Densitron Ferrograph
Build Instructions

Rhapsody Unit

211-001	1	16/01/04	GB	PC	
Document	**Issue**	**Date**	**Produced by**	**Checked by**	**Approved by**

Document Changes

Changes are identified in the document by a line in the margin next to the change. The nature of the change is kept on file below.

Issue Level	Description of Change	Change Number	Date
1	**Initial Issue**		

W/O No	Batch Size	Job Leader	Manuf Date	Total rejects	Audit Qty	Audit Failures	Auditor

Sheet

PRODUCT TRAINING RECORD

Trainee	Task Trained in:	Training commenced	Training completed	Trained by

1   Preparation of Rear Assembly for painting

Assemble together a top, a bottom, 2 extenders and a back extrusion using number 8 x ¼"
making sure all ends are square and back extrusion is centralised.

Identify the top of the display by locating the access hole for the logic board dip switch to the
left and the locating channel for the wall brackets at the top.

Fit the mains input end plate and rear grill to the right hand side of the unit.
Fit the blank end plate and rear grill to the left hand side using No 8 x ¼ self tapping screws.
Send out for painting complete with the end caps.

2   Receipt of painted Assembly

2.1   Enclosure

Insert pre wired IEC mains socket and cat 5 flying lead into relevant cut outs in the mains input
plate.

Assemble equipment tray and slot into extrusion from the left hand side.

Fix into place with 2 No.8 x ¼ self tapping screws into grooves at the power supply end of the
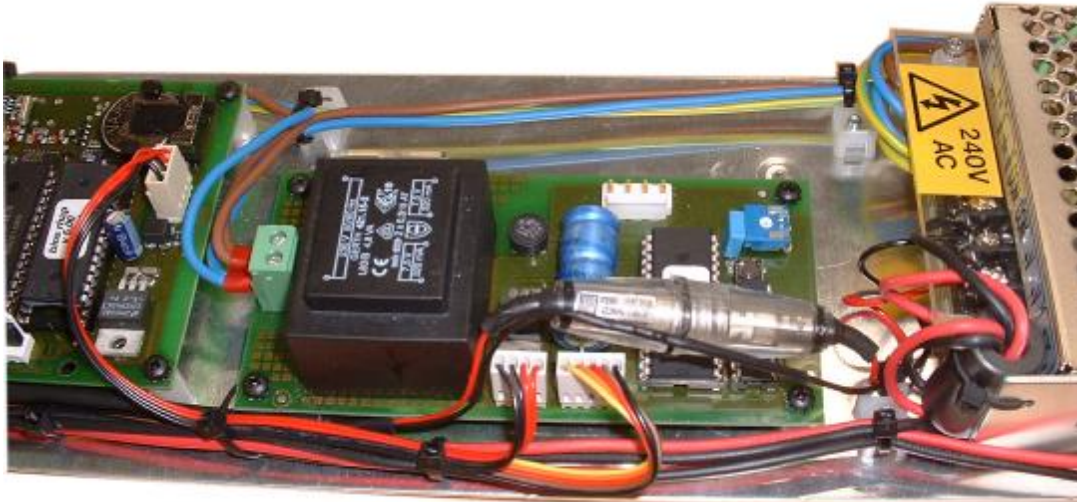plate.

