log](#) | [Controller Files](#) | [UTC Override](#) | [OSE Config](#)

GVP Gemini Outstation

Go to UD Options ?

Add Site ?

| Site ? | Del? |
|--------|--------------------------|
| J99111 | <input type="checkbox"/> |
| J99112 | <input type="checkbox"/> |
| J99113 | <input type="checkbox"/> |
| J99114 | <input type="checkbox"/> |
| MOVA | <input type="checkbox"/> |

Rename or Delete ?

Save to File ?

Site Name ? : J99112

Edit Site Contents: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? |
|---------|------|-------------|------------|-------------------|------|--------------------------|
| MOVATO | - | 0 | Output | csi.control.out.1 | 8 | <input type="checkbox"/> |
| F | 1 | 5 | Output | csi.control.out.1 | 5 | <input type="checkbox"/> |
| F | 2 | 6 | Output | csi.control.out.1 | 6 | <input type="checkbox"/> |
| MO | - | 20 | Output | csi.control.out.1 | 20 | <input type="checkbox"/> |
| MOVACRB | - | 0 | Input | csi.crb.in.1 | 1 | <input type="checkbox"/> |
| G | 1 | 5 | Input | csi.reply.in.1 | 5 | <input type="checkbox"/> |
| G | 2 | 6 | Input | csi.reply.in.1 | 6 | <input type="checkbox"/> |
| MR | - | 20 | Input | internal | 20 | <input type="checkbox"/> |
| ML | - | 21 | Input | internal | 21 | <input type="checkbox"/> |
| MF | - | 22 | Input | internal | 22 | <input type="checkbox"/> |

Function

This field dictates the function UTMC is configured to perform on the controller or other street equipment via the selected bit.

This field can only be changed when the bit is being added using the 'Add Bit Table'

Each MOVA stream provides MR (MO confirm reply), ML (MOVA on-line) & MF (MOVA fault) reply bits. Map these to "internal" as they are generated directly by the MOVA software within the OTU.

MOVA Stream 3:-

SIEMENS
Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config
GVP Gemini Outstation

Go to UD Options ?

Add Site ?

| Site ? | Del? |
|--------|--------------------------|
| J99111 | <input type="checkbox"/> |
| J99112 | <input type="checkbox"/> |
| J99113 | <input type="checkbox"/> |
| J99114 | <input type="checkbox"/> |
| MOVA | <input type="checkbox"/> |

Rename or Delete ?

Save to File ?

Site Name ? : J99113

Edit Site Contents: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? |
|---------|------|-------------|------------|-------------------|------|--------------------------|
| MOVATO | - | 0 | Output | csi.control.out.1 | 12 | <input type="checkbox"/> |
| F | 1 | 9 | Output | csi.control.out.1 | 9 | <input type="checkbox"/> |
| F | 2 | 10 | Output | csi.control.out.1 | 10 | <input type="checkbox"/> |
| MO | - | 23 | Output | csi.control.out.1 | 23 | <input type="checkbox"/> |
| MOVACRB | - | 0 | Input | csi.crb.in.1 | 1 | <input type="checkbox"/> |
| G | 1 | 9 | Input | csi.reply.in.1 | 9 | <input type="checkbox"/> |
| G | 2 | 10 | Input | csi.reply.in.1 | 10 | <input type="checkbox"/> |
| MR | - | 23 | Input | internal | 23 | <input type="checkbox"/> |
| ML | - | 24 | Input | internal | 24 | <input type="checkbox"/> |
| MF | - | 25 | Input | internal | 25 | <input type="checkbox"/> |

Function

This field dictates the function UTMC is configured to perform on the controller or other street equipment via the selected bit.

This field can only be changed when the bit is being added using the 'Add Bit Table'

MOVA Stream 4:-

SIEMENS
Home | SiteLog | FaultTable | Upgrade | ConfigImportExport | SystemLog | System | StatusConfig | Controller Log | Controller Files | UTC Override | OSE Config
GVP Gemini Outstation

Go to UD Options ?

Add Site ?

| Site ? | Del? |
|--------|--------------------------|
| J99111 | <input type="checkbox"/> |
| J99112 | <input type="checkbox"/> |
| J99113 | <input type="checkbox"/> |
| J99114 | <input type="checkbox"/> |
| MOVA | <input type="checkbox"/> |

Rename or Delete ?

Save to File ?

Site Name ? : J99114

Edit Site Contents: ?

| Func? | No.? | UTC Offset? | Direction? | Card/Port? | Bit? | Invert? |
|---------|------|-------------|------------|-------------------|------|--------------------------|
| MOVATO | - | 0 | Output | csi.control.out.1 | 16 | <input type="checkbox"/> |
| F | 1 | 13 | Output | csi.control.out.1 | 13 | <input type="checkbox"/> |
| F | 2 | 14 | Output | csi.control.out.1 | 14 | <input type="checkbox"/> |
| MO | - | 26 | Output | csi.control.out.1 | 26 | <input type="checkbox"/> |
| MOVACRB | - | 0 | Input | csi.crb.in.1 | 1 | <input type="checkbox"/> |
| G | 1 | 13 | Input | csi.reply.in.1 | 13 | <input type="checkbox"/> |
| G | 2 | 14 | Input | csi.reply.in.1 | 14 | <input type="checkbox"/> |
| MR | - | 26 | Input | internal | 26 | <input type="checkbox"/> |
| ML | - | 27 | Input | internal | 27 | <input type="checkbox"/> |
| MF | - | 28 | Input | internal | 28 | <input type="checkbox"/> |

Function

This field dictates the function UTMC is configured to perform on the controller or other street equipment via the selected bit.

This field can only be changed when the bit is being added using the 'Add Bit Table'

8. FAULT FINDING AND REPAIR

8.1 INTRODUCTION

The following section comprises of battery information and warnings, together with quick reference tables, to aid fault tracing on the unit for first line maintenance purposes:

Table 8.3 : Communication Failures

Table 8.4 : Equipment Failures

Table 8.5 : Power Failures

8.2 BATTERY FAILURES

If one of the batteries has failed, it must be replaced with the specified battery or equivalent (see section 5.6.3 on page 38). Exercise great care when handling old batteries, which may be leaking, and during replacement of new ones, to ensure no damage occurs to either.

WARNING

**OLD BATTERIES MUST BE DISPOSED OF IN ACCORDANCE WITH THE
'CONTROL OF SUBSTANCES HAZARDOUS TO HEALTH REGULATIONS 2002'.**

**SPENT BATTERIES MUST BE DISPOSED THROUGH AN APPROVED
HAZARDOUS WASTE DISPOSAL CONTRACTOR.**

DO NOT PUNCTURE BATTERIES.

DO NOT DISPOSE OF BATTERIES IN ANY FIRE.

DO NOT ATTEMPT TO RECHARGE FAILED BATTERIES.

**THE NEW BATTERY MUST BE INSTALLED THE SAME WAY ROUND.
LEAD ACID BATTERY CONNECTION TAGS MUST POINT UPWARDS.
COIN CELL BATTERY MUST HAVE THE '+' SYMBOL UPPERMOST.**

8.3 COMMUNICATIONS FAILURES

| Symptom | Possible Diagnosis | Action to Check Diagnosis |
|---|----------------------------|---|
| (a) Unit will not communicate with the Instation | Incorrect IP address | Use the 'WIZ' command to display the IP address, Netmask and Gateway settings and check these are as recommended by the Network Administrator. An incorrect Gateway value can keep the Ethernet from being brought up. Use the 'network' command to check if the Ethernet is up. |
| | Duplicate IP address | Disconnect the outstation from the network and then use the ping command from the instation to ping the allocated outstation address. If there is a response to the ping command then the IP address already exists on the network and the conflict of addresses will need to be resolved. |
| | Network Connectivity Fault | Use the ping command (see reference 1.3.1) to check if the outstation can transmit to a known IP address on the network e.g. the Gateway address. From the instation, use the ping command to check IP connectivity to the outstation IP address. If the ping command works, then the Ethernet, modem & Network are connected – proceed to the next Possible Diagnosis. If the ping command fails, then check/replace each component in turn, including the interconnecting cables. The outstation Ethernet can be tested by plugging into a hub/PC off the network. Some modems have a separate IP address which can be tested with ping to check IP connectivity. NB: The route command (see reference 1.3.1) can be used to check if the outstation is receiving any packets at all on the Ethernet. |

| Symptom | Possible Diagnosis | Action to Check Diagnosis |
|---------|--------------------------------|---|
| | Network Configuration Fault | Check with the Network Administrator that all IP ports required by the application (e.g. see E.2) are opened and are not blocked by a Network Router or Firewall. |
| | Outstation Configuration Fault | Check the System Log web screen to determine which application functions are being affected. Check if the configuration of the application matches that expected by the instation. |
| | | |

