

PART R68
FIELD PROCESSORS

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1. GENERAL

This Part specifies the requirements for the supply of Field Processors (FP) for ITS applications. It must be read in conjunction with Part R60 "General Requirements for the Supply of ITS Equipment" and if installation forms part of this Contract, Part R61 "Installation of ITS Equipment".

Documents referenced in this Part are listed below:

AS 60529	Degrees of protection provided by enclosures (IP code)
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The following abbreviations are used in this Part:

CPU	Central Processing Unit
FP	Field Processor/s
PC	Personal Computer
PnP	Plug and Play

Note: a reference in this Part to a clause in Part R60 "Supply of ITS Equipment" is indicated by "R60." preceding the clause number.

2. QUALITY REQUIREMENTS

The Contractor must prepare and implement a Quality Plan that includes or annexes the following documentation:

- (a) Acceptance Test Plans (refer Clause R60.13 "Testing and Acceptance"), which provides full details of all tests necessary;
- (b) Routine maintenance recommendations;
- (c) Training Plan (refer Clause R60.15 "Training");
- (d) Spare part requirements;
- (e) manufacturer's specifications (catalogue extracts) of all major components detailing ratings and performance characteristics; and
- (f) all layout, fabrication, interconnection and assembly drawings and diagrams necessary for this contract.

Where STREAMS compatibility has been specified, the Contractor must provide evidence of this compatibility in accordance with Clause R60.6 "STREAMS".

The Contractor must provide samples for acceptance in accordance with Clause R60.3 "Equipment Requirements".

If not submitted beforehand, the samples and documentation required by this Clause must be submitted at least 28 days prior to the commencement of site work or placing an order for Equipment.

Provision of the documentation and samples listed in this Clause shall constitute a **HOLD POINT**.

3. FUNCTIONAL REQUIREMENTS

The FP must be an industrial PC and must interface to, control and manage the operation of field systems and devices that form part of ITS applications. The FP must be located within a roadside field cabinet.

4. EQUIPMENT COMPONENTS

The field processor Equipment consists of:

- (a) FP, (rated for operation between -40°C and +80°C) including memory and input/ output interface cards;
- (b) separate power supply; and
- (c) field cabinet, mains power supply and associated infrastructure.

The Contractor must ensure that the FP is STREAMS compatible. The Principal will engage Transmax Pty Ltd for the loading and configuration of the STREAMS software onto the FP.

5. OPERATIONAL REQUIREMENTS

5.1 General

In addition to the requirements of Part R60 "Supply of ITS Equipment", the FP must meet the following general requirements:

- (a) an industry standard expansion bus must be supported;
- (b) a 'technology guarantee' backward compatibility of future replacement products for a period of at least five years must be provided;
- (c) no hardware modules must be configured using "Plug and Play" (PnP) unless the PnP functionality can be disabled (and the module configured) by jumper/BIOS; and
- (d) All hardware must be certified as compatible with Linux kernel 2.4.18 or later.

5.2 CPU and Motherboard

The CPU and motherboard must meet the following requirements:

- (a) the processor must be of a 32-bit architecture, compatible with and providing the performance of an Intel Celeron 400 MHz as a minimum; and
- (b) the processor board must be capable of stand-alone operation without keyboard, video, disk drive, etc. connected.

5.3 System Resources

The FP system resource requirements include:

- (a) the system must be supplied with minimum 64MB RAM, expandable to 256MB, in standard DIMM (168-pin) format;
- (b) the system must be supplied with minimum 32MB compact flash disk. The compact flash disk must be bootable and require no additional software support. The compact flash disk must have a lifecycle of at least 100,000 writes and be capable of retaining stored data for a minimum of 1 month without mains power;
- (c) the system must provide a battery-backed (or equivalent) "Real Time Clock", capable of retaining accurate date/time for a minimum of 12 months without mains power. The clock must be accurate to within 1 second per day; and
- (d) the system must provide a "Hardware Watchdog" timer circuit with the ability to reset the system on timeout. It must be possible to enable and disable the watchdog either by software or by jumper/BIOS, and provide a range of timeout values from 1 second to several minutes.

5.4 I/O Requirements

The FP must provide the following I/O interfaces:

- (a) Serial Interfaces:
 - Minimum four (4) EIA/ RS-232C serial ports capable of data rates of 300 bps to 115 kbps;
 - 16550 or compatible UART;
 - At least two (2) serial ports must be configurable for EIA/ RS-422 (if specified in the Project Specific Requirements, Appendix B);

