Master Specification
Part RD-ITS-S6

Field Processors

September 2024

Government of South Australia
Department for Infrastructure and Transport

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Document Information

Document Information	
K Net Number:	13508155
Document Version:	1
Document Date:	30/09/2024

Document Amendment Record

Version	Change Description	Date
0	Initial issue	31/08/2023
1	Updated cover page	30/09/2024

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Contents

RD-ITS-S6 Field Processors

1   General

a)   This Master Specification Part sets out the requirements for the supply and configuration of field processors, including:

    i)   the documentation requirements, as set out in section 2;

    ii)   the functional requirements of field processors, as set out in section 3;

    iii)   the equipment component requirements, as set out in section 4;

    iv)   the operational requirements, as set out in section 5;

    v)   the power supply unit requirements, as set out in section 6;

    vi)   the requirements for optional STREAMS communications processors, as set out in section 7;

    vii)   the mechanical and physical requirements, as set out in section 8;

    viii) the testing and commissioning requirements, as set out in section 9;

    ix)   the Hold Point requirements, as set out in section 10; and

    x)   the verification requirements and records, as set out in section 11.

b)   The supply and configuration of field processors must comply with the Reference Documents, including AS 60529 Degrees of protection provided by enclosures (IP Code).

c)   Without limiting the Contractor's obligation to comply with the Contract Documents, including the Master Specification, the supply and configuration of field processors must comply with:

    i)   RD-ITS-D1 "Design of Intelligent Transport Systems (ITS)";

    ii)   RD-ITS-S1 "General Requirements for the Supply of ITS Equipment"; and

    iii)   RD-ITS-C1 "Installation and Integration of ITS Equipment".

2   Documentation

2.1 Design Documentation

In addition to the requirements of PC-EDM1 "Design Management", the Design Documentation must include:

a)   information and design documentation required by RD-ITS-D1 "Design of Intelligent Transport Systems (ITS)" as applicable to the field processors;

b)   evidence of STREAMS compatibility in accordance with:

    i)   RD-ITS-D1 "Design of Intelligent Transport Systems (ITS)"; and

    ii)   RD-ITS-S1 "General Requirements for the Supply of ITS Equipment";

c)   where specified in the Contract Documents, samples for acceptance in accordance with RD-ITS-S1 "General Requirements for the Supply of ITS Equipment";

d)   where communications processors are proposed in accordance with section 7, and subject to the Principal's release of the Hold Point in section 7b), specifications and the proposed location details of the communications processors as required by section 7d); and

e)   all layout, fabrication, interconnection and assembly drawings and diagrams necessary to install, connect and commission the field processor.

2.2 Construction Documentation

In addition to the requirements of PC-CN3 "Construction Management", the Construction Documentation must include:

a)   testing and commissioning plans which comply with the requirements of:

   i)   RD-ITS-S1 "General Requirements for the Supply of ITS Equipment";

   ii)   RD-ITS-C1 "Installation and Integration of ITS Equipment"; and

   iii)   PC-CN1 "Testing and Commissioning"; and

b)   a training plan as required by RD-ITS-S1 "General Requirements for the Supply of ITS Equipment".

2.3 Quality Management Records

In addition to the requirements of PC-QA1 "Quality Management Requirements" or PC-QA2 "Quality Management Requirements for Major Projects" (as applicable), the Quality Management Records must include the verification records required by section 11.

2.4 Maintenance Plan

In addition to the requirements of PC-CN2 "Asset Handover", the Maintenance Plan must include:

a)   routine maintenance recommendations;

b)   fault finding and repair instruction; and

c)   spare part requirements.

3   Functional requirements of field processor

The Contractor must ensure that the field processor:

a)   is an industrial PC featuring design and construction that is suited to the intended application and environment;

b)   is of a type approved by Transmax Pty Ltd (**Transmax**) as being STREAMS compatible for integration with the Principal's ITS management application; and

c)   interfaces to, controls, and manages the operation of field systems and devices that form part of ITS applications.

