

SERVICE MANUAL

for

Systemline DMS4A



Prepared by: PD Cheney

Authorised by: S Privett

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The information contained in this service manual may be subject to change without prior notice.

1.0 PREPARING UNIT FOR REPAIR

First remove the unit from its mounting frame before attempting any repairs to the PCB. The unit can be snapped out using a small flat bladed screwdriver to lever the clips up. Push the unit forward, and it should pop out fairly easily.

Next the rear frame will need to be removed from the front red lens moulding. At either the top or the bottom, using a small flat bladed screwdriver, lever the red moulding up over the protrusion, and repeat of the other side. The rear frame can now be removed.

Next, using a small pozi screwdriver, undo the four screws holding the front PCB into the moulding. A 3mm diameter slot in the rear PCB allows easy access for the screws. **DO NOT LOOSE THEM.**

To separate the PCB's, ease the front PCB from the rear PCB by wriggling gently. Take care not to bend the pins of the connectors.

The unit is now ready for repair.

2.0 CIRCUIT DESCRIPTION

The Dot Matrix display accepts IR commands from a hand controller via an integrated IR Receiver IRRX1. The receiver has a centre frequency of 37.9kHz, this is the carrier frequency for Systemline Handset commands. Because IRRX1 strips the carrier, the IR signal is re-modulated by a pulse triggered oscillator formed around U9. The frequency of the oscillator is set approximately to 38kHz. This frequency is determined by the components R7,R2 & C8. The re-modulated IR output passes through NOR gates (U6:A:B:C) for mixing/inversion and gating by U8 uController before being buffered and transmitted via J2 to the Zone input on the controller.

U8 16C65-04TQ is the main controlling device for the DMS and contains all the software necessary to control the Intelligent LED display/ run the real time clock and process I2C feedback data from the controller.

The real time clock runs from a 32.768kHz watch crystal (X1), this increments an internal time/counter register of U8. This Oscillator runs independently of the main processor clock which runs at 4MHz (X2). When power from the controller is removed a backup battery (BAT1) supplies power to the processor. The processor is made aware that controller power has been disconnected by the drop in voltage across R19, as Q1 is no longer driven ON. Q1 monitors the output of the voltage regulator U4 and turns OFF when the voltage drops to a level determined by the ratio of resistors R21 & R20. This causes the processor (U8) to enter a low current sleep mode that draws approximately 6uA from the battery. The main 4MHz Oscillator is shut down and only enabled momentarily when the internal clock registers need updating (every 2 seconds). The battery is trickle charged when the controller is ON via D1 and R16. U10 is a uProcessor reset device that ensures the processor is reset in the event that the battery runs low or is disconnected.

U5 (dual 556 timer) forms an oscillator to control the display and LED brightness. R9 is a light dependent resistor that alters the mark: space ration of the oscillators output.

SW1 is a master reset and battery enable DIP switch. U2 is an E2 memory device which stores both zone settings and display information. Information is exchanged via a 3 wire bus. U2 informs the uController which zone address commands it should decode, the text to be displayed for the inputs, and whether the DMS is in Slave or Master mode. The latter determines whether the alarm function is enabled.

Note: When a DMS is set to zone A and the time reaches 12:00pm a clock synchronisation pulse is sent to all zones via the controller to ensure that the DMS clock times do not drift apart.

3.0 UNIT RE-ASSEMBLY

To re-assembly the unit, reverse the instructions in 1.0. The front PCB may fixed in first, and the rear PCB pushed gently home after the switch alignment and functionality has been checked. The rear frame clips in top and bottom, but is a slightly fiddly operation to complete.