8.4 TABLE FOR EQUIPMENT FAILURES

| Symptom | Possible Diagnosis | Action to Check Diagnosis |
|---------------------------------------|---|--|
| (a) Unit not operating | Software watchdog has triggered | Check the state of the Watchdog LED (see section 5.3 which starts on page 35), if lit power down and power up the unit to cause a reset. If Watchdog LED lights again, replace the Processor card. If the Watchdog LED lights again, replace the unit. |
| | Processor card failed | Check the state of the System LED (see section 5.3 which starts on page 35), it should be flashing. If it is either permanently on or off power down and power up the unit to cause a reset. If the error condition persists replace the Processor card. If the System LED stops flashing again, replace the unit. |
| (b) IO card faults | Digital input failed | Monitor the relevant input(s) using the din command. If the indications are incorrect, replace the relevant IO cable and card. If the indications are correct, replace the Processor card. If the fault persists, replace the unit. |
| | Digital output failed | Monitor the relevant output(s) using the dout command. If the output does not function as displayed, replace the relevant IO cable and card. If the fault persists, replace the unit. |
| | Unit not able to read the inputs and outputs on certain groups of ports belonging to an IO card | Check that the address switches of suspected cards are set correctly (see section 4.2.1 on page 25). If OK, replace that IO card. If not OK, set the switches to the correct setting. |
| (c) Handset port not operating | Terminal configured wrong | Check that the terminal is set correctly, at 57600 baud, with 1 start bit, 7 data bits, 1 stop bit and even parity. |
| | Wrong type of terminal | If the terminal can not be set to act as a dumb terminal, at 57600 baud, with 1 start bit, 7 data bits, 1 stop bit and even parity, then replace the terminal. The terminal must use the RS232 DTR/DSR control lines. |
| | Handset port failed | Check the terminal is set correctly and that it's interconnection cable is not damaged. If the handset port still does not work, replace the Processor card. |

8.5 TABLE FOR POWER FAILURES

| Symptom | Possible Diagnosis | Action to Check Diagnosis |
|--|---|---|
| (a) Unit not operating | PSU failed | Check the unit has mains power. If yes, replace the PSU. If no, then check the cabinet's mains fusing and power supply. |
| | Mains Supply failed | Check the cabinet's mains supply to the unit and repair as necessary. If fault persists due to no mains, request the electricity authority to restore mains supply. |
| (b) Outstation has no Unit Battery Support. | Battery Fuse failed | Check the battery fuse and replace if blown. |
| | Battery cable connections failed | Remove the unit. Check, by removing the protective cover from the PSU and battery area, that the Faston tags are connected correctly. Refit if necessary. |
| | Unit Support Battery failed | When the Mains power is switched off, or has failed. If the battery fuse is not blown, and the battery cables connections are sound, then replace the Unit's support battery (see section 8.2 on page 110). |
| (c) Invalid Date reported | RTC support battery insulation tab still fitted | Check that the RTC support battery insulation tab is not fitted. If fitted remove it and check if the unit now has RTC support. If the fault persists, replace the RTC Battery (see section 8.2 on page 110). |
| | RTC support battery failed | If the RTC support battery insulation tab is not fitted replace the battery (see section 8.2 on page 110). |

Appendix A - GEMINI² DRAWINGS

A.1 INTRODUCTION

Section A.2 contains a list of the drawings that are available as separate PDF files. Hyperlinks to each file are available with some distributions of the handbook.

The drawings may be included with hard-copy printouts of the handbook.

A.2 DRAWING LIST

- a) **667/GA/32600/000** Gemini² Traffic Outstation
General Assembly
- b) **667/GA/26577/000** Traffic Outstation Unit Mounting
Details

Appendix B – PC setup for Direct IP (ppp) Connection

This appendix details how to connect a Gemini-2 running GVP to a Windows XP computer using the PC COM port and the Gemini-2 front handset connector.

It also details the additional setup to use MOVACOMM across the serial connection – see section B.5.

For connection via Bluetooth, see Appendix C.

The following equipment is needed:

1. A PC with a serial port (USB or normal) running Windows XP
2. A 9-way (male) to 25-way (female) handset serial cable, see section B.4.

If the PC has not yet been configured using the GeminiConnect tool then follow instruction in section B.1.

If the PC has already been configured using GeminiConnect then proceed as follows:-

1. Make sure the System LED on the Gemini unit is flashing.
2. Connect the Handset serial Cable between the Front handset connector on the outstation and the Serial Port on the Laptop/Desktop. If using Bluetooth, connect the Bluetooth dongle to the Front handset connector on the outstation.
3. Click on the desktop shortcut created by GeminiConnect e.g. :-



Alternatively, from the Windows Start menu select **Start→Control Panel→Network Connections→GeminiConnect on COM...**

4. A Connection Windows will appear, and should connect to the outstation within 20 seconds.
5. To access the web interface click on the desktop shortcut created by GeminiConnect e.g. :-



Alternatively, open internet explorer and use <http://169.254.33.31/>

6. To access the telnet interface, from the Windows Start menu select **Start->Run** then type the command **telnet 169.254.33.31**

B.1 Configuring the Direct Connection Using GeminiConnect Tool

This section describes how configure the Direct IP connection using the GeminiConnect software package.

1. Unzip the GeminiConnect package, available from the Siemens web site.
2. Double click on the **GeminiConnect.exe** file
3. Follow the on-screen instructions.

If the GeminiConnect software is not available, the configuration can be performed as described in the following sections. However, use of GeminiConnect is strongly advised, to make the installation as simple and automatic as possible.

B.2 Installing the PC Direct Connection Driver

This section describes how to manually configure the PC serial port to be a "Direct Communications Cable".

1. If the serial port is a non-standard one (Bluetooth/USB), make sure the Serial port is connected and working.
2. Open **Phone and Modem Options** from the Control-Panel
3. Click on the **Modems** tab at the top of the window.
4. Click **Add**
5. Select the **Don't detect my modem** option, click **Next**
6. From the left hand pane, select **(Standard Modem Types)**
7. From the right hand pane, select **Communications cable between two computers**
8. Click **Next**
9. Select **All Ports**, click **Next**
10. Click **Finish**

Once the driver is installed, the communications settings can be configured as described in the following section.

B.3 Configuring the Direct Connection Settings Manually

This section describes how configure the Direct IP connection using the standard Windows DUN (Dial-Up Networking) system. The steps only need to be performed once.

