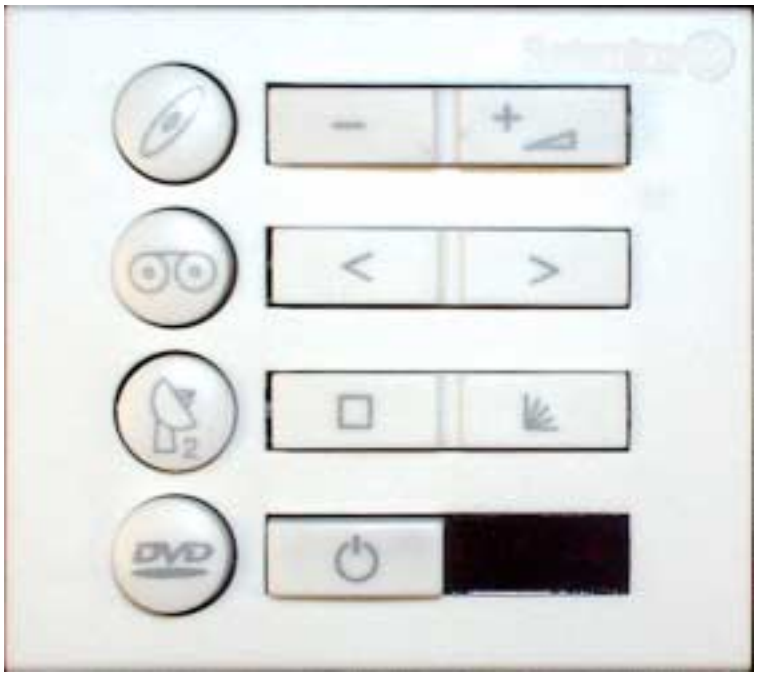
SERVICE MANUAL

for

Combined Keypad



Prepared by: PD Cheney

Authorised by: S Privett

Contents

Appendices

DISCLAIMER

WARNING:
Dangerous voltages, capable of causing death are present in this unit. ONLY qualified personnel should attempt repair of this unit. Use extreme caution when the cover is removed, when testing and adjusting internal components.

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 DESCRIPTIONS

The keypad is designed to transmit 5 bit ppm control commands via a single wire to the controller. A small uController U2 operates as a key scanner and IR code generator. When a button is depressed the Row connection is pulled low when the processor pulls the Column line low (sequentially) via the resistors R4, R5 & R7. The IR command is then generated by U1 via RA1 (pin20). The NOR gates of U1 are used to 1) Enable mixing or IR signals from the J1 input and 2) For the CMS to block these signals via U3:D when an IR transmission from a button depression is in progress. U4 is a hex buffer than ensures that the signal is transmitted cleanly along lengths of CAT-5 cable up to 100 metres.

The keypad also has an intergral IR Receiver. It 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 U5. The frequency of the oscillator is set approximately to 38kHz. This frequency is determined by the components RV1 & C6. The re-modulated IR output passes through NOR gates (U1:B:C:D) for mixing/inversion and gating by U2 uController before being buffered and transmitted via J2 to the Zone input on the controller.

Transistor Q1 forms a 'Brown Out' circuit which monitors the supply voltage to the uController U2, resetting it in the event of the voltage falling to a point where the software may run erratically.

For details of the PCB, items list and circuit diagram please refer to Appendix B.

3.0 UNIT RE-ASSEMBLY

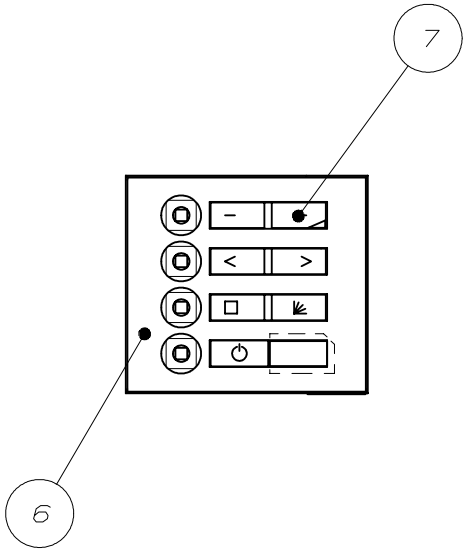
To re-assembly the unit, reverse the instructions in 1.0. The front PCB may be fixed in first, and the rear PCB pushed gently home after the switch alignment and functionality has been checked. The rear frame clips in top and bottom, but is a slightly fiddly operation to complete.