APPENDIX A

DMS4A Main Assembly

Drawing Number: Q10049/IL

Items List for: Q10049/AS
DMS FINAL ASSEMBLY

Approved for Production: _____

Date: 21/03/2001 Change Number: CR000079



Issue: 2

Item No.	Part No.	Description	Manf. Part No.	Qty	Iss	Remarks
A						
B						
C						
1	WR108	DMS3A PCB1 FRONT ASSEMBLY		1	2	Q10026/AS
2	WR109	DMS4A PCB2 REAR ASSEMBLY		1	2	
3						
4						
5	ZENC121	SHORT REAR MOULDING	Q10067/DE	1		
6	ZENC119	PRINTED "RED" MOULDING DMS3A	Q10005/DE			
7						
8						
9	ZCAB020	TINNED COPPER WIRE 22swg		As Reqd		
10	ZSRW019	POZI PAN ZINC K18 X 6		4		
11						
12						
13	ZCAR021	UNIVERSAL KEYPAD/EYE PACKAGING		1		
14						
15						
16						
17						
18						
19						
20						
21						

APPENDIX B

DMS4A Front PCB

Drawing Number: Q10026/IL

Items List for: Q10026/AS
DMS FRONT PCB ASSEMBLY

Approved for Production: _____



Issue: 7

Date: 22/03/2001

Change Number: CR00079

Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
A							
1	ZPCB110	DMS PCB FRONT	EA		1	3	
2							
3							
4							
5	OPT-T-0005	DLR2416 SIEMANS DISPLAY RED	EA	SIEMANS DLR2416	1		DS1
6	OPT-T-0002	OPTIC RMTE CONT. RECEIVER MODULE	EA	TELEFUNKEN - TSOP4838	1		IRRX1
7	CON-T-0016	CONNECTOR HEADER 15 WAY 1.27P	EA	TOBY PRS1-15S1-01	2		J5, J6
8	SWA-S-0008	SWITCH TACTILE 6MM 9.5 HIGH	EA	Diptronics DTSM-65K	3		SW2, SW3, SW4
9							
10	ICL-S-0012	IC TIMER NE556D SOIC14	EA	RS 273-438	1		U5
11	ICL-S-0003	IC LOGIC MC14001BD SOIC14	EA	RS 197-5876	1		U7
12	ICL-S-0007	LOGIC HEF4047BT SOIC14	EA	RS 355-8861	1		U9
13							
14							
15	TRA-S-0002	TRANSISTOR BC79C SOT23 SMT	EA	RS 287-415	1		Q1
16	LED-S-0001	PANASONIC RED LED	EA	COMP BUR LNJ208R8ARA	5		D5, D9 - D11, D13
17							
18							
19							
20	CAP-S-00195	CAP 1nF 5% 50V 0603	EA	RS 204-0678	2		C8, C29
21	CAP-S-00198	CAP 4.7nF 5% 50V 0603	EA	RS 204-0741	1		C13
22	CAP-S-00199	CAP 10nF 5% 50V 0603	EA	RS 204-0779	2		C14, C15
23	CAP-S-00196	CAP 2.2nF 5% 50V 0603	EA	RS 204-0707	1		C16
24	CAP-S-00200	CAP 100nF 5% 16V 0603	EA	RS 204-7922	2		C17, C18
25	CAP-S-00024	CAP ELEC SM 10uF 16V 105C CASE B	EA	RS 108-192	1		C19