- Isolation must be available for ports when configured for the EIA/ RS-232C and EIA/ RS-422 standards. Isolators must suppress at least 3KV and be replaceable without opening the enclosure;
 - Base addresses and IRQs selectable by jumper/BIOS;
 - Connections made by D-style 9-way connectors with locking screws;
 - Upgradeable to 24 ports within the enclosure (if specified in the Project Specific Requirements, Appendix B). All additional serial ports must be able to run both EIA/ RS-232C and EIA/ RS-422;
- (b) Parallel Interfaces:
- minimum 1 x EPP/ECP Parallel port, compatible with IBM LPT: standard;
 - base addresses and IRQs selectable by jumper/BIOS; and
 - connections made by D-style 25-way connectors with locking screws;
- (c) Network Adaptor
- 10/100 or 10/100/1000 megabit adaptor with Linux driver;
 - Connection made by standard Ethernet RJ45 modular connector;
 - Base addresses and IRQs selectable by jumper/BIOS;
- (d) Modem Adaptor (if specified in the Contract Specific Requirements):
- integrated modem/serial port (matching the stated serial interface requirements) meeting the V.34 standard and capable of operation over Telstra voice-grade dial (PSTN) and two-wire leased (PAPL) lines. This may logically appear in place of one of COM1-4 or as an additional serial port;
 - alternatively, an external modem meeting the requirements of the integrated modem (above) may be offered, where no suitable integrated modem can be supplied;
 - supplied with AUSTEL approved connector for connection to the PSTN/PAPL network; and
 - incorporate (or be provided with) adequate transient protection, filtering and shielding against induced electromagnetic radiation;
- (e) Display Adaptor (if specified in the Contract Specific Requirements):
- minimum 1MB video memory, capable of 800x600x256 colours with connection to CRT made by standard triple-row 15-way video connector with locking screws; and
 - Optionally, an additional interface to flat-panel LCD display with connection to panel made by standard D-style dual-row 15-way connector with locking screws;
- (f) Permanent Storage Interfaces (if specified in the Contract Specific Requirements):
- Removable compact flash; or
 - alternatively, an IDE hard disk controller (supporting up to LBA Mode 4 devices) may be supplied, with connection made by standard dual-row transition connector with latches (for ribbon cables);
- (g) Keyboard Interface (if specified in the Contract Specific Requirements):
- standard AT 101-key keyboard interface, with connection made by PS/2-style mini-DIN or standard DIN connector (PS/2-style preferred).

5.5 Site Specific Identifier

The field processor must include a STREAMS site specific identifier which:

- (a) uniquely identifies a unit; and
- (b) takes the form of a programmable “dongle” connected to the unit’s parallel or serial interface.

5.6 Field Processor Hardware Enclosure(s)

Further to the requirements of Part R65 “ITS Enclosures”, the enclosures must comply with the following:

- (a) FPs must be suitable for being mounted in telecommunications field cabinets that comply with ITS-01. A space of approximately 300 x 260 x 200mm will be available for mounting within the cabinets;
- (b) allowance for expansion;
- (c) metallic construction of high quality, sealed against dust and moisture to a minimum rating of IP51, as specified in AS 60529; and

- (d) connectors for all data interfaces (excepting the floppy and hard disk) must be located on a single face of the unit with effective means of restraining any connectors in their sockets. An LED power indicator and recessed momentary-action power reset switch/button must also be provided on this same face, with power connection made at the rear; and
- (e) no moving parts or fans.

6. **POWER SUPPLY UNIT**

6.1 **General**

The power supply unit must:

- (a) be suitable for connection to nominal 240V 50Hz earthed-neutral electrical supply, capable of correct operation between 200V and 265V a.c;
- (b) provide (as a minimum) DC output at +5V and GND, with connection compatible with that required by the processor board/unit;
- (c) be rated with 20% spare supply capacity when the FP is fully confirmed with all expansion slots filled, and maximum number of I/O cards installed;
- (d) incorporate (or be provided with) adequate transient protection and filtering;
- (e) have no exposed 240V contacts;
- (f) provide an interface to an UPS or other DC-based backup power supply; and
- (g) be contained within its own enclosure.

6.2 **Optional Equipment**

To ensure flexibility for future applications (by others), information on the availability and costings of the following options must be provided with the design documentation:

- (a) two or more additional serial ports;
- (b) the ability to configure/convert existing or additional serial ports to RS422;
- (c) an "External Reset" circuit with the ability to reset the system on timeout. This is similar in operation to the Hardware Watchdog but is a self-contained module, acting independently of the unit.

7. **MECHANICAL & PHYSICAL REQUIREMENTS**

Further to Clause R60.4 "Environmental Requirements", the FP must be capable of continuous operation in a field cabinet where the ambient temperature is in the range 0 to +70°C and humidity is in the range 0-90% (non-condensing).

Further to Part R61 "Installation of ITS Equipment", the FP and power supply must be suitable for shelf mounting in a telecommunications field cabinet that complies with Part R65 "ITS Enclosures". The site specific identifier may be connected to the field cabinet.

8. **HOLD POINTS**

The following is a summary of Hold Points referenced in this Part:

CLAUSE REF.	HOLD POINT	RESPONSE TIME
2	Quality Plan	7 days
2	Evidence of STREAMS compatibility	7 days
2	Samples for acceptance	7 days

9. VERIFICATION REQUIREMENTS AND RECORDS

The Contractor must supply the following records:

CLAUSE REF.	SUBJECT	RECORD TO BE PROVIDED
260.11	Manuals	Operation and maintenance manual(s)
260.12	Warranty	Manufacturer's Warranty
260.13	Testing and commissioning	Factory Acceptance Test (FAT) Records
260.14	System documentation	"As Built" documentation
261.6	Testing and commissioning (where the Contract includes installation)	Site Acceptance Test (SAT) and System Integration Acceptance Test (SIAT) Records - refer Part R61 "Installation of ITS Equipment".