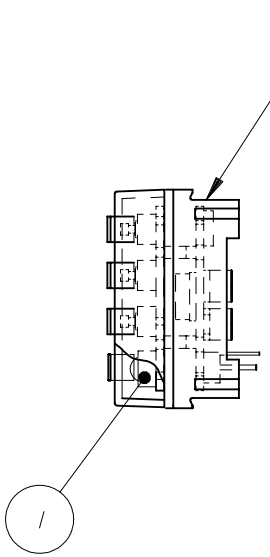
APPENDIX A

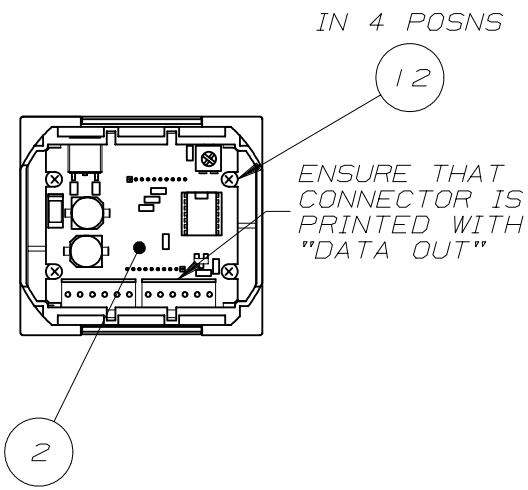
CMS Main Assembly

DRAWING NUMBER
Q10457/AS

DO NOT SCALE







NOTES:

1. THE FOUR ROUND BUTTONS ARE NOT TO BE FITTED. FIT ALL THREE SPRUES IN BOTTOM OF BOX

2. DISCARD LARGE STANDBY/MUTE BUTTON FROM RECTANGULAR SPRUE

DRN	ISSUE	1	2					SCALE
PDC	DATE	05-02-01	03-10-01					| : |
	Change No.		CR00097					
CH'KD	MATERIAL		FINISH			TOLERANCES: UNLESS OTHERWISE STATED ARE: 1 DP: ±0.4 2 DP: ±0.15 ANG.: ±1.0° DIMS : mm		
APP								

QED
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TITLE
SYSTEMLINE CMS KEYPAD WHITE

DRAWING NUMBER
Q10457/AS

Drawing Number: Q10457/IL

Items List for: Q10457/AS **Approved for Production:** _____

SYSTEMLINE CMS KEYPAD ASSY - WHITE SYMBOLS

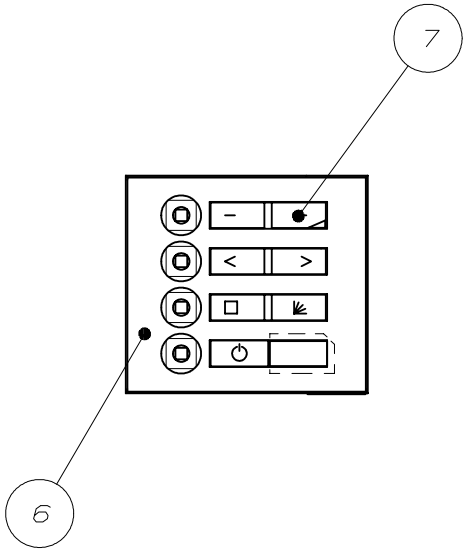
Issue: 1 **Date:** 05/02/2001 **Change Number:**

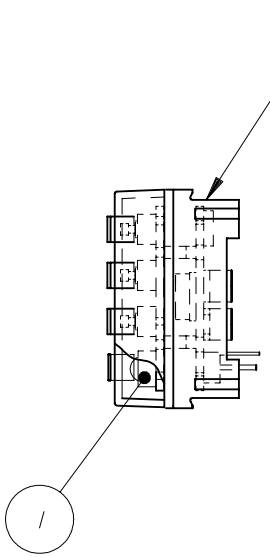
Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
A							
1	ZPCB091	CMS FRONT PCB ASSEMBLY	EA	Q10461/AS	1	1	
2	ZPCB092	CMS REAR PCB ASSEMBLY	EA	Q10462/AS	1	1	
3							
4							
5	ZENC121	SHORT REAR MOULDING	EA	Q10067/DE	1	1	
6	ZMLD004	CMS MOULDING WHITE INC LENS	EA	Q10471/AS	1	1	
7	ZMLD220	RECTANGULAR BUTTON SET WHITE	EA	Q10390/DE	1	1	
8							
9	ZMLD100	ROUND BUTTON SET WHITE SYMBOLS 1	EA	Q10391/DE/000	1	1	
10	ZMLD101	ROUND BUTTON SET WHITE SYMBOLS 2	EA	Q10391/DE/003	1	1	
11	ZMLD104	ROUND BUTTON SET WHITE WORDS	EA	Q10391/DE/001	1	1	
12	ZSRW019	POZI PAN ZINC K18 X 6	EA		4		
13							
14							
15	ZCAR021	UNIVERSAL KEYPAD/EYE PACKAGING	EA		1		
16							
17							
18	ZPLA012	CAT 5 CONNECTOR	EA		2		PUSH ONTO CONNECTORS
19							
20							
21							
22							
23							
24							
25							