Drawing Number: Q10026/IL

Items List for: Q10026/AS
DMS FRONT PCB ASSEMBLY

Approved for Production: _____

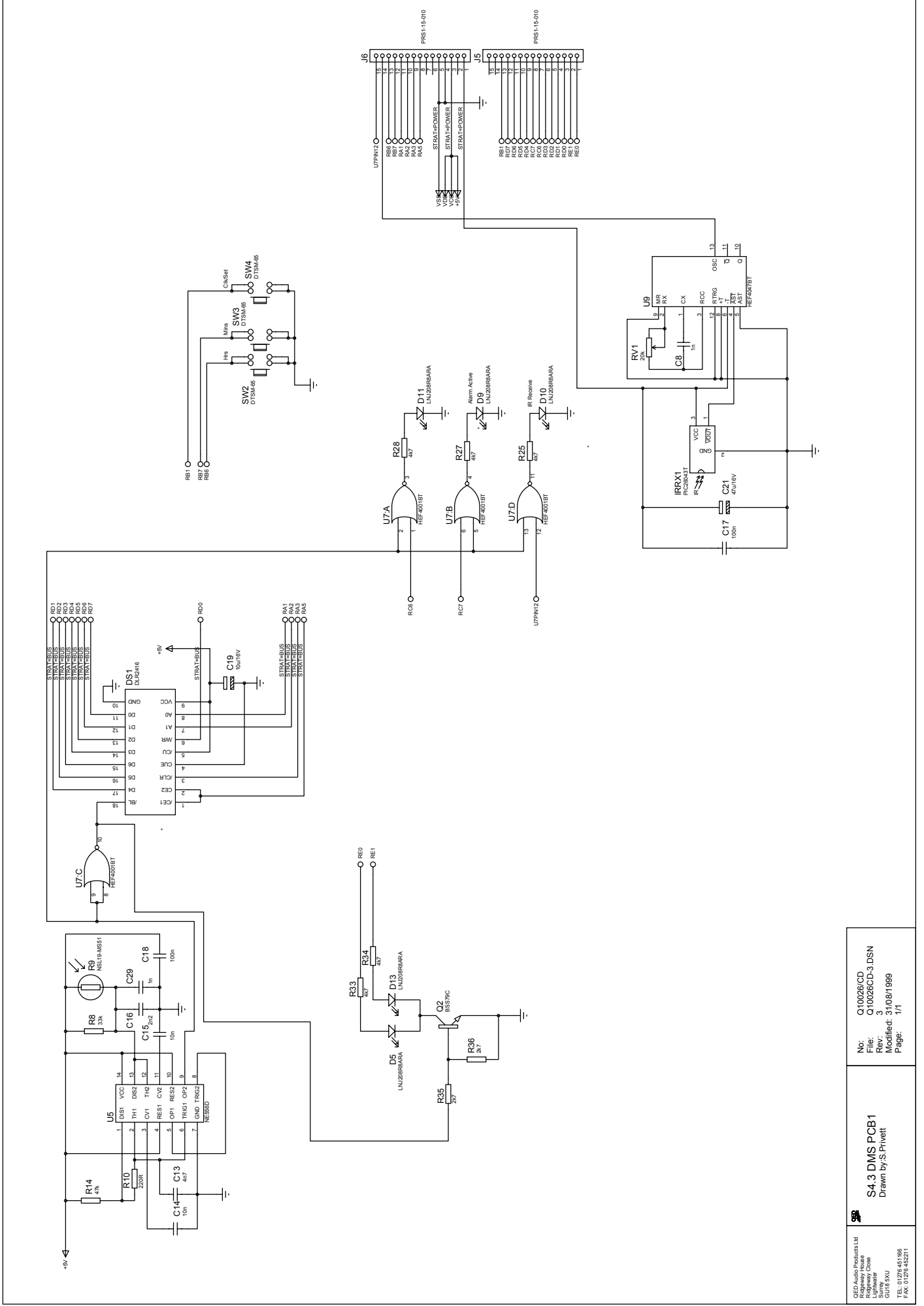


Issue: 7

Date: 22/03/2001

Change Number: CR00079

Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
26	CAP-S-00026	CAP ELEC SM 47uF 16V 85C CASE D	EA	RS 108-211	1		C21
27							
28							
29							
30	POT-S-0001	POT 20K SINGLE TURN 3MM SMT	EA	RS 177-100	1		RV1
31							
32	RES-S-0296	RES 33K 1% 0.01W 0603	EA	RS 213-2474	1		R8
33	ZYRES8	RES NSL19-MS51	EA	RS 596-141	1		R9
34	RES-S-0270	RES 220R 1% 0.01W 0603	EA	RS 213-2187	1		R10
35	RES-S-0298	RES 47K 1% 0.01W 0603	EA	RS 213-2496	1		R14
36	RES-S-0283	RES 2K7 1% 0.01W 0603	EA	RS 213-2323	2		R35 - R36
37	RES-S-0286	RES 4K7 1% 0.01W 0603	EA	RS 213-2367	5		R25, R27, R28, R33, R34
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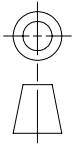