Ensure all cables and ferrites are pushed well down to avoid snagging when fitting display boards.
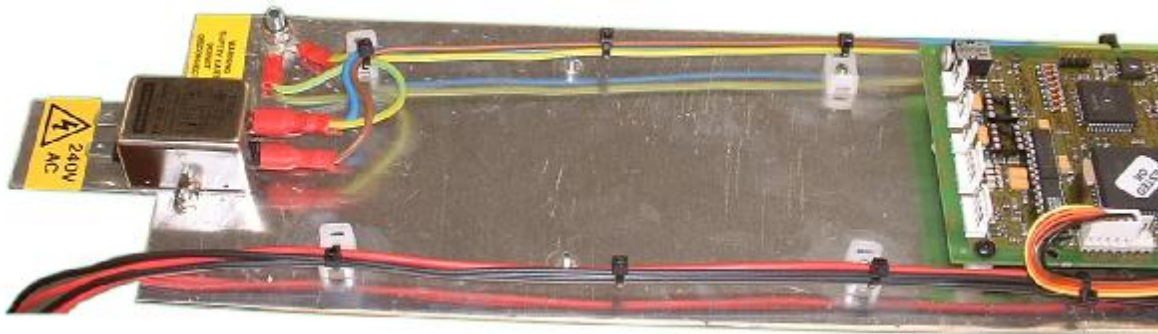
A variation is the LANTRONIX unit the only difference is the equipment plate
and the mains / data input plate.
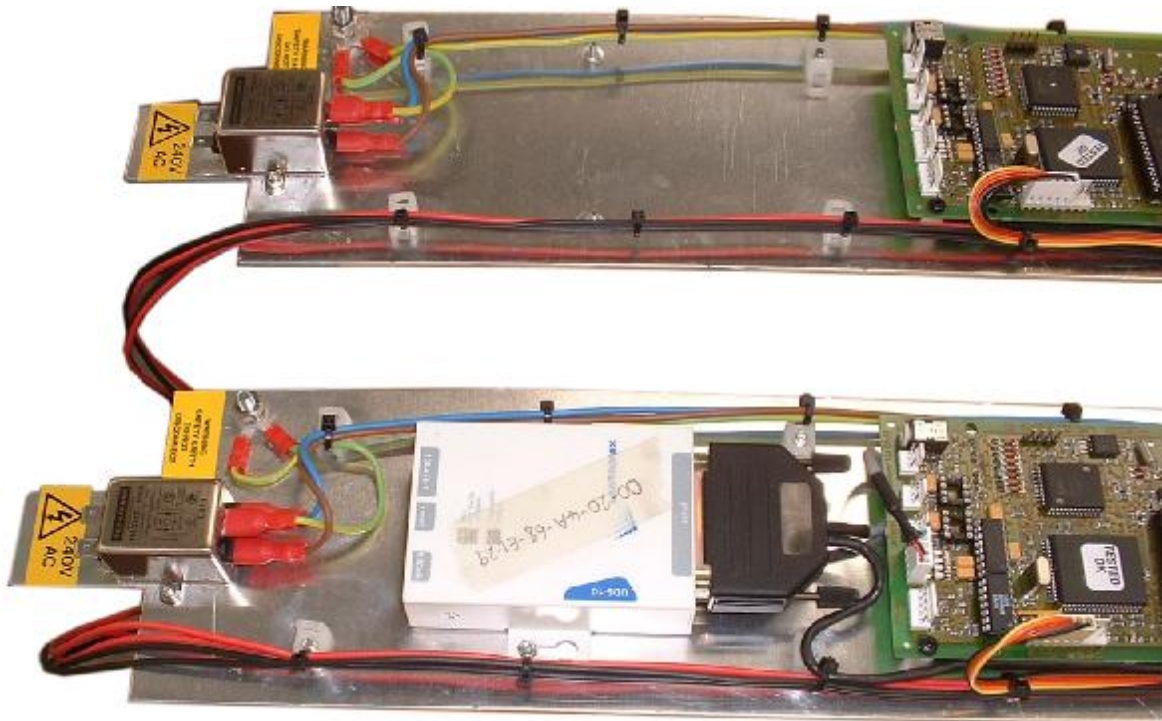
