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1.0 General

1.1 Scope

- 1.1.1 This section of the specification describes and specifies requirements for the supply, delivery, installation, testing, commissioning, handing over in approved working order and maintenance during the Defects Liability Period of the whole Queue Management System in accordance with the Specification, Schedule of Technical Data, Important Notes to Tenderers, "Arahan Kepada Petender", Bill of Quantities, Conditions of Contract, drawings etc.

1.2 Technical Particulars


- 1.2.1 Tenderers shall submit at the time of tendering all catalogues, detailed technical particulars and guarantees in respect of the equipment offered, which shall be binding. No departure from these technical particulars and guarantees shall be permitted except with the written approval of the Superintendent Officer (S.O) or S.O's Representative.

1.3 Guarantees

- 1.3.1 The tenderers shall guarantee all equipment to be supplied under this contract against faulty design, materials and workmanship at the manufacturer's works within the defect liability period (DLP).

1.4 Electrical System

- 1.4.1 All equipment shall be rated for operation on a 230/400 V (within the tolerance as defined in MS IEC 60038; 230/400 V, +10%, -6%), 3 phase, 4 wire, 50 Hz system with solidly earthed neutral.

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2.0 Description

2.1 System Description

2.1.1 The system generally consists of the following components:-

2.1.1.1 Ticketing System

2.1.1.2 Router

2.1.1.3 Network Switch

2.1.1.4 Voice Module

2.1.1.5 Loudspeaker

2.1.1.6 Counter Terminal


2.1.1.7 Counter Display

2.1.1.8 Multimedia Information Display Controller

2.1.1.9 LED Display

2.1.2 On arrival, a customer will obtain a queue ticket from the ticketing system. When the customer is called, the ticket number and counter number will be displayed on the LED display.

When front desk personnel is ready to serve the customer, he presses the NEXT button on his counter terminal or key-in the next ticket number. The next ticket number will appear on the LED display. At the same time a voice announcement will be broadcasted through the loudspeaker.

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3.0 Equipment

3.1 Ticketing System

3.1.1 The ticketing system shall consist of a ticket printer and queue processor.

3.1.2 A ticket printer with built-in queue processor shall be used for ten (10) nos. or less service counters. A separate ticket printer and queue processor shall be used for (ten) 10 nos. or more service counters.

3.1.3 The ticket printer with built-in queue processor shall comply to the following minimum technical specifications:-

Service Button	:	Five (5) or as specified in the drawing or bill of quantities.
Connectivity	:	100 Mbps Ethernet
Printer type	:	Direct line thermal printer with paper end sensor.
Printer Paper	:	Thermal, 80mm width


3.1.4 The ticket printer shall comply to the following minimum technical specifications:-

LCD Screen	:	8", IPS panel, 1024 x 768 pixels
Touch Screen	:	Capacitive
Controller	:	Embedded
Connectivity	:	100 Mbps Ethernet and WiFi 802.11b/g/n
Printer Type	:	Direct line thermal printer with paper end sensor.
Printer Paper	:	Thermal, 80mm width

3.1.5 The queue processor shall comply to the following minimum technical specifications:-

Processor	:	Intel Core i5
Memory	:	4GB RAM
Data Storage	:	1 TB
LAN Connectivity	:	100/1000 Mbps Ethernet
Feature	:	Can support unlimited counter terminal

3.1.6 The ticketing system shall have factory preinstalled operating system (OS). Queue system application shall be installed in the queue processor to ensure a fully operational system.

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3.1.7 Monitoring, reporting, maintenance and control of system shall be able to be performed remotely via a standard web browser. It shall allow for key performance indicators in queue service and quality of services to be monitored easily and swiftly in real time.