4   Equipment components

a)   The Contractor must ensure that the field processor equipment complies with this Master Specification Part and consists of:

   i)   field processor including memory and I/O interface cards;

   ii)   a separate power supply; and

   iii)   a site specific identifier as required in section 5.5.

b)   The Contractor must ensure that the field processor is STREAMS loaded and configured with STREAMS software.

5   Operational requirements

5.1 General

a)   The Contractor must ensure that the field processor meets the following general requirements:

i)   the field processor must satisfy all requirements set out in RD-ITS-S1 "General Requirements for the Supply of ITS Equipment";

ii)   an industry standard architecture expansion bus must be capable of being supported by the field processor;

iii)   a "technology guarantee" backward compatibility of future replacement products for a period of at least 5 years must be provided;

iv)   hardware modules must not be configured using plug-and-play unless the plug-and-play functionality can be disabled (and the module configured) by BIOS or hardware jumper; and

v)   all hardware must be certified by the field processor manufacturer as compatible with Linux kernel 5.10 or later.

b)   Field processors must have a local serial console management port available for diagnostics, in addition to the serial ports provided for field device communications.

5.2   Central processing unit and motherboard

The Contractor must ensure that the central processing unit and motherboard of the field processor meets the following requirements:

a)   the central processing unit must be of a 64-bit architecture; and

b)   the motherboard must be capable of stand-alone operation without the connection of a keyboard, video, disk drive, or similar.

5.3   Minimum system requirements

The Contractor must ensure that the field processor system resource meets the following requirements:

a)   the system must be supplied with minimum 4 GB of on-board RAM;

b)   the system must be supplied with minimum 2GB Industrial Grade Compact Flash Card. The system must be bootable and require no additional software support;

c)   the system resources must be capable of operating in the temperature and humidity environment expected to be encountered in field installations;

d)   the system must provide a battery-backed (or equivalent) "Real Time Clock", capable of retaining accurate date and time for a minimum of 12 months without mains power. The clock must be accurate to within 1 second per day; and

e)   when connected to the Principal's communications network, must synchronise their clocks with the Principal's network time servers using NTP.

5.4   Input / output interface requirements

a)   The Contractor must ensure that the field processor provides the following serial I/O interfaces:

i)   a minimum of 4 serial ports with an option of 8 ports from a single field processor;

ii)   all serial ports must be capable of being configured as EIA/TIA 232, EIA/TIA 422 or EIA/TIA 485 (both 2-wire and 4-wire operation for EIA/TIA 422 and EIA/TIA 485);

iii)   Port No. 1 of each field processor is initially configured for TIA/EIA232 communications (Port number 1 is reserved by the Principal for in-pavement loop detector units);

iv)   subsequent ports are configurable for TIA/EIA 232, TIA/EIA 422 or EIA/TIA 485 communications as required by the devices to be connected;

v)   isolation must be available for ports when configured for the EIA/TIA 232, EIA/TIA 422 or EIA/TIA 485 standards. Isolators must suppress at least 3 kV and be replaceable without opening the field processor enclosure;

vi)   base addresses and IRQs are selectable by BIOS or hardware jumper; and

vii)   connections must be made by D-style 9-way connectors with locking screws.

b)   The Contractor must ensure that protocol convertors are not used when connecting devices to the field processor.

c)   The Contractor must ensure that the field processor includes a network adaptor which complies with the following:

i)   10/100/1000 megabit adaptor with Linux driver; and

ii)   connection made by standard Ethernet RJ45 modular connector or industrial or industry standard weatherproof connectors.

d)   The Contractor must ensure that the field processor includes one USB2 or USB3 port to allow a keyboard interface.