1. Make sure the Handset Serial Cable is DISCONNECTED
2. Open the **Network Connections** Window from the Control-Panel
3. Click **New Connection Wizard**, Click **Next**
4. Select **Set up an advanced connection**, Click **Next**
5. Select **Connect directly to another computer**, Click ***Next**
6. Select **Guest**, Click **Next**

7. Write the Text **GeminiConnection** for the **Computer Name**, Click **Next**
8. Select the correct Serial Communications port from the drop down list, Click **Next**
9. Select **Anyone's use**, Click **Next**
10. Click **Add a shortcut to this connection to my desktop**, Click **Finish**
11. For the username and password contact Siemens support.
12. Click **Save this user name and password for the following users**.
13. Select **Anyone who uses this computer**.
14. Click **Properties**
15. Select **General** tab. (should also be selected)
16. Under the **Select a device**, click **Configure**
17. Change the **Maximum speed (bps)** to 115200
18. Un-click all **Hardware features**, Click **OK**
19. Select **Options** tab.
20. Un-Click **Prompt for name and password, certificate, etc.**
21. Select **Networking** tab.
22. Select **Internet Protocol (TCP/IP)**
23. Click **Properties**
24. Click **Advanced**
25. Un-Click **Use default gateway on remote network**, Click **OK** on the Advanced TCP/IP settings window.
26. Click **OK** on the **Internet Protocol (TCP/IP) Properties** Window
27. Click **OK** on the **GeminiConnection Properties** Windows.
28. The Connection will start to dial, Just click **Cancel**

B.4 Handset Serial Cable Pinout

The wiring connections for a 9-way (male) to 25-way (female) handset serial cable is shown below. This cable is used when connecting to the outstation handset port from a PC.

| DB9 (male) | Signal | DB25 (female) |
|---------------|--------|------------------|
| 1 | - | - |
| 2 | RD | 3 |
| 3 | TD | 2 |
| 4 | DTR | 20 |
| 5 | SGND | 7 |
| 6 | DSR | 6 |
| 7 | RTS | 4 |
| 8 | CTS | 5 |
| 9 | - | - |

B.5 Configuring Direct MOVAComm shortcuts

Use this sequence to configure desktop shortcuts for MOVAComm direct IP communication. MOVAComm must be installed on the PC first and is available from the TRL web site at <http://www.trl.co.uk>. Pre-generated shortcuts can also be copied from the GeminiConnect download directory.

1. Make a copy of the MOVAComm shortcut on the desktop.
2. Rename it to "Local MOVA M6.0 Stream1" or similar.
3. Right-click and select "Properties"
4. Add the Target parameters **/pcmov TCP 169.254.33.31:12001** and click **OK**. See example below.



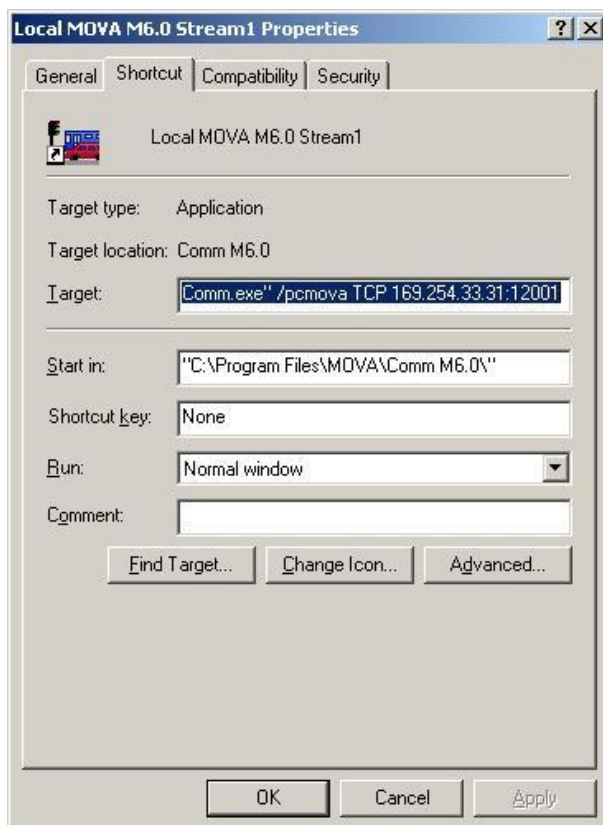
On firmware versions 3.0 and above, the base port number used by MOVA can be configured on the ConfigStatus outstation web page. If the base port has been changed, the port numbers (12001 etc) will need to be updated accordingly.

5. Repeat the above steps for each MOVA stream, naming the shortcut accordingly and changing the port number in the Target parameters according to the stream number:-

/pcmov TCP 169.254.33.31:12002 - MOVA stream 2

/pcmov TCP 169.254.33.31:12003 - MOVA stream 3

/pcmov TCP 169.254.33.31:12004 - MOVA stream 4



Appendix C – PC setup for Bluetooth IP Connection

This appendix details how to connect a GeminiMK2 running GVP to a Windows XP computer via Bluetooth.

The following equipment is needed:

1. PC running Windows XP, with Bluetooth (integral or USB)
2. AIRserial3X serial Bluetooth adaptor 652/4/11360/000

C.1 Setting Up the Airserial3x Serial – Bluetooth Adaptor

1. Ensure that the DIP switches on the front of the adaptor are correctly set – the switches are numbered 1 to 4 and should be set UP, UP, UP, DOWN in numerical order.
2. Plug the adaptor into the front of the Gemini using the 25-9 way cable; a green power light should come on at the top of the unit indicating there is power.
3. The adaptor is now ready for pairing with another device.

C.2 Setting up the PPP over Bluetooth-serial connection

1. Start the new connection wizard [**Start → Settings → Network Connections → New connection wizard**]
2. Select **“Set up an advanced connection”** on the first screen and click **“Next”**
3. Select **“Connect directly to another computer”** and click **“Next”**
4. Select **“Guest”** and click **“Next”**
5. Name the connection **“Bluetooth link to Gemini”** and click **“Next”**
6. If you know the COM port of the serial-Bluetooth connection, pick it from the list and click **“Next”** otherwise – just click **“Next”**
7. Click through to finish the wizard until you are prompted to provide a Username and Password
8. Click the **“Properties”** button
9. Ensure the device selected is the COM port which represents the serial-Bluetooth link.
10. Click **“Configure”**
11. In the new window ensure the **Maximum speed (bps)** is set to **115200** and that all three hardware features (flow control, error control & modem compression) are unchecked. Click **“OK”** on all the open configuration windows.
12. Enter the username and password for the connection and click connect to test the connection

C.3 Setting up the Windows Bluetooth Link (IVT Blue Soliel / Widcomm)

1. Plug in the USB Bluetooth dongle and start the IVT BlueSoleil software from the start menu [**Start → Programs → IVT BlueSoleil → BlueSoleil**]
2. Perform a device discovery [**Main menu → My Bluetooth → Bluetooth Device Discovery**]
3. After a short pause icons should appear around the orange circle in the middle of the screen. If no icons appear – and the status bar at the bottom of the window reports **“No new devices found”** then an error has occurred.
4. There may be several icons in the centre of the blue screen; most likely mobile phones and/or PDAs. Look for an icon that looks like a computer, right click on it and select **“Pair Device”**
5. When prompted to enter a pairing code – enter the number “1234” in to the dialogue box and click OK; you will only have 30 seconds in which to do this. If the pairing fails or no prompt is given during the pairing and there is more than one computer like icon on the screen go back to step 4 and repeat on the other icon(s) as required.
6. A successful pairing is indicated by a small red tick next to the device icon in question – the name of the device may also change from an ID (xx:xx:xx:xx:xx:xx) to AirXL.
7. Once pairing with the adaptor is complete; right click its icon and select **“Refresh Services”**.
8. Wait for the status bar at the bottom of the window to read **“Service Discovery finished”** and then right click on the adaptor icon again to start the Bluetooth serial service [**Right click device icon → Connect → Bluetooth serial**]
9. If presented with a dialogue box, click “Yes” and make a note of the new COM port. If no dialogue box is presented; the COM port information will be displayed in a notification popup in the bottom right of the screen.
10. A successfully established connection is indicated in the BlueSoleil window by a dotted line with a red circle running along it connecting the AirXL icon and the orange circle in the middle of the screen; a signal strength indicator may be present as well.
11. If the connection **“Bluetooth link to Gemini”** has already been set up then go to C.2 “Setting up the PPP over Bluetooth-serial connection” Step 9; otherwise go to C.2 “Setting up the PPP over Bluetooth-serial connection” Step 1.