3.2 Router

3.2.1 A router shall be used to setup a single IP address for queue management system connectivity with ICT network.

3.2.2 The router shall comply to the following minimum technical specifications:-

Cabling Type	:	Category 5e or better
LAN	:	Four (4) Gigabit LAN port
WAN	:	One (1) Gigabit WAN port


3.3 Network Switch

3.3.1 The network switch shall comply to the following minimum technical specifications:-

Number of Port	:	As specified in the drawing or bill of quantities
Uplink Port	:	One (1)
Ethernet Speed	:	100/1000 Mbps

3.3.2 The PoE network switch shall comply to the following minimum technical specifications:-

Number of Port	:	As specified in the drawing or bill of quantities
Uplink Port	:	One (1)
Ethernet Speed	:	100/1000 Mbps
PoE Power	:	15.4W each port, IEEE 802.3af compliance

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3.4 Voice Module

3.4.1 The voice module is a digital voice synthesizer used for announcing ticket numbers and counter numbers.

3.4.2 The voice module shall comply to the following minimum technical specifications:-

Amplifier	:	2 x 10W audio power amplifier
Voice Storage	:	Flash memory
Control Buttons	:	Volume control, mute, melody
Audio Outputs	:	Left and right push speaker terminals
Data Interface	:	100 Mbps Ethernet
Language	:	Malay and English

3.5 Loudspeaker

3.5.1 The loudspeaker shall be used for announcing ticket number and counter number.

3.5.2 Loudspeaker mounted on false/ suspended ceiling shall be supported adequately by an approved mean to carry its own weight and not rested directly on the ceiling.

3.5.3 The loudspeaker shall comply to the following minimum technical specifications:-


Rated Power (@100V)	:	As specified in the drawing or bill of quantities
Frequency Response (-3dB)	:	120Hz – 10kHz
SPL Level (1W,@1kHz,@1m):	:	85dB
Opening Angle(at 1kHz/-6dB):	:	Min 90°

3.6 Counter Terminal

3.6.1 The counter terminal shall be used by the counter staff to call the customers and operate other queue operations.

3.6.2 The counter terminal shall comply to the following minimum technical specifications:-

Display	:	1-line, 16-character LCD
Controller	:	Low power flash microcontroller
Function Buttons	:	User ID, Next, Call, Store, Transfer Counter, Transfer Service, Done, Settings

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Data Interface	:	100 Mbps Ethernet
Power Interface	:	Complete with PoE receiver or similar to provide power supply and Ethernet connectivity.

3.6.3 The touch screen type counter terminal shall comply to the following minimum technical specifications:-

Display Screen	:	7" LCD with capacitive touch screen
Controller	:	Embedded quad-core ARM processor
Functions	:	Login, Next, Call, Recall, Store, Done, Transaction, Transfer Service, Transfer Counter, Customer Information & Message
Data Interface	:	100 Mbps Ethernet
Power Interface	:	Complete with PoE receiver or similar to provide power supply and Ethernet connectivity.

3.7 Counter Display


3.7.1 The counter display shall be used to display called number at the counter.

3.7.2 The 7-segment type counter display shall comply to the following minimum technical specifications:-

LED Display	:	3" high, 7-segment super bright, red colour
Ticket Number	:	4-digit
Counter Number	:	Vinyl sticker label
Speaker	:	Integrated
Audio	:	Electronic chime, adjustable volume
Data Interface	:	100 Mbps Ethernet
Power Interface	:	Complete with PoE receiver or similar to provide power supply and Ethernet connectivity.
Mounting	:	Wall mounted or ceiling suspended

3.7.3 The LCD type counter display shall comply to the following minimum technical specifications:-

Display Screen	:	10" colour TFT-LCD
Display Resolution	:	1024 x 600 pixels
Display Brightness	:	250cd/m ² , LED backlight
Controller	:	Low power embedded processor, 2GB

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Audio	:	Flash storage
Data Interface	:	Built-in speakers
Power Interface	:	100 Mbps Ethernet
	:	Complete with PoE receiver or similar to provide power supply and Ethernet connectivity.
Mounting	:	Wall mounted or ceiling suspended

