

# MACE System

## Multi-Access Concentrator Equipment

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The STS Rail MACE system is used to control a number of remote telephones via a multi-operator Control Centre, and has been designed to meet the exacting requirements of Rail Administrations, especially when working in an electrified environment.

MACE applications include control of Signal Post Telephones (SPT's) located at :

- Signals
- Point zones or ground frames
- Level crossings
- Station platforms

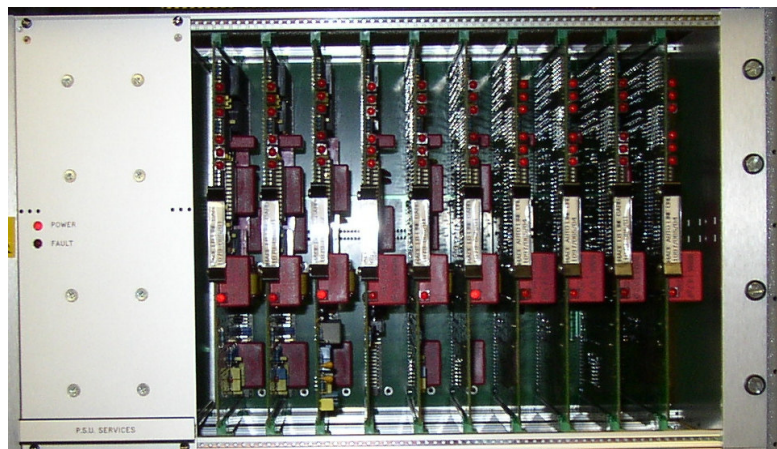
In addition, the MACE system may provide extensions to a customer's private or Public Switched Telephone Network (PSTN).

The MACE system is particularly useful where a number of telephones need to be provided over a large area for emergency communications, such as major highways or railway networks.

MACE allows up to eight operator console positions to call any remote telephone individually and access all external lines. All consoles have the capability for conferencing and any console may be used to answer an incoming call, i.e. a maximum of nine telephones may be included in a conference call if all consoles are connected.

Inherent in the design is high reliability, simplicity of operation and ease of maintenance.

**MACE Line card shelf  
with PSU/services unit  
and Line cards**



## System Configuration

The MACE system consists of the following components:

- A 6U high 19" MACE Line card shelf with PSU/services unit.
- A 2U high 19" MACE X-Point Controller.
- Line cards – up to 10 cards (providing 20 lines) per shelf.
- Operator's Console – up to 8 consoles per system.

The MACE system is contained in an industry standard 19" rack or cubicle and powered from an external –50V dc or optional 240V ac supply.



**MACE X-Point Controller Unit**



**Typical MACE Operator's Console showing illuminated push-button matrix, alarms and DTMF dialler pad with push-to-talk telephone handset.**

**Custom designed consoles may be integrated to suit any fixed or free standing desk arrangements.**

The MACE design offers a flexible communication system that is capable of handling a variety of line signalling conditions:

- Central Battery (CB)
- Local Battery (LB – typically Magneto)
- Auto (including PSTN)
- Two-wire E&M for interface to carrier derived circuits

LED's on each circuit card show the system activity and a display shows any system fault conditions. Fault alarms are extended via a voltage free contact to the operator consoles or other locations. The MACE system is based on a modular design of 20 circuits per shelf.

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STSRail Ltd  
Unit 2, Stone Lane Industrial Estate, Wimborne, Dorset BH21 1HD, UK

Tel: +44 (0) 1202 888 402  
Fax: +44 (0) 1202 841 717  
[www.sts-rail.com](http://www.sts-rail.com)

### **Operator's Consoles**

The MACE system permits up to eight consoles to be driven from one X-Point Controller unit depending on the number of push-buttons required. A maximum of either eight consoles with up to 64 push-buttons or four consoles with up to 128 push-buttons may be connected.

The Operator's Consoles may be free-standing keyboards, or custom console mounted key-panels consisting of non-latching push-buttons with integral high intensity incandescent illumination. The push-buttons are arranged in a matrix of 8 rows or columns, and each button corresponds to a dedicated line circuit. The identity or location of each external telephone may be shown on the push-button by a clear or coloured transparency insert. The allocation of line circuits to push-buttons may be specified by the User.

A number of alarm keys are incorporated on every Operator's Console;

- Lamp Test - allows a confidence check to be carried out at any time.
- Charger Fail – provides a visual indication of the PSU/charger condition.
- Call Tech – provides a visual indication of a system fault requiring the MACE operator to notify the relevant Maintenance Authority.

The internal alarm sounders may be extended via rear panel connectors to drive remote alarms if required.

### **X-Point Controller Unit**

The X-Point Controller is CPU based and provides the system intelligence by which the Operator controls and communicates with the system. It controls:

- All the line cards
- The Operator's Consoles interface
- The interface circuits to the Operator's handset
- The number of Consoles connected
- The number of Line Cards in circuit

The X-Point Controller allows the system to conference a line with many operators by converting the 2 wire incoming line into a 4 wire system to allow mixing of ear and microphone signals.

The control software routes signals and processes keyboard button presses.

Error fault monitoring of line cards, consoles and power supplies is provided.

System alarms are detected and displayed on the X-Point Controller unit front panel in the form of digits on two decimal LED displays, with a "Call Tech" relay activated to warn the user.

### **Connections**

The Operator's Consoles are connected to the MACE system via an RS232 link using 10 or 12 pair 7/0.2mm screened cable for the signal path, and a 4-wire speech circuit using twin 7/0.2mm individually screened audio cable for the Operator's telephone. Both cables terminate at the console on a 25 way 'D' type socket. At the rack or cubicle, the multipair cable is terminated on a krone connector, and the twin audio cable terminates on two phono plugs.

Telephone line connections between the MACE equipment rack or cubicle and the Main Distribution Frame (MDF) is made using multipair CW1308 cable and is terminated on krone connectors at both ends.

### **PSU/Services Unit**

The PSU/Services unit provides the DC-DC conversion from the -50V supply to power the logic and other electronic circuits. It also provides the CB and LB ringing voltage generators.

### **Specifications, Protocols and Data Interfaces**

RS485 serial communications link used for line card control.

RS232 data links between X-Point Controller and Consoles (Max 100m).

Maximum capacity up to 64 line cards per system (128 lines)

Up to 10 linecards (any mix of CB, LB, AUTO, E&M) per 6U shelf

Power requirements: DC Input -44V to -56V (positive battery earthed)  
or AC mains input 240V/110V nominal +/-10% at 50Hz

Environmental Specification:

Temperature: -10°C to +45°C

Humidity: 0 to 95% (non-condensing)

### **Standards and Approvals**

All STS Signals' concentrator systems are CE approved and comply with:

- Safety Standards EN 60950:2000
- EMC Standards EN50121-4:2000
- R&TTE Standard R&TTE(1999/5/EC).