C.4 Setting up the Windows Bluetooth Link (Advent Netbook)

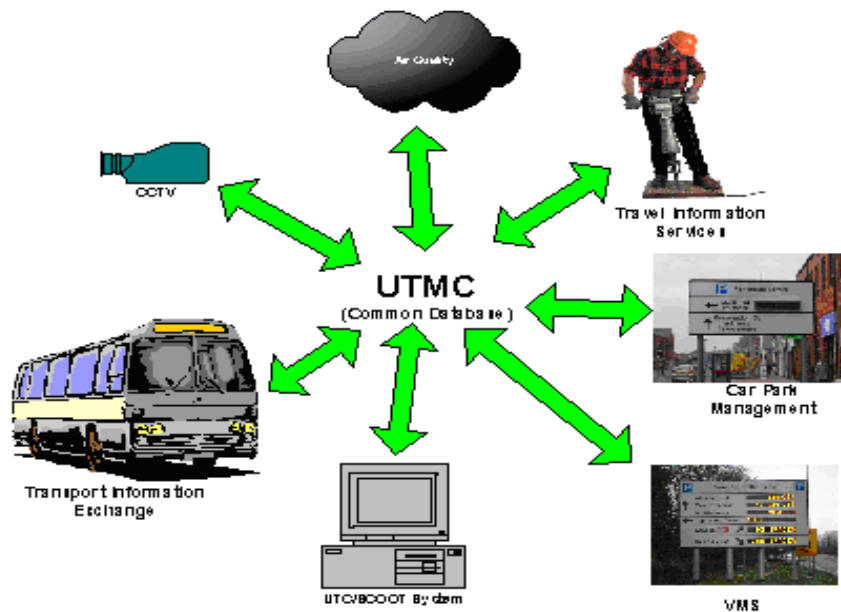
1. Ensure that the Bluetooth radio is activated (indicated by blue indicator LED on the bottom right hand side of the laptop). If it is not; press Fn – F11 until the Bluetooth radio is online.
2. Open the Bluetooth settings manager [**Start → Bluetooth Settings**]
3. Click the **“New Connection”** button and select **“Custom mode”** from the options in the wizard, click **“Next”**
4. Select **AIRserial3X** from the list of discovered devices and click **“Next”**. If the device is not shown – ensure the adaptor is on and press refresh.

5. When prompted select the **Serial Port Service** (SPP) from the list of device services and click **Next**
6. Make a note of the COM port assigned to the Bluetooth link, click **Next** through the remaining screens to finish the wizard
7. Right click the AIRserial3X connection icon in the Bluetooth settings window and select the **Connect** option. Enter the PIN code if prompted.
8. Upon a successful connection – the icon should change, indicating a successful link.
9. If the connection **Bluetooth link to Gemini** has already been set up then go to “Setting up the PPP over Bluetooth-serial connection” Step 9; otherwise go to “Setting up the PPP over Bluetooth-serial connection” Step 1.

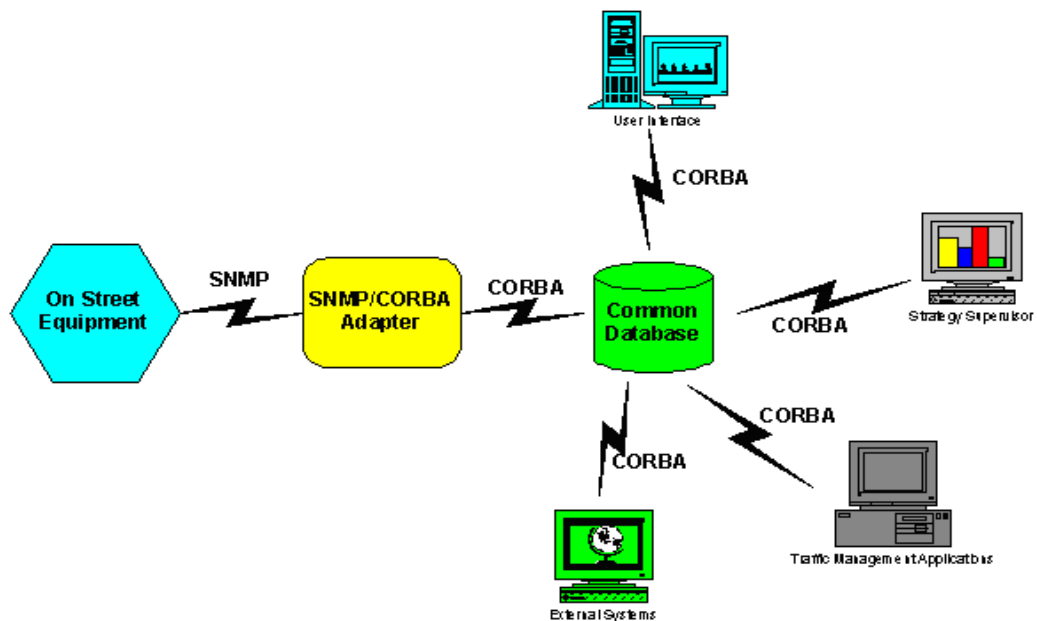
Appendix D – UTMC Guide

Urban Traffic Management and Control (UTMC) supports an open and modular approach to the design and implementation of Intelligent Transport Systems.

The UTMC system seeks to make it possible for local authorities to integrate its existing applications for example UTC with other systems such as VMS and to expand and introduce new applications. The following diagram illustrates how the system components are integrated within a UTMC system.



A typical UTMC communications model, shown schematically below, illustrates the use of a CORBA interface between UTC instation and Common Database as well as UTMC compliant communications from on-street equipment to common database. All equipment connects directly to the communications network and intermediate software applications called 'Adapters' provide the *Simple Neutral Management Protocol* (SNMP) to *Common Object Request Broker Architecture* (CORBA) translation by supporting the UTMC standard Management Information Bases (MIBs), which provide the open mechanism for communication to on-street equipment. Access to and support for other management and information systems are also achieved via adapters with information shared and exchanged through UTMC standard data objects.

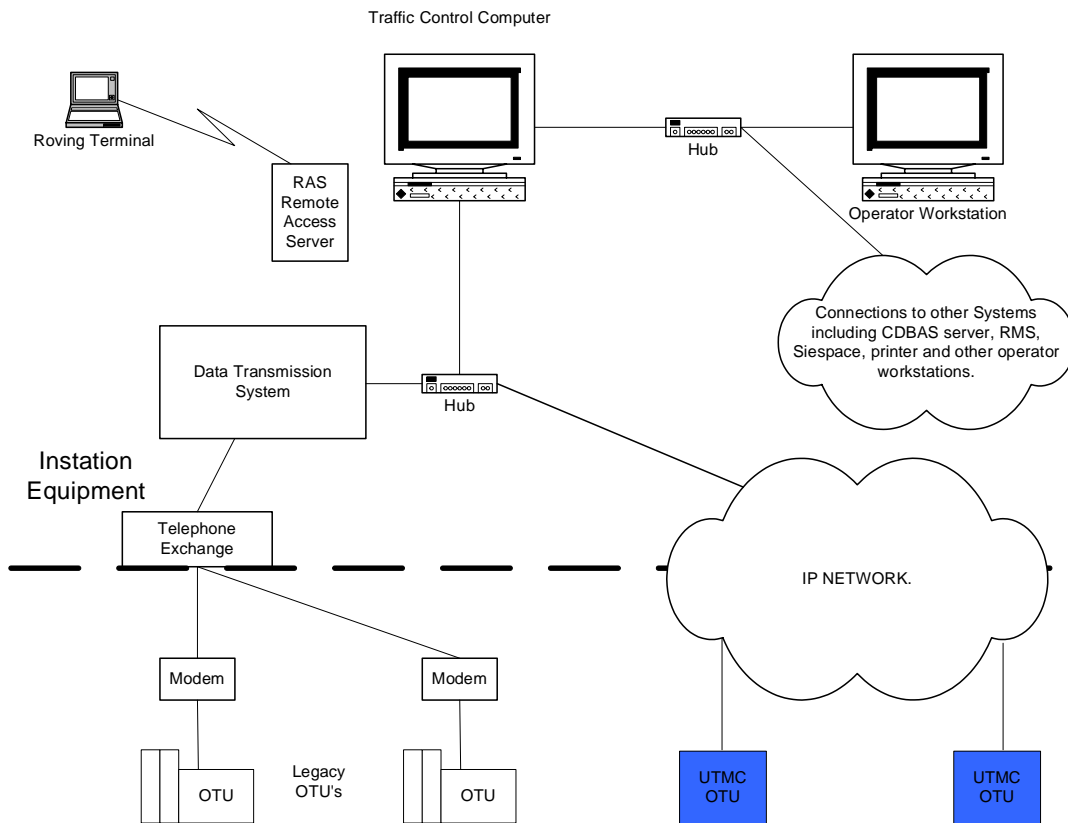


CORBA is the acronym for **C**ommon **O**bject **R**equest **B**roker **A**rchitecture, an open vendor-independent architecture and infrastructure that computer applications use to work together over networks.