QED Audio Products Ltd Ragway House Salford Greater Manchester M6 6PU UK Tel: 0161 275 4521 Fax: 0161 275 4521	S4.3 DMS PCB1 Drawn by S.Privett	No: Q10026/CD File: G10026CD-3.DSN Rev: 3 Modified: 31/08/1999 Page: 1/1
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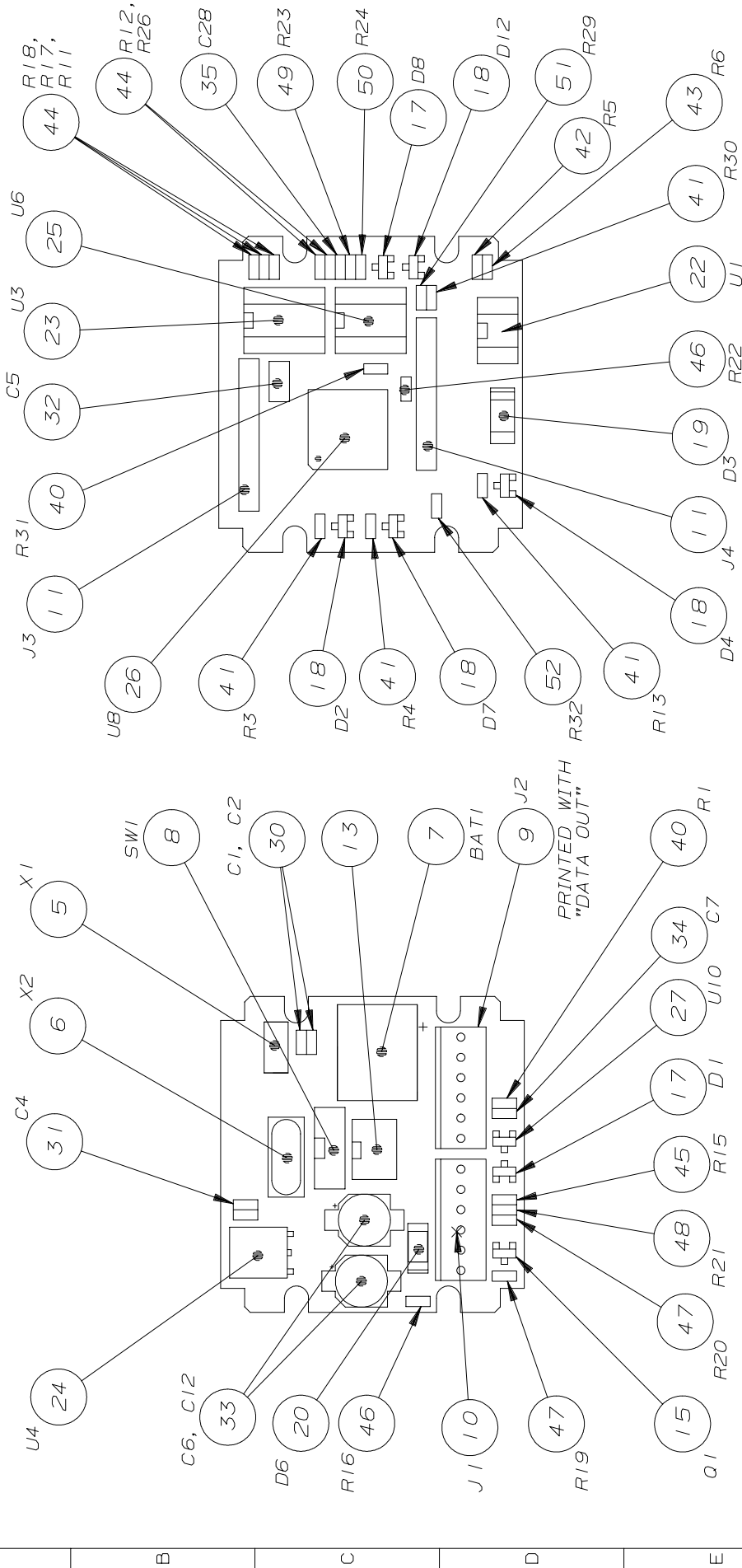
APPENDIX C