3.8 Multimedia Information Display Controller


3.8.1 The multimedia information display controller shall comply to the following minimum technical specifications:-

Type	:	Mini CPU with 2GB RAM, 500GB HDD
OS	:	Windows 7 Embedded
LAN Connectivity	:	100Mbps Ethernet
Video Output	:	HDMI + VGA
AV Input	:	RF tuner & composite video
Power Supply	:	External switching adapter, AC 110-240V Input, 12V/5A output
Display Panel Resolution	:	Full HD (1920 x 1080 pixels)
Display Panel Orientation	:	Portrait or landscape
Feature	:	Support DVB-T2, Built-in client software

3.9 LED Display Monitor

3.9.1 The LED display monitor shall comply to the following minimum technical specifications:-

Diagonal Screen Size	:	As specified in the drawing or bill of quantities
Resolution	:	Full HD (1920 x 1080 pixels)
HDMI Input	:	2
USB Input	:	1
Component In (Y/Pb/Pr)	:	1
Component In (AV)	:	1
Audio Out (Mini Jack)	:	1

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4.0 Wiring

4.1 General

- 4.1.1 General system of wiring, conduits, trunking, cable tray or cable ladder, wiring accessories etc. shall be referred to the latest JKR Specification for Low Voltage Internal Electrical Installation (L-S1).

4.2 Service Colour Identification

- 4.2.1 All conduits and trunking for the system shall be clearly identified and distinguished from other services.
- 4.2.2 Trunking for queue management system shall be identified using black "QMS" letterings over white background. The letterings shall have a minimum height of 15 mm but need not exceed 50 mm, and at an interval not more than 1000 mm. All letterings shall be clearly legible, and to the satisfaction of the S.O or S.O's Representative.
- 4.2.3 Colour bands for conduits identification shall be as specified in the latest JKR Specification for Low Voltage Internal Electrical Installation (L-S1) or as approved by the S.O or S.O's Representative.

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5.0 Testing and Commissioning

5.1 Test Instruments

- 5.1.1 All measuring and test instruments used for testing and commissioning of the installations shall be regularly tested and calibrated by the manufacturers or accredited calibration laboratories for their functionality and accuracy. Test and Calibration Reports or Certificates for the measuring and test instruments issued by the calibration laboratory shall be valid for two (2) years from the date of issuance.
- 5.1.2 The instruments and their Test and Calibration Reports or Certificates shall be submitted to S.O or S.O's Representative for verification two (2) weeks before testing of the installations being carried out. No test on the installations shall be carried out without prior approval of the S.O or S.O's Representative. Notwithstanding the validity of the aforesaid Reports or Certificates the measuring and test instruments shall be re-calibrated if so required by the S.O or S.O's Representative after any mechanical or electrical mishandling. Fee required for the testing and calibrating of the measuring and test instruments is deemed to be included in the Contract.


5.2 Test and Test Certificates

- 5.2.1 After the installation work has been completed and before Certificate of Practical Completion is issued, the whole system shall be tested for compliance and performance as follows:-
- 5.2.1.1 Network cables shall be tested according to relevant standard;
 - 5.2.1.2 Functional test to indicate correct operation and performance of all equipment; and
 - 5.2.1.3 Any other tests which may be needed to demonstrate the satisfactory function of the system
- 5.2.2 The S.O or S.O's Representative reserves the right to be present at all tests and the Contractor shall give at least one (1) week notice in writing to the S.O or S.O's Representative for this purpose. In any case, no test shall be carried out without prior approval of the S.O or S.O's Representative. Copies of all the test certificates together with As-Installed Drawings properly bound and titled shall be submitted to the S.O or S.O's Representative within one (1) week after the completion of the testing.