Simple Network Management Protocol (SNMP) is a widely used protocol for monitoring the health and welfare of network equipment

MIB stands for **M**anagement **I**nformation **B**ases and was created as a means to control the configuration and assist in monitoring internet devices such as routers which may be in remote locations.

A Typical UTMC SYSTEM



IP communication is required at both the instation and outstation. The IP network can be implemented in many different ways depending on infrastructure already existing, service providers, technology etc. The network must meet certain requirements, defined in Appendix E.

Appendix E – UTMC OTU Network Requirements

1. IP over Ethernet, with an RJ45 Ethernet 10-BaseT presentation at the outstation.
2. As an alternative to 1, the network can comprise lease-lines with 2-wire presentation at the outstation, with V34 modems and ppp to provide the IP transport.
3. The network routing and firewall settings must enable the ports and services as shown in section E.2.
4. Network addresses are fixed and allocated by a Network Administrator.
5. The network delay should be typically less than 200mS. The network delay is the delay caused to a message passing through the network from Instation to Outstation or vice-versa.
6. For optimum system performance there should be no breaks in communication exceeding 4 seconds and packet loss should be less than 0.1%.
7. The network bandwidth should be at least 128K bits-per-second for optimum performance. The load placed on the network by each outstation will vary depending on the actions being undertaken and the configuration of the outstation. Typical network traffic includes:-
 - a. SNMP control and reply messages (typically 400 bytes-per-second)
 - b. User interface traffic (web pages, remote handset and MOVAComm)
 - c. User transfers of files e.g. export of the system log, export of controller data files.
 - d. Periodic outstation configuration backup (typically 50 Kbytes once per hour)
 - e. Software upgrade (1.5 Mbytes)

Where the network bandwidth is low, e.g. lease line operation at 19.2Kbps, then the transfer of large amounts of data will delay the SNMP control and reply messages. Although full UTC (UTC type 2) is more tolerant of delays than simple UTC it can still be affected by significant delays. Putting the outstation off-control before performing such transfers will prevent the flagging of comms errors unnecessarily on the UTC instation.

8. Individual network design considerations such as ip address allocation, traffic routing and network security are outside the scope of this list. However, it is not advised to operate across an open network without VPN protection and consideration of the possible effects of Denial-Of-Service (DOS) attacks.

E.1 Adjustments to Network requirements when used on a 3G Cellular Network

When connected across a UMTS mobile network the 3G communications profile (see Appendix L) should be used at the instation. This is more resilient to poor communications and can tolerate network delays of up to 1.5 seconds, communication breaks up to 25 seconds and packet loss in excess of 1%, though not as the norm. It should be noted that SCOOT can advance or retard the change time for the next stage at any point in the cycle. If this happens during a communication break then the previously prescheduled change will be used, this may result in a slight degradation in SCOOT performance. In isolated cases this will be of little consequence but should bursts of communication breaks occur then the degradation could be significant,

particularly if it affects other junctions in the group. Where breaks are greater than 25 seconds the outstation may drop off control.

The techniques employed by the UTMC UG405 profile in conjunction with the 3G communications profile at the Instation will work to minimise the impact of these phenomena on SCOOT but UMTS communications should not normally be considered to be as reliable as a wired connection

For a UMTS cellular network items 5 and 6 of the network requirements can be relaxed as follows:-

- Network delay should typically be less than 500 ms with fewer than 1% exceeding one second.
- No communication break should exceed 25 seconds.
- Experience has shown that there will be longer durations where the network is unavailable due to maintenance work. Normally this will occur at off peak times such as during the night. The traffic manager should seek assurance from the cellular network operator as to when this will happen, ideally with pre-warning, and implement a suitable fall back plan.

There are a number of types of network service, such as via private or public APN that are available to a customer over a cellular network. These are discussed in the document 'Site selection Guide' 667/AY/45025/002.

E.2UTMC OTU Use of IP Network Ports and Services

The UTMC OTU uses the following IP ports. These ports must not be blocked by Firewalls or Routers.

| Description | Protocol | Port | Direction * | Notes |
|-----------------------------|----------|-------------|-------------|--|
| SNMP | UDP | 161 | Out | |
| HTTP/XML-RPC | TCP | 80 | Out | |
| Telnet | TCP | 23 | Out | |
| MOVAComm | TCP | 12001-12004 | Out | Only required by MOVA |
| Network Time Protocol (NTP) | UDP | 123 | In | Only required by full UTC (UTC type 2) |
| SNMP Inform (non-standard) | UDP | 2201 | In | Only required by full UTC (UTC type 2) |
| TFTP | UDP | 69 | In | |

* **Direction** is with respect to the UTC Instation.

Appendix F – Example CSV File

The CSV file contains the allocation of control and reply bit functions for the outstation. The file is generated automatically at the UTC instation by using the "Download OTU Mapping CSV file" link from the outstation data preparation screen. The file can be imported as described in section 6.2.3.

UTMC OTU equipment function mapping table for X11990 generated on Mon Dec 7 10:42:56 2009

#SiteID, Function, Instance, Direction, Description, Offset, Param 1, Param 2, Card/Port, Bit

```
J11991, Gn, 1, In, "GA: Green confirm for stage", 1, 0, 0
J11991, Gn, 2, In, "GB: Green confirm for stage", 2, 0, 0
J11991, Gn, 3, In, "GC: Green confirm for stage", 3, 0, 0
J11991, Gn, 4, In, "GD: Green confirm for stage", 4, 0, 0
J11991, Gn, 5, In, "GE: Green confirm for stage", 5, 0, 0
Z11991, GPn, 1, In, "RQ: Unspecified remote request or notification", 6, 0, 0
Z11992, GPn, 1, In, "RQ: Unspecified remote request or notification", 7, 0, 0
Z11993, GPn, 1, In, "RQ: Unspecified remote request or notification", 8, 0, 0
J11991, MR, 1, In, "MR: reply to confirm that MO control bit seen", 9, 0, 0
J11991, ML, 1, In, "ML: reply to confirm MOVA operating normally - up to 4 mins after MR", 10, 0, 0
J11991, MF, 1, In, "MF: MOVA detected a fault", 11, 0, 0
D11991, VC, 1, In, "VC1: Vehicle count bit", 12, 2, 0
D11991, VO, 1, In, "VO: Vehicle occupancy bit", 13, 0, 0
Q11991, VQ, 1, In, "VQ: Queue detected bit", 14, 0, 0
Q11991, DF, 1, In, "DF: Detector fault", 15, 0, 0
X11990, VSn, 1, In, "VS1: N01111A3: SCOOT detector occupancy", 17, 0, 0
X11990, VSn, 2, In, "VS2: N01111A4: SCOOT detector occupancy", 21, 0, 0
X11990, VSn, 3, In, "VS3: N03151R1: SCOOT detector occupancy", 25, 0, 0
X11990, VSn, 4, In, "VS4: N01111A5: SCOOT detector occupancy", 29, 0, 0
J11991, Fn, 1, Out, "FA: Controller force bits for stage", 1, 0, 0
J11991, Fn, 2, Out, "FB: Controller force bits for stage", 2, 0, 0
J11991, Fn, 3, Out, "FC: Controller force bits for stage", 3, 0, 0
J11991, Fn, 4, Out, "FD: Controller force bits for stage", 4, 0, 0
J11991, Fn, 5, Out, "FE: Controller force bits for stage", 5, 0, 0
J11991, MO, 1, Out, "MO: set to change junction to MOVA control", 9, 0, 0
F11991, SFn, 1, Out, "SF: Special facility output", 49, 0, 0
J11991, TC, 1, Out, "TC: Transmission Confirm", 0, 0, 0, csi.utc.to.out.1, 1
J11991, MOVACRB, 1, In, "MOVACRB: MOVA Controller Ready Bit", 0, 0, 0, csi.crb.in.1, 1
```

Appendix G – MOVA Detector Mapping CSV Files

The MOVA detector mapping file is imported on the OSE Config screen in order to allocate all the MOVA detectors, either on the serial link to the controller or on IO cards. Detectors can be defined globally across all streams or on a per stream basis. When defined across all streams the StreamID will be 'MOVA'. When defined on a per stream basis the StreamID will be selected from 'MOVA1', 'MOVA2', 'MOVA3' and 'MOVA4' with up to 64 detectors per stream with a maximum of 128 across all streams.