DMS4A Rear PCB

DRAWING NUMBER
Q10205/AS



DO NOT SCALE



PRINTED WITH
"DATA OUT"

SCALE
2 : 1
TOLERANCES:
UNLESS OTHERWISE
STATED ARE:
1 DP: ±0.4
2 DP: ±0.15
ANG.: ±1.0°

QED
Ridgeway House,
Ridgeway Close,
Lightwater,
Surrey, GU18 5XU
TEL: 01276 451166
FAX: 01276 452211

TITLE
DMS4A REAR PCB
ASSEMBLY

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NO PART MAY BE REPRODUCED
WITHOUT PRIOR PERMISSION

DRAWING NUMBER
Q10205/AS

DRN	ISSUE	1	2
PDC	DATE	14-01-00	21-03-01
CH'KD	Change No.	CRO0079	
APP	MATERIAL	FINISH	

DRN	ISSUE	1	2
PDC	DATE	14-01-00	21-03-01
CH'KD	Change No.	CRO0079	
APP	MATERIAL	FINISH	

DRN	ISSUE	1	2
PDC	DATE	14-01-00	21-03-01
CH'KD	Change No.	CRO0079	
APP	MATERIAL	FINISH	

DRN	ISSUE	1	2
PDC	DATE	14-01-00	21-03-01
CH'KD	Change No.	CRO0079	
APP	MATERIAL	FINISH	

Drawing Number: Q10205/IL

Items List for: Q10205/AS
DMS REAR PCB ASSEMBLY

Approved for Production: _____



Issue: 2

Date: 21/03/2001

Change Number: CR00079

Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
A							
1	ZPCB109	DMS PCB REAR	EA		1	1	
2							
3							
4							
5	CRY-S-00003	RES CERAMIC 32.768KHZ 15PPM DT26	EA	ANGLIA 607-001	1		X1
6	CRY-S-00001	CRYSTAL 4MHz HC49 SMT	EA	ANGLIA 607-009	1		X2
7	MIS-M-0010	BATTERY 3.6V 11mAh NiMH RECHARGABLE	EA	RS 422-387	1		BAT1
8	SWA-S-0007	SWITCH DIL 2 WAY SM	EA	446597B	1		SW1
9	CON-T-0014	CONN PCB-CABLE VERT HDR 6WAY PRINTED	EA	TOBY 110-28-106-01	1		J2 PRINTED WITH "DATA OUT"
10	CON-T-0003	CONN PCB-CABLE VERT HDR 6WAY	EA	TOBY 110-28-106-01	1		J1
11	CON-T-0015	CONNECTOR HEADER 15 WAY 1.27P	EA	TOBY QPRB1-15S1-01	2		J3, J4
12							
13	ICP-S-0005	EE MEMORY 64x16 93C46B/SN SO8	EA	HB - 93C46B/SN	1		U2
14							
15	TRA-S-0001	TRANSISTOR BC856BLT1 SOT23 SMT	EA	RS 112-6210	1		Q1
16							
17	DIO-S-0023	DIODE SMALL SIGNAL BAS21 SM SOT23	EA	RS 287-241	2		D1, D8
18	DIO-S-0010	DIODE ZENER BZX84C5V1LT1 SM SOT23	EA	RS 348-5971	4		D2, D4, D7, D12
19	DIO-S-0001	DIODE RECTIFIER GF1A SM DO214	EA	RS 422-242	1		D3
20	DIO-S-0024	DIODE SCH0TTKY MELF	EA	Flint - 1N5817M	1		D6
21							
22	ICR-S-0003	REGULATOR LM317LM S08	EA	FAR 411-760	1		U1
23	ICL-S-0004	LOGIC HEF4502BT SOIC16	EA	RS 355-9202	1		U3
24	ICR-S-0001	REGULATOR L78M05CDT DPAK-R	EA	HB	1		U4
25	ICL-S-0003	IC LOGIC MC14001BD SOIC14	EA	RS 197-5876	1		U6