Connect to mains wire input plate. Fit IEC connector and RJ45 chassis socket ensure earth is connected.
Fix speaker to speaker grill and insert on right hand side top grooves. Connect cable to sound card output port. Neatly lay cable and secure.
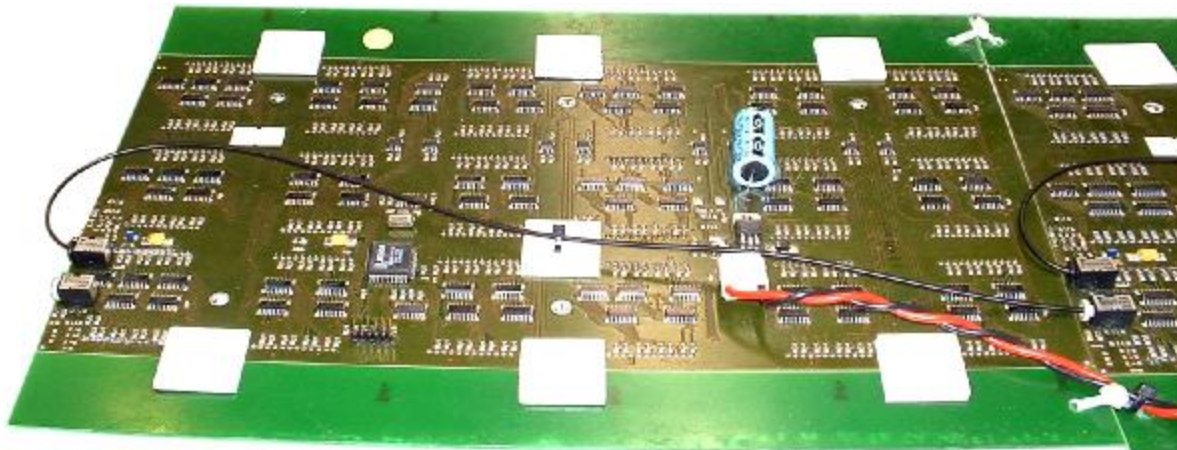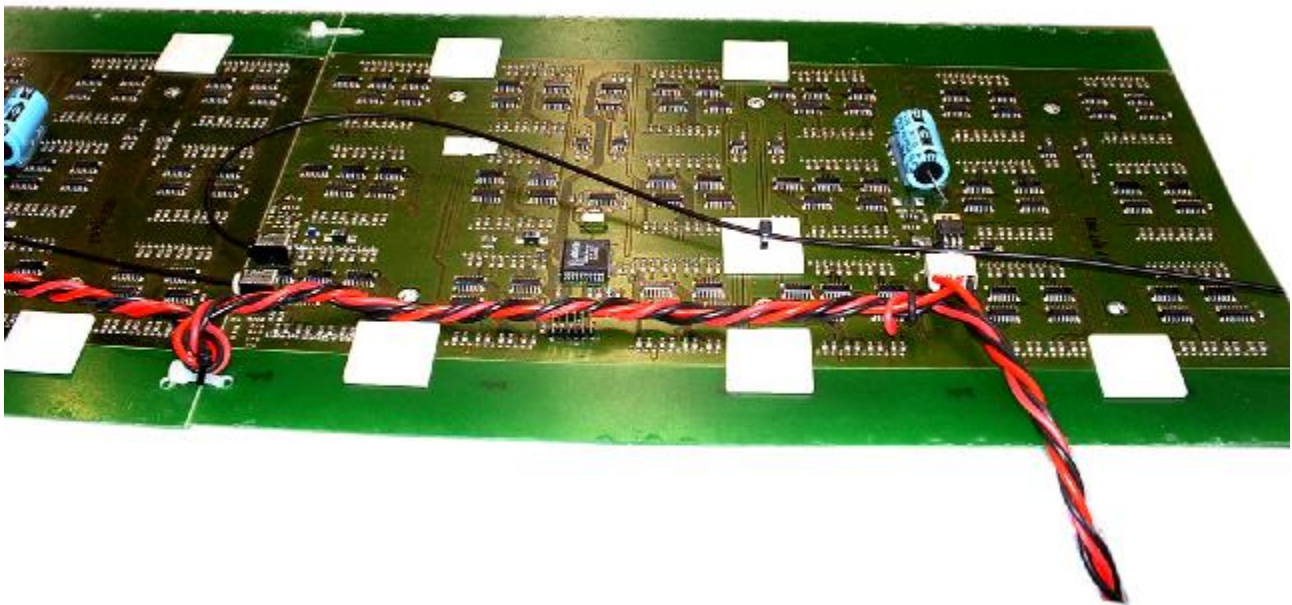