Example csv files are shown in section G.1 – G.4

G.1 Semi-integral Global Assignment

```
StreamID,MOVADETn,1,In,MOVA detector 1,0,0,0,csi.det.in.1,1
StreamID,MOVADETn,2,In,MOVA detector 2,0,0,0,csi.det.in.1,2
StreamID,MOVADETn,3,In,MOVA detector 3,0,0,0,csi.det.in.1,3
StreamID,MOVADETn,4,In,MOVA detector 4,0,0,0,csi.det.in.1,4
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StreamID,MOVADETn,60,In,MOVA detector 60,0,0,0,csi.det.in.1,60
StreamID,MOVADETn,61,In,MOVA detector 61,0,0,0,csi.det.in.1,61
StreamID,MOVADETn,62,In,MOVA detector 62,0,0,0,csi.det.in.1,62
StreamID,MOVADETn,63,In,MOVA detector 63,0,0,0,csi.det.in.1,63
StreamID,MOVADETn,64,In,MOVA detector 64,0,0,0,csi.det.in.1,64
```

G.2 Freestanding Global Assignment

```
StreamID,MOVADETn,1,In,MOVA detector 1,0,0,0,busmova1.in.1,1
StreamID,MOVADETn,2,In,MOVA detector 2,0,0,0,busmova1.in.1,2
StreamID,MOVADETn,3,In,MOVA detector 3,0,0,0,busmova1.in.1,3
StreamID,MOVADETn,4,In,MOVA detector 4,0,0,0,busmova1.in.1,4
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StreamID,MOVADETn,30,In,MOVA detector 30,0,0,0,busmova1.in.1,30
StreamID,MOVADETn,31,In,MOVA detector 31,0,0,0,busmova1.in.1,31
StreamID,MOVADETn,32,In,MOVA detector 32,0,0,0,busmova1.in.1,32
StreamID,MOVADETn,33,In,MOVA detector 33,0,0,0,busmova2.in.1,1
StreamID,MOVADETn,34,In,MOVA detector 34,0,0,0,busmova2.in.1,2
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StreamID,MOVADETn,60,In,MOVA detector 60,0,0,0,busmova2.in.1,28
StreamID,MOVADETn,61,In,MOVA detector 61,0,0,0,busmova2.in.1,29
StreamID,MOVADETn,62,In,MOVA detector 62,0,0,0,busmova2.in.1,30
StreamID,MOVADETn,63,In,MOVA detector 63,0,0,0,busmova2.in.1,31
StreamID,MOVADETn,64,In,MOVA detector 64,0,0,0,busmova2.in.1,32
```

G.3 Semi-Integral – per Stream Assignment

```
StreamID,MOVADETn,1,In,MOVA detector 1,0,0,0,csi.det.in.1,1
StreamID,MOVADETn,2,In,MOVA detector 2,0,0,0,csi.det.in.1,2
StreamID,MOVADETn,3,In,MOVA detector 3,0,0,0,csi.det.in.1,3
StreamID,MOVADETn,4,In,MOVA detector 4,0,0,0,csi.det.in.1,4
StreamID,MOVADETn,5,In,MOVA detector 5,0,0,0,csi.det.in.1,5
StreamID,MOVADETn,6,In,MOVA detector 6,0,0,0,csi.det.in.1,6
```

[illegible]

```
StreamID,MOVADETn,58,In,MOVA detector 58,0,0,0,csi.det.in.1,58
StreamID,MOVADETn,59,In,MOVA detector 59,0,0,0,csi.det.in.1,59
StreamID,MOVADETn,60,In,MOVA detector 60,0,0,0,csi.det.in.1,60
StreamID,MOVADETn,61,In,MOVA detector 61,0,0,0,csi.det.in.1,61
StreamID,MOVADETn,62,In,MOVA detector 62,0,0,0,csi.det.in.1,62
StreamID,MOVADETn,63,In,MOVA detector 63,0,0,0,csi.det.in.1,63
StreamID,MOVADETn,64,In,MOVA detector 64,0,0,0,csi.det.in.1,64
```

G.4 Freestanding – per Stream Assignment

```
StreamID,MOVADETn,1,In,MOVA detector 1,0,0,0,busmov1.in.1,1
StreamID,MOVADETn,2,In,MOVA detector 2,0,0,0,busmov1.in.1,2
StreamID,MOVADETn,3,In,MOVA detector 3,0,0,0,busmov1.in.1,3
StreamID,MOVADETn,4,In,MOVA detector 4,0,0,0,busmov1.in.1,4
StreamID,MOVADETn,5,In,MOVA detector 5,0,0,0,busmov1.in.1,5
StreamID,MOVADETn,6,In,MOVA detector 6,0,0,0,busmov1.in.1,6
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```
StreamID,MOVADETn,58,In,MOVA detector 58,0,0,0,busmov2.in.1,26
StreamID,MOVADETn,59,In,MOVA detector 59,0,0,0,busmov2.in.1,27
StreamID,MOVADETn,60,In,MOVA detector 60,0,0,0,busmov2.in.1,28
StreamID,MOVADETn,61,In,MOVA detector 61,0,0,0,busmov2.in.1,29
StreamID,MOVADETn,62,In,MOVA detector 62,0,0,0,busmov2.in.1,30
StreamID,MOVADETn,63,In,MOVA detector 63,0,0,0,busmov2.in.1,31
StreamID,MOVADETn,64,In,MOVA detector 64,0,0,0,busmov2.in.1,32
```

Appendix H General Public License

The text below is the licence for the GNU open software that is embedded in the Outstation firmware. This firmware contains modified GPL code and that source code is available on application to Siemens as per clause 3a or 3b.

GNU GENERAL PUBLIC LICENSE

Version 2, June 1991

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Appendix I OTU Capacity

The maximum capability is dependent on the instation and outstation as follows:-

1. Outstation Control/Reply Capability

The UTMC OTU/MOVA software has the capability for:-

- 8 control bytes i.e. 64 control bits*
- 16 reply bytes i.e. 128 reply bits*
- 24 SCOOT loops*
- 16 uni-direction loop pairs *
- 16 count, queue and occupancy units.*

*The actual capacity available on a site will be limited by the hardware equipped, as follows:-

a) Freestanding OTU

The capacity will be limited by the number of BUS/MOVA I/O cards fitted (3 off max). Each BUS/MOVA I/O card has:-

- 16 output lines
- 48 input lines

In addition, 8 inputs for detectors etc. are available on the CPU card.

b) Semi-integral OTU

The capacity is limited by the controller serial interface, and by the controller configuration:-

- up to 32 control bits
- up to 32 reply bits
- up to 64 SCOOT/MOVA detector bits

In addition, 8 inputs for detectors etc. are available on the CPU card.