Drawing Number: Q10205/IL

Items List for: Q10205/AS
DMS REAR PCB ASSEMBLY

Approved for Production: _____

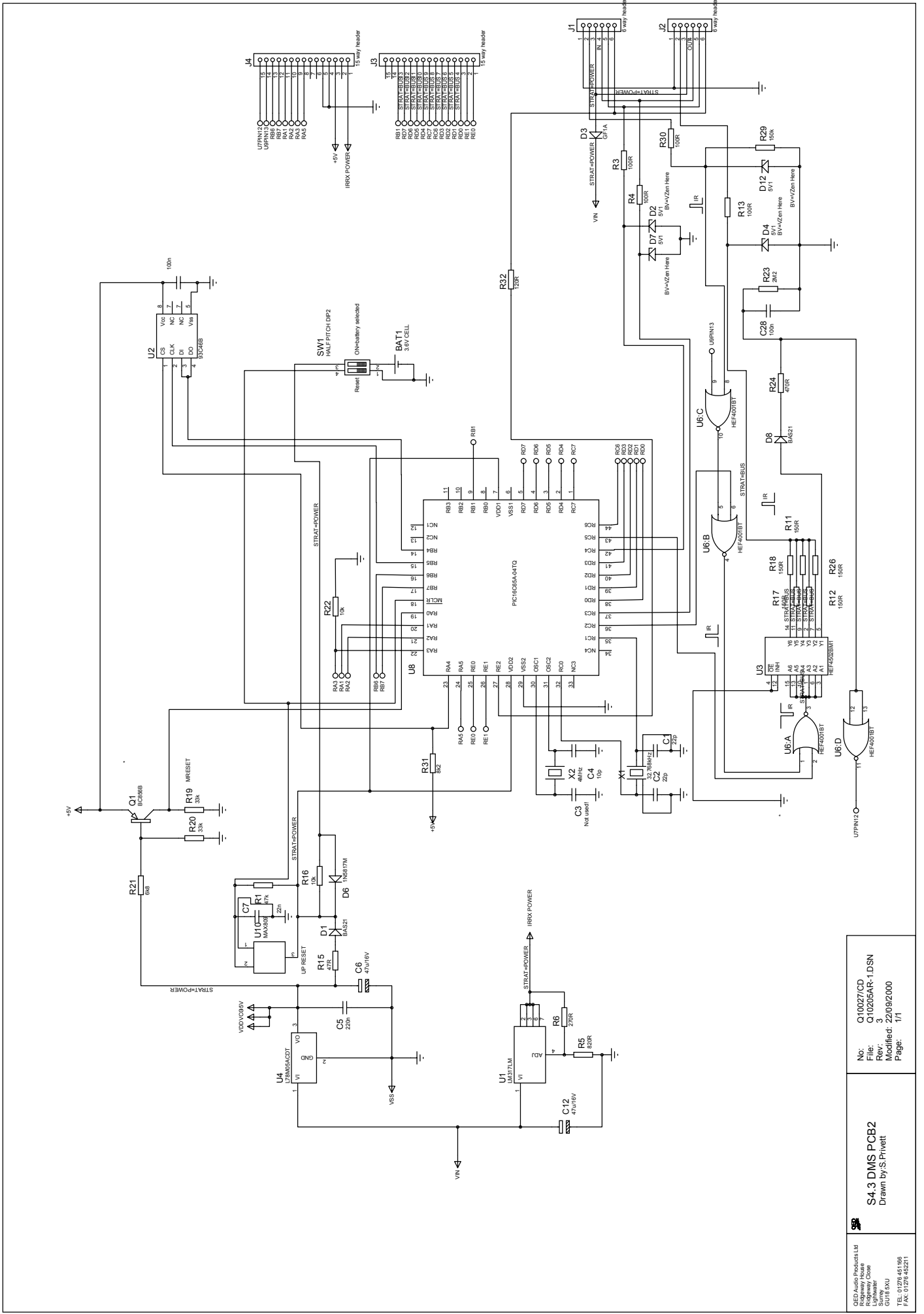


Issue: 2

Date: 21/03/2001

Change Number: CR00079

Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
26	ICP-S-0004	PIC 16C65A-10/PT TQFP44	EA	Microchip 16C65A-10/PT	1		U8
27	ICR-S-0004	MAX809TEUR 3 PIN MICRO PROC.	EA	MAX809TEUR	1		U10
28							
29							
30	CAP-S-00181	CAP 22pF 5% 50V 0603	EA	RS 204-0498	2		C1, C2
31	CAP-S-00177	CAP 10pF 5% 50V 0603	EA	RS 204-0454	1		C4
32	CAP-S-00123	CAP 220nF 5% 25V 1206	EA	RS 211-3366	1		C5
33	CAP-S-00026	CAP ELEC SM 47uF 16V 85C CASE D	EA	RS 108-211	2		C6, C12
34	CAP-S-00250	CAP 22nF 5% 50V 0603	EA	FAR 578-174	1		C7
35	CAP-S-00200	CAP 100nF 5% 16V 0603	EA	RS 204-7922	1		C28
36							
37							
38							
39							
40	RES-S-0298	RES 47K 1% 0.01W 0603	EA	RS 213-2496	2		R1, R31
41	RES-S-0266	RES 100R 1% 0.01W 0603	EA	RS 213-2143	4		R3, R4, R13, R30