5.5 Site specific identifier

The Contractor must ensure that the field processor includes a STREAMS site specific identifier which uniquely identifies the field processor unit and either:

a)   takes the form of a programmable "dongle" connected to the field processor unit's serial interface which includes one voltage free digital input for the cabinet door switch; or

b)   includes a micro SD card used as the serial site identifier and a minimum of 4 digital inputs to be used for the door switches.

6   Power supply unit

The Contractor must ensure that each field processor power supply unit:

a)   is suitable for connection to nominal 230 V 50Hz earthed-neutral electrical supply, capable of correct operation between 200 V and 265 V a.c;

b)   provides (as a minimum) DC output which is compatible with that required by the field processor;

c)   is rated at 120% of the maximum rating of the field processor;

d)   incorporates (or is provided with) adequate transient protection and filtering;

e)   has no exposed 230 V contacts;

f)   is contained within its own enclosure; and

g)   is suitable for being mounted via a 19" rack or DIN rail mount.

7   Optional equipment - STREAMS communications processors

a)   If the Contractor proposes to implement communications processors, it must first obtain the Principal's approval. The Principal's approval to implement communications processors constitutes a **Hold Point** and the Contractor's use of communications processors must not proceed unless the Hold Point is released.

b)   Where the Principal has released the Hold Point contained in section 7a), the Contractor must engage Transmax to perform an assessment of the Principal's requirements. The Contractor must submit Transmax's assessment report to the Principal, which constitutes a **Hold Point**. The Contractor's use of communications processors must not proceed unless this Hold Point is released.

c)   Where the Principal has released the Hold Point contained in section 7b), the Contractor must engage Transmax to incorporate communications processors in the design.

d) The Contractor must submit the communications processors specifications and the proposed location details as part of the Design Documentation.

8 Mechanical and physical requirements

a) The Contractor must ensure that the field processor is capable of continuous normal operation in accordance with the requirements of RD-ITS-S1 "General Requirements for the Supply of ITS Equipment".

b) The Contractor must ensure that the field processor housings comply with the following:

   i) field processors must be suitable for being mounted via 19" racks or DIN rail mounts;

   ii) has a primarily metallic construction:

      A. of high quality; and

      B. sealed against dust and moisture to a minimum IP rating of IP51, as specified in AS 60529 Degrees of protection provided by enclosures (IP Code);

   iii) contain no moving parts or fans; and

   iv) is designed to be securely located within a field cabinet.

c) The Contractor must ensure that, in addition to meeting the requirements of RD-ITS-C1 "Installation and Integration of ITS Equipment", the field processor and power supply are suitable for mounting in a telecommunications field cabinet that complies with the requirements of RD-ITS-S3 "ITS Enclosures" and section 8b). The field processor site-specific identifier may be mounted separately within the field cabinet.

9 Testing and commissioning

Testing and commissioning procedures and documentation must comply with the requirements of:

a) RD-ITS-C1 "Installation and Integration of ITS Equipment"; and

b) PC-CN1 "Testing and Commissioning".

10 Hold Points

Table RD-ITS-S6 10-1 details the review period or notification period, and type (documentation or construction quality) for each Hold Point referred to in this Master Specification Part.

Table RD-ITS-S6 10-1 Hold Points

Section reference	Hold Point	Documentation or construction quality	Review period or notification period
7a)	Proposal to implement communications processors	Documentation	20 Business Days review
7b)	Transmax assessment report for suitability of using communications processors	Documentation	20 Business Days review

11 Verification requirements and records

The Contractor must supply written verification as part of the Quality Management Records that the requirements listed in Table RD-ITS-S6 11-1 have been complied with.

Table RD-ITS-S6 11-1 Verification requirements

Master Specification reference	Subject	Record to be provided
RD-ITS-S1 "General Requirements for the Supply of ITS Equipment"	Testing and acceptance	Factory Acceptance Testing records
PC-CN1 "Testing and Commissioning"	Testing and commissioning	Test and commissioning procedures and documentation as required by PC-CN1 "Testing and Commissioning"