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6.0 Service and Maintenance

- 6.1 During the Defects Liability Period, the Contractor shall be responsible for the service and maintenance work of the complete installation. All works shall be carried out by skilled person. All labour, material, tools and parts necessary to rectify the defect due to manufacturing/installation faults shall be supplied/executed at the Contractor's cost.
- 6.2 The service and maintenance to be performed and defects to be rectified and making good shall include but not limited to the following:-
- 6.2.1 Repairs and replacement of all equipment and accessories that become faulty due to manufacturing and installation defects whether it is under the manufacturer's warranty or not;
 - 6.2.2 Replacement and making goods of all wiring and accessories;
 - 6.2.3 Making good any damage to roads, buildings, drains, cables, pipes, concrete areas, paved areas etc. which had not been properly made good arising out of his work; and
 - 6.2.4 All other works deemed as necessary by the S.O or S.O's Representative.
- 6.3 All works shall be carried out as soon as the Contractor is being informed by the S.O or S.O's Representative or the occupant, and shall be completed within a reasonable time except under emergency situation. If the Contractor fails to comply with the above requirements, the S.O or S.O's Representative reserves the right to engage another party to carry out the work. in which case, the Contractor shall be responsible for all the expenses incurred.

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7.0 Shop Drawings and As Built Documents

7.1 Shop Drawings

7.1.1 Two (2) sets of prints of shop drawings for construction and/or installation shall be submitted to the S.O or S.O's Representative for approval. The Contractor shall prepare and submit shop drawings for the whole work or parts of the work at least two (2) weeks before the work begins. If the shop drawings submitted are not acceptable by the S.O or S.O's Representative, the Contractor shall amend and re-submit the shop drawings within two weeks from the date of return of the shop drawings. No work shall be carried out without the shop drawings being approved by the S.O or S.O's Representative.

7.1.2 The shop drawings shall include and show the following:-

- 7.1.2.1** Co-ordinated dimensioned general arrangements, layouts and positions of accessories, equipment racks and all others necessary for the complete installation;
- 7.1.2.2** Schematic line diagrams of the installation;
- 7.1.2.3** The dimensioned general arrangements, layouts and routes of final circuits;
- 7.1.2.4** The dimensioned general arrangements, layouts, routes and positions of all lateral and vertical mains and/or sub-mains;
- 7.1.2.5** The dimensioned layouts and positions of all holes and cut-through in the walls and floors for the lateral and vertical mains and/or sub-mains; and
- 7.1.2.6** Co-ordinated routes for all cables laid external of the building;


7.1.3 The cost of all these shop drawings is deemed to be included in the Contract.

7.2 As Built Documents

7.2.1 As built document shall consist of but not limited to the as installed drawings, manuals, certificates, catalogues, inventories and parts lists.

7.2.2 The as installed drawings shall comprise of:-

- 7.2.2.1** Site plan;
- 7.2.2.2** External cable routes;

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7.2.2.3 Internal layout plans; and

7.2.2.4 Schematic diagrams.

7.2.3 These drawings shall be labelled at the lower right hand corner with the Electrical Contractor's name and address, date of commissioning, scale, drawing number (the drawing number to be obtained from the S.O or S.O's Representative), title and following particulars: -

JABATAN KERJA RAYA
CAWANGAN KEJURUTERAAN ELEKTRIK
CONTRACT NO.:

7.2.4 If the drawings submitted are not according to the actual installation at site and/or not acceptable to the S.O or S.O's Representative, the Contractor shall amend and re-submit the drawings within two (2) weeks from the date of return of the drawings to the satisfaction of the S.O or S.O's Representative.

7.2.5 Manual and documents for the installation shall be supplied. It shall comprise of:-

7.2.5.1 Installation manual;

7.2.5.2 Operation manual;

7.2.5.3 Service and maintenance manual;

7.2.5.4 Inventories and parts list;

7.2.5.5 Product data and catalogue;

7.2.5.6 Product test certificates; and

7.2.5.7 Installation test results.

7.2.6 Each of the as built documents shall be bound together with hard cover and submitted in minimum four (4) sets upon issuance of Certificate of Practical Completion of the project.

7.2.7 In addition, one (1) set of the as installed drawing shall be submitted in the form of original document, and four (4) sets in physical digital storage.

7.2.8 The cost of all these prints, manuals, tools etc. whether or not provided in the Bill of Quantities, is deemed to be included in the Contract.