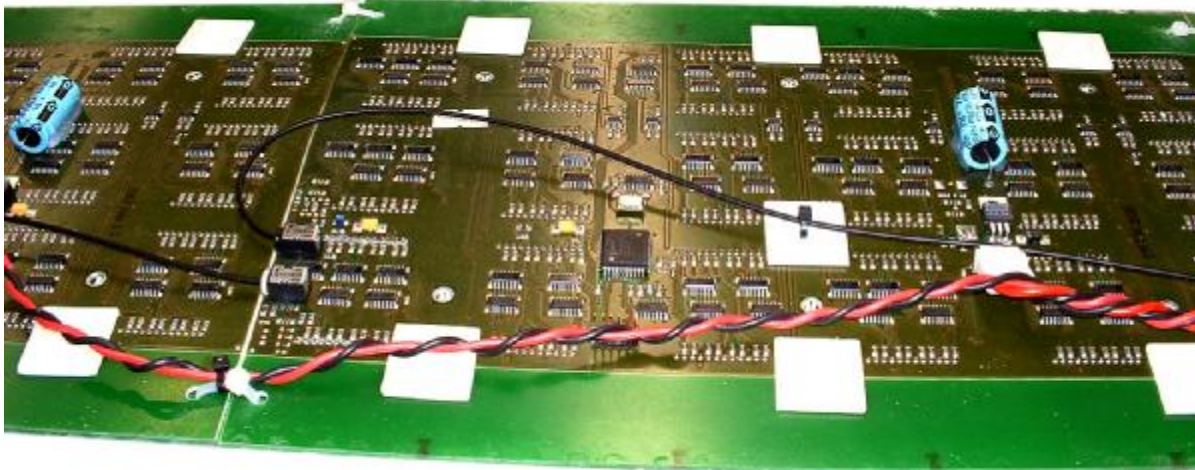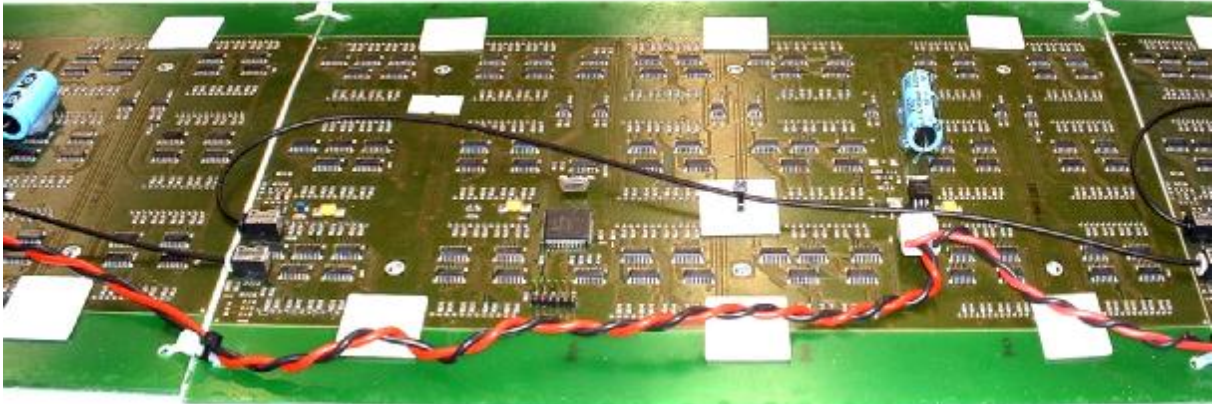
To improve earthing between modular extrusions screw at least 12 off m8 x ¼ equally spaced into the mating slots. Connect all extrusions back to star point earth.
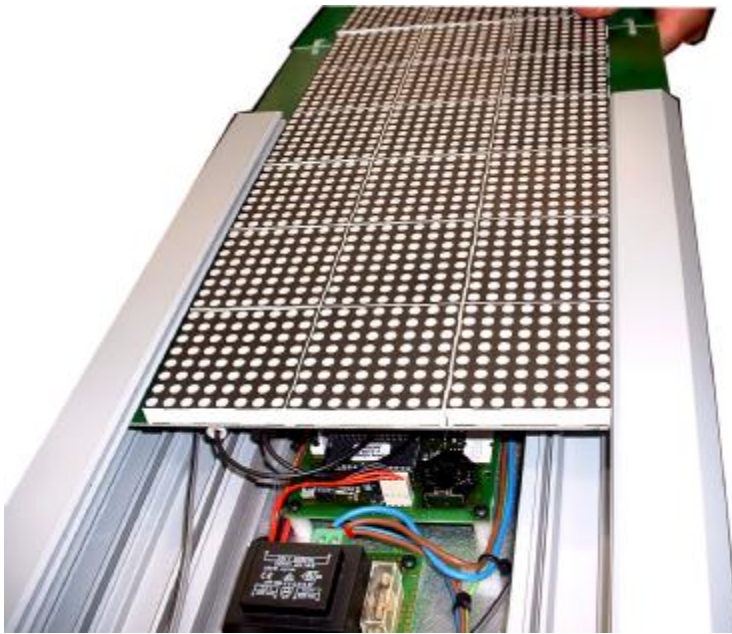
2.2 Display Board