2. Instation Control/Reply Capability

The Siemens UTC instation V29.0 and later supports the following for each OTU:-

- 8 control bytes
- 16 reply bytes, including junction reply bits and SCOOT samples (4 bits per SCOOT loop)

NB: Prior to V29.0, the instation supported 3 control and 14 reply bytes

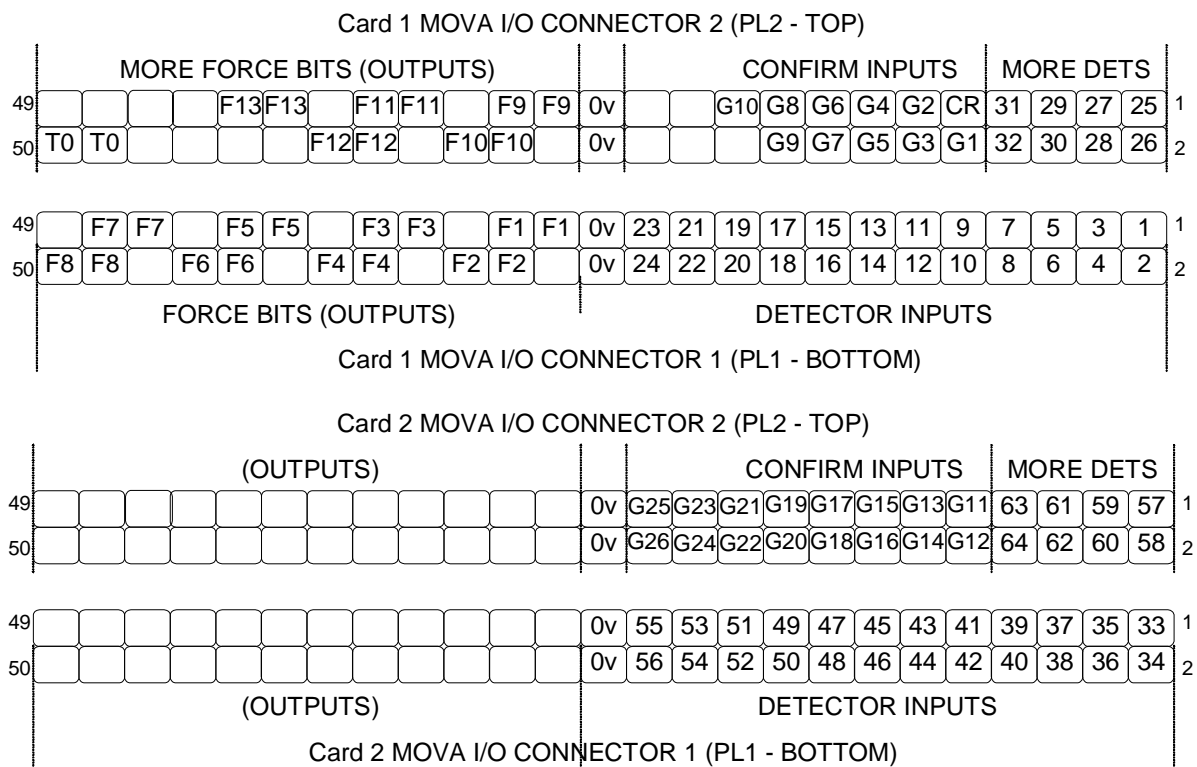
At the instation, when configuring junctions, the “data word format” (i.e. the controller bits other than stage force bits) is limited to 19 bits and needs to start in the same 16 bit word as the stage bits.

Appendix K – Connection of MOVA via a Parallel Interface

For a parallel interconnection the I/O connectivity is as follows:-

| MOVA Connection | Connected to... |
|-------------------------------------|--|
| MOVA Detectors ⇐ | Controller detectors (and ped. Outputs) |
| Confirm and Controller Ready Bits ⇐ | Controller UTC terminal blocks (Outputs) |
| MOVA Force Bits (Fn and TO) ⇒ | Controller UTC terminal blocks (Inputs) |
| PL1 & PL2 Input 0V ⇒ | Controller detector ground connection |

A typical MOVA I/O allocation would use the inputs and outputs of the BUS / MOVA (Digital) I/O boards as shown in the following diagram. The precise allocation of the I/O however is now configurable via the OTU On Street Equipment (OSE) Config screens, see section 6.11.1.



K.1 DETECTOR INPUTS AND PUSH-BUTTONS

The detector inputs are normally connected in parallel to the controller at the controller's terminal blocks.



: Ensure that the detector inputs have been configured in the correct sense in the MOVA site data. For example, on a Siemens T400 or ST800/700 controller, the detector inputs are normally open circuit, closing when a vehicle is detected.

It is recommended that Push button inputs be configured as follows...

The controller should be configured to provide an output for each pedestrian phase, which is then connected to the configured MOVA pedestrian detector input, rather than connecting the MOVA unit directly to the push-button input(s).

The pedestrian demand output should be activated when the controller has a demand registered for that phase and thus are sometimes referred to as a 'wait confirms'. But note that they must be configured in the same sense as the detectors (e.g. normally open, closing when a demand has been latched), which may be in the opposite sense to the stage- and phase-confirm outputs.

Confirms and Controller Ready Inputs

The stage- and phase-confirm outputs from the controller should be configured as held closed, opening when the stage/phase is active. The Controller Ready Bit should be closed when the controller is ready.

Therefore, being physically normally open contacts, if the controller fails, then the MOVA unit will see the controller ready bit disappear and multiple stage confirms, and thus it will release control of the junction.

Force Bits and Take Over Outputs

When the MOVA unit is on control, it closes the 'Take Over' relay output and closes the required stage force bit relay output.

I/O Allocation

The standard cableform connects into these connectors and provides flying leads for each pin. Since there are two connectors on each BUS / MOVA (Digital) I/O board, PL1 and PL2, then each board requires two identical cables. It is therefore recommended that the cableforms be clearly identified before installation commences.

The wire colours used are described on the following page.

If more inputs are required, then a second BUS / MOVA (Digital) I/O board can be fitted, also shown on the following page. This increases the number of detector inputs by 32 and the number of confirm-inputs by 16. See table above for details.

An alternative cableform is available which simplifies connecting the MOVA unit up to a Siemens T400 traffic controller and this is described on page **Error! Bookmark not defined..**