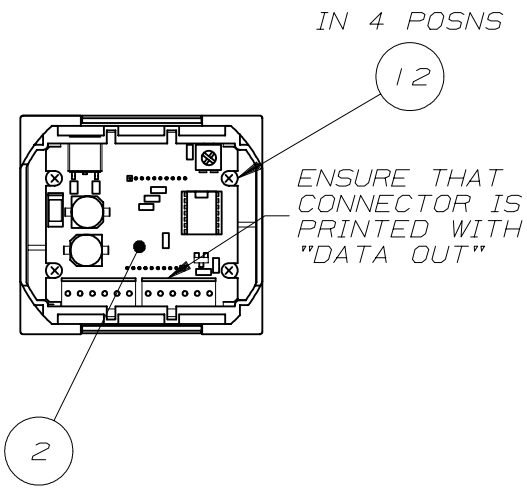
Production Cross Reference:

DRAWING NUMBER
Q10459/AS

DO NOT SCALE







NOTES:

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2. DISCARD LARGE STANDBY/MUTE BUTTON FROM RECTANGULAR SPRUE

DRN	ISSUE	1	2					SCALE
PDC	DATE	05-02-01	03-10-01					| : |
	Change No.		CR00097					
CH'KD	MATERIAL		FINISH			TOLERANCES: UNLESS OTHERWISE STATED ARE: 1 DP: ±0.4 2 DP: ±0.15 ANG.: ±1.0° DIMS : mm		
APP								

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TITLE
SYSTEMLINE CMS
KEYPAD BLACK

DRAWING NUMBER
Q10459/AS

Drawing Number: Q10459/IL

Items List for: Q10459/AS **Approved for Production:** _____

SYSTEMLINE CMS KEYPAD ASSY - BLACK SYMBOLS

Issue: 1 **Date:** 05/02/2001 **Change Number:**

Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
A							
1	ZPCB091	CMS FRONT PCB ASSEMBLY	EA	Q10461/AS	1	1	
2	ZPCB092	CMS REAR PCB ASSEMBLY	EA	Q10462/AS	1	1	
3							
4							
5	ZENC121	SHORT REAR MOULDING	EA	Q10067/DE	1	1	
6	ZMLD005	CMS MOULDING BLACK INC LENS	EA	Q10470/AS	1	1	
7	ZMLD221	RECTANGULAR BUTTON SET BLACK	EA	Q10390/DE	1	1	
8							
9	ZMLD102	ROUND BUTTON SET BLACK SYMBOLS 1	EA	Q10391/DE/000	1	1	
10	ZMLD103	ROUND BUTTON SET BLACK SYMBOLS 2	EA	Q10391/DE/003	1	1	
11	ZMLD105	ROUND BUTTON SET BLACK WORDS	EA	Q10391/DE/001	1	1	
12	ZSRW019	POZI PAN ZINC K18 X 6	EA		4		
13							
14							
15	ZCAR021	UNIVERSAL KEYPAD/EYE PACKAGING	EA		1		
16							
17	ZPLA012	CAT 5 CONNECTOR	EA		2		PUSH ONTO CONNECTORS
18							
19							
20							
21							
22							
23							
24							
25							