Place 4 display boards face down on a protected bench. Fasten together using ty wraps and wire as photo.

3   Final Assembly

Take the finished display boards and insert into appropriate grooves from the left hand side taking care not to snag any wires or boards. Partly extract the equipment plate and connect the fibre optic cable to the logic board and the power cable arrangement to the display boards.

Gently ease into position both display boards and equipment tray and secure using 2 x No.8 x ¼ into groove between plate and extrusion.

Put 2mm foam along inner edge of both loud speaker extrusions. And fit right hand plate so as foam rests on LED blocks. Insert screen and left hand plate then fit end caps using grub screw and special locating pins.

Check for any gaps and rectify.

Fit label to the RJ45 output port to indicate the TCP/IP and RS485 outputs, i.e. the RJ45 flying lead and socket.

These units must be pat tested before switching on.

4 TESTING:

Test Sheet

Test Description	Test Result	
Visual Inspection	**OK**	ŏ
a) Wiring layout and neatness	OK	
b) Labeling	OK	
c) Exterior Cosmetic Condition	OK	
d) Mechanical test – secure all fixings, moving parts - smooth action, etc	OK	
Inspected By	Date	

Test Description	Test Result	
Earth Continuity and Wiring Check	**OK**	ŏ
a) MAINS POWER EARTH AND MAIN ENCLOSURE STAR EARTH POINT		Ω
b) Mains Power Earth To LED Mounting Frame		Ω
c) Mains Power Earth To Equipment Chassis Plate(s)		Ω
d) Mains Cable Wiring Inspection	OK	
e) Insulation Resistance Test		Ω
TESTED BY		

Functional Tests	OK	ŏ
a) PSU Voltage1		V
PSU Voltage2		V
SoundWav PCB Voltage		V
b) LEDs Full Screen, Blank Screen and Stripe Test	OK	
This test must be carried out in low ambient lighting conditions.		
c) Information Screen	OK	
d) PC to Sign Communication RS485/Ethernet	OK	
Tested By	Date	

Soak Test	
Date and Time On Test	Date and Time Off Test
Additional Information/Comments	**By**

4.1 Visual Inspection Prior To Power Up

Wiring

Check the following:

- Security of star earth point connections and fixing nut on equipment tray.
- Earth bonding to both extrusion sections and end plate.
- All cable connectors are firmly and fully pushed into their respective mating plugs or sockets.
- Cables are routed to avoid them being trapped when the interior equipment chassis tray is pulled forward.
- The equipment tray is not free to slide. A self-tapping screw into the extrusion should provide a stop.
- Ensure that the cables are long enough to allow the equipment tray to be slid out far enough to disconnect the speakers from the soundcard.

Labelling.

Check the following are correctly identified as "240v ac"

- Mains power adjacent to IEC inlet
- Mains Filter

Check that safety Earth label is correctly positioned next to star point.

Check the following :-

- Electronics Chassis is fitted with:
- Tested label
- Indication of IP Address (Ethernet enabled model only)

- Logic Control Eprom is labelled thus:-

Rhap V5.0

- External Metallised Label fitted to rear of Housing .

The following labels are required to be fixed to the sign.

External Label Details
Aluminium plate max size 50 x 30 mm bearing the following information :-

- Manufacturer/supplier
- Model
- Serial No
- Software version(s) installed

Firmware Label bearing the following information :-

- Part No
- Firmware version
- Checksum

Default IP address: Only in the case of ethernet-enabled unit.