K.2 MOVA TYPICAL DIGITAL I/O CONNECTIONS

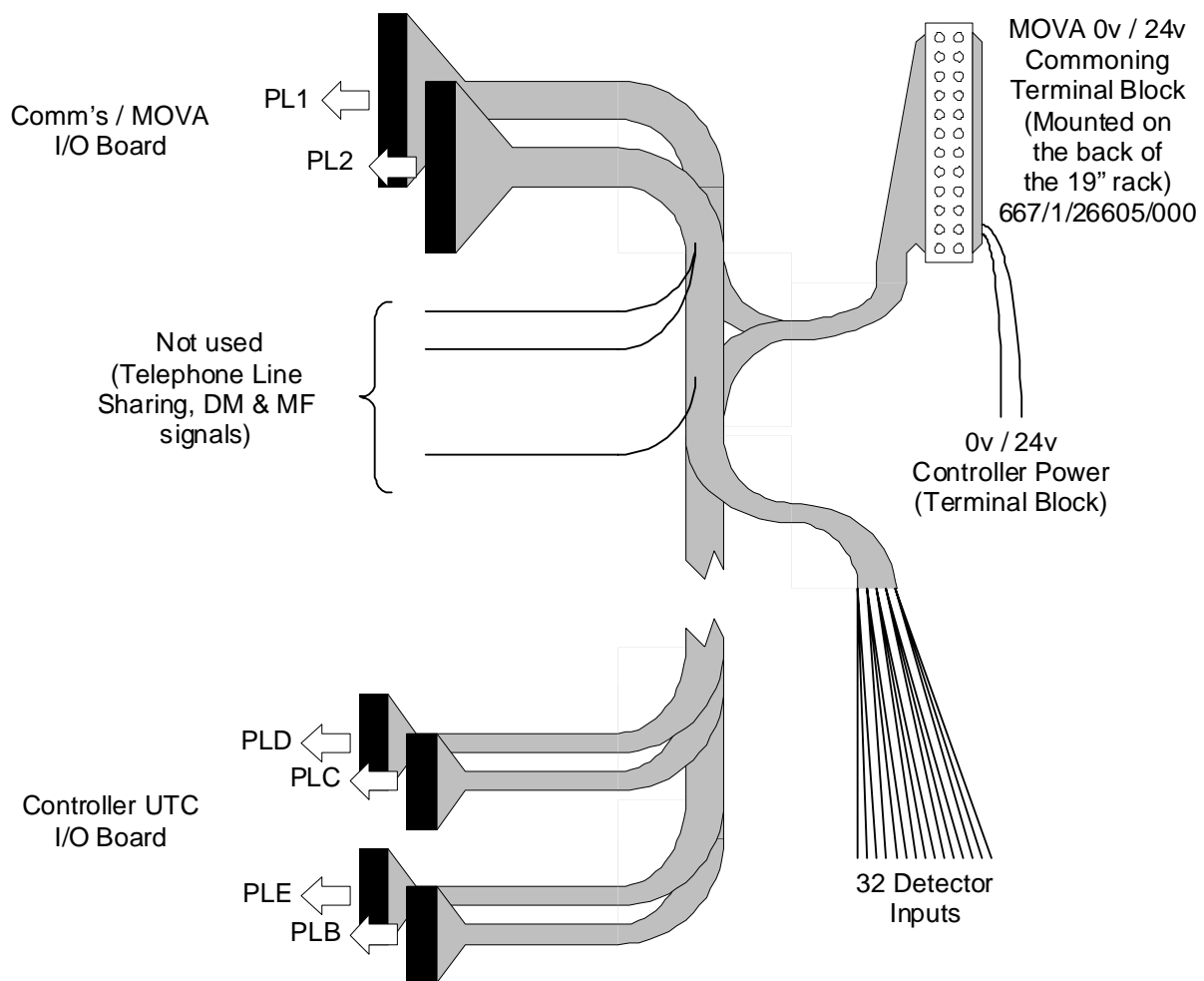
| Pin | Wire Colour | Board 1 PL1 | Board 1 PL2 | Board 2 PL1 | Board 2 PL2 |
|-----|----------------|-------------|------------------|---|---|
| 1 | Blue | Detector 1 | Detector 25 | Detector 33 | Detector 57 |
| 2 | Yellow | Detector 2 | Detector 26 | Detector 34 | Detector 58 |
| 3 | Brown | Detector 3 | Detector 27 | Detector 35 | Detector 59 |
| 4 | Violet | Detector 4 | Detector 28 | Detector 36 | Detector 60 |
| 5 | Orange | Detector 5 | Detector 29 | Detector 37 | Detector 61 |
| 6 | Slate | Detector 6 | Detector 30 | Detector 38 | Detector 62 |
| 7 | Pink | Detector 7 | Detector 31 | Detector 39 | Detector 63 |
| 8 | Red / Blue | Detector 8 | Detector 32 | Detector 40 | Detector 64 |
| 9 | Red / Green | Detector 9 | Controller Ready | Detector 41 | Confirm Bit 11 |
| 10 | Red / White | Detector 10 | Confirm Bit 1 | Detector 42 | Confirm Bit 12 |
| 11 | Red / Brown | Detector 11 | Confirm Bit 2 | Detector 43 | Confirm Bit 13 |
| 12 | Red / Orange | Detector 12 | Confirm Bit 3 | Detector 44 | Confirm Bit 14 |
| 13 | Red / Slate | Detector 13 | Confirm Bit 4 | Detector 45 | Confirm Bit 15 |
| 14 | Blue / Green | Detector 14 | Confirm Bit 5 | Detector 46 | Confirm Bit 16 |
| 15 | Blue / White | Detector 15 | Confirm Bit 6 | Detector 47 | Confirm Bit 17 |
| 16 | Blue / Brown | Detector 16 | Confirm Bit 7 | Detector 48 | Confirm Bit 18 |
| 17 | Blue / Orange | Detector 17 | Confirm Bit 8 | Detector 49 | Confirm Bit 19 |
| 18 | Blue / Slate | Detector 18 | Confirm Bit 9 | Detector 50 | Confirm Bit 20 |
| 19 | Green / Orange | Detector 19 | Confirm Bit 10 | Detector 51 | Confirm Bit 21 |
| 20 | Green / Brown | Detector 20 | - | Detector 52 | Confirm Bit 22 |
| 21 | Green / Slate | Detector 21 | - | Detector 53 | Confirm Bit 23 |
| 22 | Brown / Slate | Detector 22 | - | Detector 54 | Confirm Bit 24 |
| 23 | Orange / Brown | Detector 23 | - | Detector 55 | Confirm Bit 25 |
| 24 | Orange / Slate | Detector 24 | - | Detector 56 | Confirm Bit 26 |
| 25 | White | Input 0V | Input 0V | Input 0V | Input 0V |
| 26 | White | Input 0V | Input 0V | Input 0V | Input 0V |
| 27 | Blue | F1 n/open | F9 n/open | Outputs on Second Board are not used by MOVA | Outputs on Second Board are not used by MOVA |
| 28 | Yellow | - | - | | |
| 29 | Brown | F1 common | F9 common | | |
| 30 | Violet | F2 n/open | F10 n/open | | |
| 31 | Orange | - | - | | |
| 32 | Slate | F2 common | F10 common | | |
| 33 | Pink | F3 n/open | F11 n/open | | |
| 34 | Red / Blue | - | - | | |
| 35 | Red / Green | F3 common | F11 common | | |
| 36 | Red / White | F4 n/open | F12 n/open | | |
| 37 | Red / Brown | - | - | | |
| 38 | Red / Orange | F4 common | F12 common | | |
| 39 | Red / Slate | F5 n/open | F13 n/open | | |
| 40 | Blue / Green | - | - | | |
| 41 | Blue / White | F5 common | F13 common | | |
| 42 | Blue / Brown | F6 n/open | - | | |
| 43 | Blue / Orange | - | - | | |
| 44 | Blue / Slate | F6 common | - | | |
| 45 | Green / Orange | F7 n/open | - | | |
| 46 | Green / Brown | - | - | | |
| 47 | Green / Slate | F7 common | - | | |
| 48 | Brown / Slate | F8 n/open | TO n/open | | |
| 49 | Orange / Brown | - | - | | |
| 50 | Orange / Slate | F8 common | TO common | | |

K.3 CONNECTION TO A SIEMENS T400

To simplify connecting the MOVA unit to a Siemens Type 400 traffic controller, an alternative cableform is available.

This cableform connects the first BUS / MOVA (Digital) I/O Board's connectors PL1 and PL2 directly to the controller's UTC Expansion I/O Board's four connectors PLB, PLC, PLD and PLE. This cable also commons the 24V and 0V connections and thus only requires two wires to be connected to the controller's 24V and 0V supplies.

It cannot however replace the detector cables and these still have to be connected during installation. Note that the colours of these wires are the same as the colours used in the standard cableform that is detailed on the previous page.



I/O Cable between Siemens MOVA and a T400 - 667/1/26604/000

Appendix L Communications Profiles

Profile ID: [7]

Profile name: 3G OTU

Outstation types this profile is applicable to:

TC8/TC12: ☐ UTMC Type 1: ☐ UTMC Type 2: ☒

Transmission Faults:

No reply: Tolerance for 'no reply' (1-60 seconds): 25

No reply: Clearance time (3-3600 seconds): 5

Intermittent: 1 hour tolerance of TX errors (4-999): 15

Intermittent: 1 hour clearance limit (4-999): 15

Persistent: Tolerance for TX errors (4-99): 15

Persistent: Clearance/reset time (30-3600 seconds): 180

Hourly Report Threshold (0-99): 1

UTMC Settings:

SNMP Timeout (10-1500ms): 1500 SNMP Retry Count (0-5): 0

UTMC Type 2 Specific Settings:

SCOOT Sample reporting interval (1-8 sec): 4

Resend hold-off interval (1-9 sec): 1

Keep-alive interval (0-9 sec): 4

Processing timeout (1-30 sec): 30

Late Message Threshold (1-10 sec): 3

Operating Mode Timeout (5-99 sec): 60

Maximum Pre-scheduling (0-25 sec): 25

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