42	RES-S-0277	RES 820R 1% 0.01W 0603	EA	RS 213-2250	1		R5
43	RES-S-0271	RES 270R 1% 0.01W 0603	EA	RS 213-2193	1		R6
44	RES-S-0268	RES 150R 1% 0.01W 0603	EA	RS 213-2165	5		R11, R12, R17, R18, R26
45	RES-S-0262	RES 47R 1% 0.01W 0603	EA	RS 213-2092	1		R15
46	RES-S-0290	RES 10K 1% 0.01W 0603	EA	RS 213-2418	2		R16, R22
47	RES-S-0296	RES 33K 1% 0.01W 0603	EA	RS 213-2474	2		R19, R20
48	RES-S-0288	RES 6K8 1% 0.01W 0603	EA	RS 213-2389	1		R21
49	RES-S-0315	RES 2M2 1% 0.01W 0603	EA	RS 136-941	1		R23
50	RES-S-0274	RES 470R 1% 0.01W 0603	EA	RS 213-2222	1		R24
51	RES-S-0304	RES 150K 1% 0.01W 0603	EA	RS 213-2553	1		R29
52	RES-S-0267	RES 120R 1% 0.01W 0603	EA	RS 213-2159	1		R32



QED Audio Products Ltd
 Redway House
 Liphaville
 Co. Wick
 Ireland
 Tel: 01276 45211
 Fax: 01276 45221

S4.3 DMS PCB2
 Drawn by S.Privett

No: Q10027/CD
 File: Q10205AR-1.DSN
 Rev: 3
 Modified: 22/09/2000
 Page: 1/1