4.2 Exterior Cosmetic Appearance.

Check the following are scratch free and clean:-

- Front Glass.
- Main enclosure.
- Check that DIP-switch lines up with cut-out on rear of extrusion.

4.3 Earth Continuity and Wiring Check

Earth Continuity

Use the PAT4 to test the earth continuity and bonding between Main enclosure Star Earth Point and
- Front Frame.
- Main Housing
- Led mounting frame
- Internal equipment chassis earth points

 (Record the value on the test sheet. (The value must be <0.1 ohm).

Insulation test

Connect the live and neutral pins of the mains input connector together.
Use the PAT4 tester to measure the insulation resistance (at 500v dc) between these pins and the metalwork of the enclosure. It must be $\geqq 50\text{M}\Omega$. Record the value reported by the PAT Tester on the test sheet.

Mains Cable Wiring Inspection

Check that Live Neutral and Earth cabling is connected correctly (i.e. Polarity correct to components, securely fitted and tidy).

4.4 Functional Tests

Bootup

Set the logic board DIP switches with switch 7 ON, all others off. Power up the unit and check that the test pattern is displayed.

Psu Voltages

Check the DC output of the Meanwell PSU is 7.5V +/- 200mV
If an ethernet Device Server is fitted, check the voltage output is as stated on the Server's PSU.

Record the values.

Display Matrix Scanning

Perform the following tests :-

* Switch Logic Board Dip Sw 7 to ON and check that the stripe test runs from right to left. Switch Dip 7 back to off.
* Switch Logic Board Dip Sw 8 to ON and check that the full block test runs from right to left with display lines 1 and 2 leading lines 3 and 4 by one pixel.. Switch Dip 8 back to off.

Ensure that LED test is done in limited light conditions to check for faulty LED panels.

4.5 Communication Testing

External PC Comms Test

RS485/422 Model

Connect the flying comms lead with RJ45 termination to a 485 line driver connected to the PC.

Run UDPTWin V1.2.0.11 to communicate a test message to the unit.

Check speaker operation by sending an instruction to play a sound.

RS232

Connect the flying comms lead to a junction box and pick off the required Rx, Tx & ground for RS232 connection (see appendix1). Run UDPTWin V1.2.0.11 to communicate a test message to the unit.

Check speaker operation by sending an instruction to play sound.

Ethernet

Determine the IP address and port number of the Device Server. (marked on the reverse of the unit)

Connect the unit to the PC network card either via the LAN or direct – with a crossed ethernet cable. Use Lantronix Redirector c/w UDPTWin to communicate with the display. See Technical Specification (206-042) for details of device server configuration.

Check speaker operation by sending an instruction to play sound.

4.6 Soak Test.

Run the EUT for a minimum of 24 hours whilst displaying the stripe test.

4.7 Final Test.

> **NOTE :**   The equipment must be powered directly from the mains supply via a 6 to 10 amp rccb with earth leakage trip current of 30ma and not from an isolation transformer.

Repeat tests 2, 3, and 4

4.8 Equipment Lists

The equipment lists are given below and are dependent on the customer specification.

Product Code: A4-1021-00

**Product Name and Key Design Details:
Rhapsody A4-1021-00 RS485 Type**

LEVEL	ENGINEERING DESCRIPTION	FERRO PART NO.	PART NUMBER	REVISION	SUPPLIER DESCRIPTION	SUPPLIER	QTY
	Yellow = Caution under Review						
	Light Green = Checked						
	Rhapsody Extrusion Profiles (Tooling)						
	Rhapsody Top/Bottom Extrusion Profile Detail (For Extrusion Tool)	221 228 E	B3-1085			Railex	
	Rhapsody Extension Extrusion Profile Detail (For Extrusion Tool)	221 232 C	B3-1086			Railex	
	Rhapsody Wall Bracket Extrusion Profile Detail (For Extrusion Tool)	221 235 C	B3-1087			Railex	
	Rhapsody Speaker Extrusion Profile Detail (For Extrusion Tool)	221 234 D	B3-1088			Railex	
	Rhapsody Rear Housing Extrusion Profile Detail (For Extrusion Tool)	221 233 B	B3-1089			Railex	
	Housing Assembly		01				
	Top/Bottom Extrusion Cutting Details	221238_C	B3-1080		221228		2
	Extender Extrusion Cutting Details	221239_B	B3-1081		221232		2
	Rear Extrusion Cutting Details	221240_C	B3-1082		221233		1
	Speaker Plate (without slots) Cutting & Machining Details	221245_A	B3-1084		221134		1
	End Plate	555402_A	24-1048				1
	Vent Plate	555403_A	24-1050				2
	3mm Pop Rivet		18				0
	Acrylic Screen	640133_A	19-1042				1
	End Cap Cutting Details	555400_B	24-1089		221259		2
	Securing Pin (for End Cap)	250352_B	26-1008				4
	M6x6mm S/S Grub Screw						4
	3mm DIAx10mm S/S Roll Pin						4
	Rhapsody 3 line x 32 character display KIT		03-1012		Rhapsody FDS178 kit	Surtronic Kit	
	24x48 Full Matrix Tricolour LED				FDS178	Surtronic Kit (Part)	4
	Speaker Plate Assembly		01				
	Speaker Plate (with slots) Cutting & Machining Details	221241_B	B3-1083		221234		1
	8 ohm 10W Oval (Visaton SC 5.9)		BE-1007	364-3408		RS	1
	#8x5/16" S/S S/T Screw						4
	Connector Plate Assembly		01				
	Connector Plate - RS485 type		24-1092_A				1
	M5 Nut		16-1020				1
	M5 Shakeproof Washer		15-1016				1
	IEC Snap In 1.5mm Male Panel mount plug (black)		63-1106		481-623	RS	1
	Equipment Plate assembly		01				
	Equipment Plate (with serial to network converter)		24-1091-B				1
	M4 Nut		161006				2
	M4 Shakeproof Washer		151017				2
	M6 Nut		161012				2
	M6 ShakeproofWasher		151014				2
	M3 Nut		161010				4
	M3 Shakeproof Washer		151011				4

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Rhapsody Unit

	Tie Base		C3			3
	Label - 240V		C1-1008	463-784	Farnell	1
	M3x6mm SEM screw		141016			12
	M3x9mm F/F Nylon Pillar		121008			12
	M3 Fibre Washer		151015			8
	PSU 7V5 Meanwell 100W		17-1037	S-100F - 7.5	Surtronic Kit (Part)	2
	10A Mains Filter (Schaffner- FN332-10/05)		45-0027	217-0735	RS	1
	IEC Male Panel mount plug		63-	481-623	RS	1
	Insulation Boot (Mains Filter)		C4-1013	801-932	RS	1
	Logic Controller FDS101 V4.01 (rear DIPs)		80-1552	FDS101	Surtronic Kit (Part)	1
	5 way Ribbon Comms Cable Assy			FDS101 Kit	Surtronic Kit (Part)	
	4 Way Ribbon Power Cable Assy			FDS101 Kit	Surtronic Kit (Part)	
	"SoundWav" Soundcard			SOUNDWAV	Surtronic Kit (Part)	1
	Tie Base					
	Cables and connectors					
	RJ45 plug			CN04673	CPC	1
	4 way PC power plug (pin)			299-479	Farnell	
	4 way PC power plug (socket))			148-085	Farnell	
	Pin contact (per 100)			299-558	Farnell	
	Socket contact (per 100)			149-091	Farnell	
	Molex 4-way socket			RS296-4956	RS	2
	Molex 5-way socket			RS296-4962	RS	2
	Molex Crimp pins (per 100)			RS467-598	RS	
	Tie Base					
	Strain Relief Bush			543-872	RS	1

A4-1021-02	**Rhapsody A4-1021-02 (Ref: 904018_D) RS485 & Ethernet DualType**

LEVEL	ENGINEERING DESCRIPTION	FERRO PART NO.	PART NUMBER	REVISION	SUPPLIER DESCRIPTION	SUPPLIER	QTY	TYPE
	Yellow = Caution under Review							
	Light Green = Checked							
	Rhapsody Extrusion Profiles (Tooling)							
	Rhapsody Top/Bottom Extrusion Profile		B3-1085					
	Rhapsody Extension Extrusion Profile		B3-1086					
	Rhapsody Speaker Extrusion Profile		B3-1088					
	Rhapsody Rear Housing Extrusion Profile		B3-1089					
	Housing Assembly		01					
	Top/Bottom Extrusion Cutting Details		B3-1080				2	
	Extender Extrusion Cutting Details		B3-1081				2	
	Rear Extrusion Cutting Details		B3-1082				1	
	Speaker Plate (without slots) Cutting & Machining Details		B3-1084				1	
	End Plate		24-1048				1	
	Vent Plate		24-1050				2	
	3mm Pop Rivet		18				0	C
	Acrylic Screen		19-1042				1	
	End Cap Cutting Details		24-1089				2	
	Securing Pin (for End Cap)		26-1008				4	
	M6x6mm S/S Grub Screw						4	C
	3mm DIAx10mm S/S Roll Pin						4	C
	Rhapsody 3 line x 32 character display KIT		03-1012		Rhapsody FDS178 kit	Surtronic Kit		
	24x48 Full Matrix Tricolour LED				FDS178	Surtronic Kit (Part)		
	Speaker Plate Assembly		01					
	Speaker Plate (with slots) Cutting & Machining Details		B3-1083				1	
	8 ohm 10W Oval (Visaton SC 5.9)		BE-1007		364-3408	RS	1	
	#8x5/16" S/S S/T Screw						4	C
	Connector Plate Assembly		01					
	Connector Plate Dual Interface (RS485 & Ethernet)		24-1197	A			1	
	M5 Nut		16-1020				1	C
	M5 Shakeproof Washer		15-1016				1	C
	IEC Snap In 1.5mm Male Panel mount plug (black)		63-1106		481-623	RS	1	C
	Grommet 6.3mm cable Hole				543-204	RS	1	C
	Equipment Plate assembly		01					
	Equipment Plate (with serial to network converter)		24-1091	C			1	
	M4 Nut		161006				2	C
	M4 Shakeproof Washer		151017				2	C
	M6 Nut		161012				2	C
	M6 ShakeproofWasher		151014				2	C
	M3 Nut		161010				4	C
	M3 Shakeproof Washer		151011				4	C

Tie Base	C3				3	C
Label - 240V	C1-1008		463-784	Farnell	1	C
M3x6mm SEM screw	141016				12	C
M3x9mm F/F Nylon Pillar	121008				12	C
M3 Fibre Washer	151015				8	C
PSU 7V5 Meanwell 100W	17-1037		S-100F - 7.5	Surtronic Kit (Part)	2	
10A Mains Filter (Schaffner- FN332-10/05)	45-0027		217-0735	RS	1	1
IEC Male Panel mount plug	63-		481-623	RS	1	1
Insulation Boot (Mains Filter)	C4-1013		801-932	RS	1	C
Logic Controller FDS101 V4.01 (rear DIPs)	80-1552		FDS101	Surtronic Kit (Part)	1	
5 way Ribbon Comms Cable Assy			FDS101 Kit	Surtronic Kit (Part)		
4 Way Ribbon Power Cable Assy			FDS101 Kit	Surtronic Kit (Part)		
"SoundWav" Soundcard			SOUNDWAV	Surtronic Kit (Part)	1	1
Tie Base						C
Lantronix UDS100 Device Server + PSU	68-1011					1
RJ45 Patch Bay Punchdown Skt						1
Cables and connectors						
RJ45 plug			CN04673	CPC	1	C
4 way PC power plug (pin)			299-479	Farnell		C
4 way PC power plug (socket))			148-085	Farnell		C
Pin contact (per 100)			299-558	Farnell		C
Socket contact (per 100)			149-091	Farnell		C
Molex 4-way socket			RS296-4956	RS	2	C
Molex 5-way socket			RS296-4962	RS	2	C
Molex Crimp pins (per 100)			RS467-598	RS		C
Tie Base						C
Strain Relief Bush			543-872	RS	1	C
						C