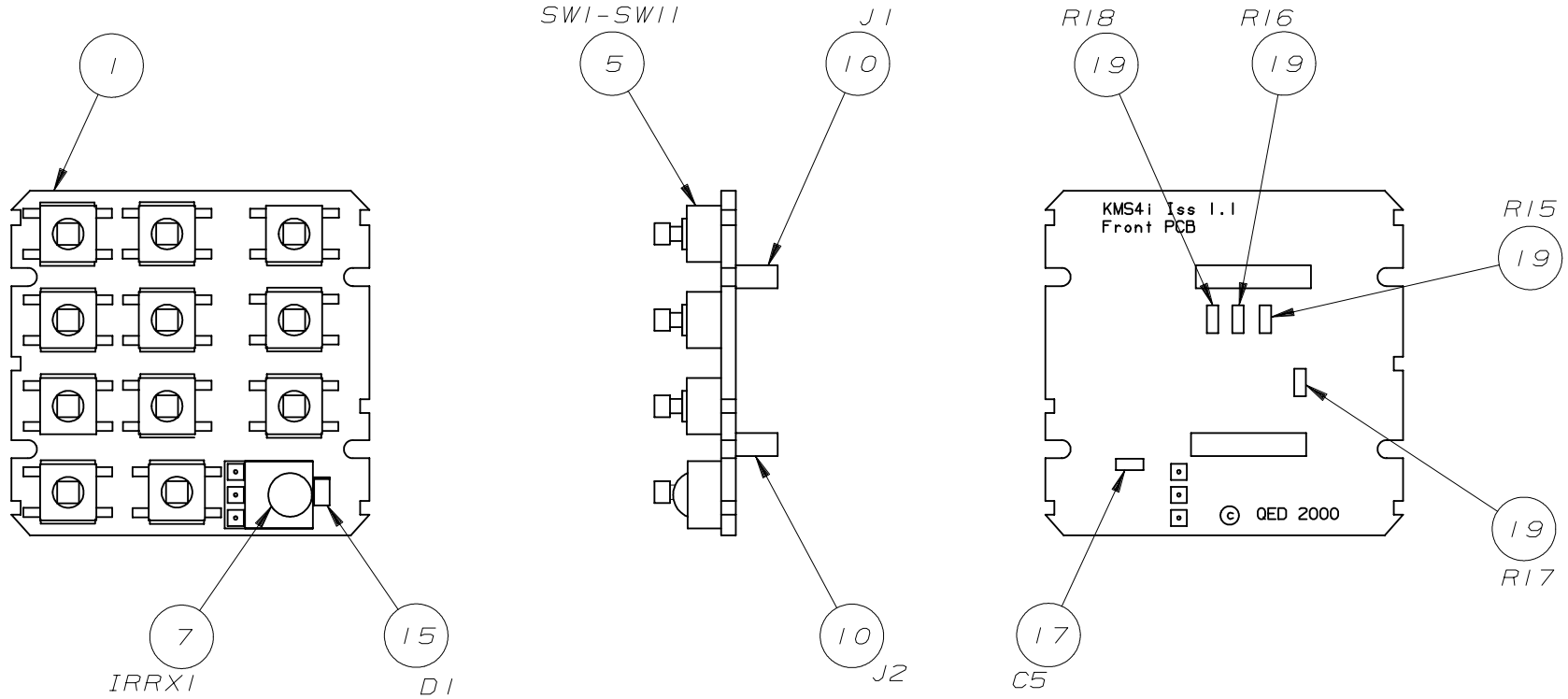
Production Cross Reference:

APPENDIX B

CMS Front PCB Assembly

DRAWING NUMBER
Q10461/AS

DO NOT SCALE



DRN	ISSUE	1						SCALE	
PDC	DATE	05-02-01						2 : 1	
	Change No.								
CH'KD	MATERIAL		FINISH				TOLERANCES: UNLESS OTHERWISE STATED ARE: 1 DP: ±0.4 2 DP: ±0.15 ANG.: ±1.0° DIMS : mm		
APP									

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TITLE

SYSTEMLINE CMS KEYPAD FRONT PCB ASSEMBLY

DRAWING NUMBER
Q10461/AS

Drawing Number: Q10461/IL

Items List for: Q10461/AS **Approved for Production:** _____

SYSTEMLINE CMS FRONT PCB ASSEMBLY

Issue: 1 **Date:** 05/02/2001 **Change Number:**

Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
A	Q10461/TS	CMS TEST SPECIFICATION			REF	A	
1	PCB-M-00001	SYSTEMLINE CMS FRONT PCB	EA		1	1	
2							
3							
4							
5	SWA-S-0001	SWITCH TACTILE 6MM 7.3 HIGH (SQU)	EA	Diptronics DTSM-644KB	11		SW1 - SW11
6							
7	OPT-T-0002	OPTIC RMTE CONT. RECEIVER MODULE	EA	TELEFUNKEN - TSOP4838	1		IRRX1
8							
9							
10	CON-T-0001	CONNECTOR SOCKET 10 WAY 1.27P	EA	TOBY PRS1-10-020-B	2		J1, J2
11							
12							
13							
14							
15	LED-S-0001	PANASONIC RED LED	EA	COMP BUR LNJ208R8ARA	1		D1
16							
17	CAP-S-00200	CAP 100nF 5% 16V 0603	EA		1		C5
18							
19	RES-S-0286	RES 4K7 1% 0.01W 0603	EA	RS 213-2367	4		R15 -R18
20							
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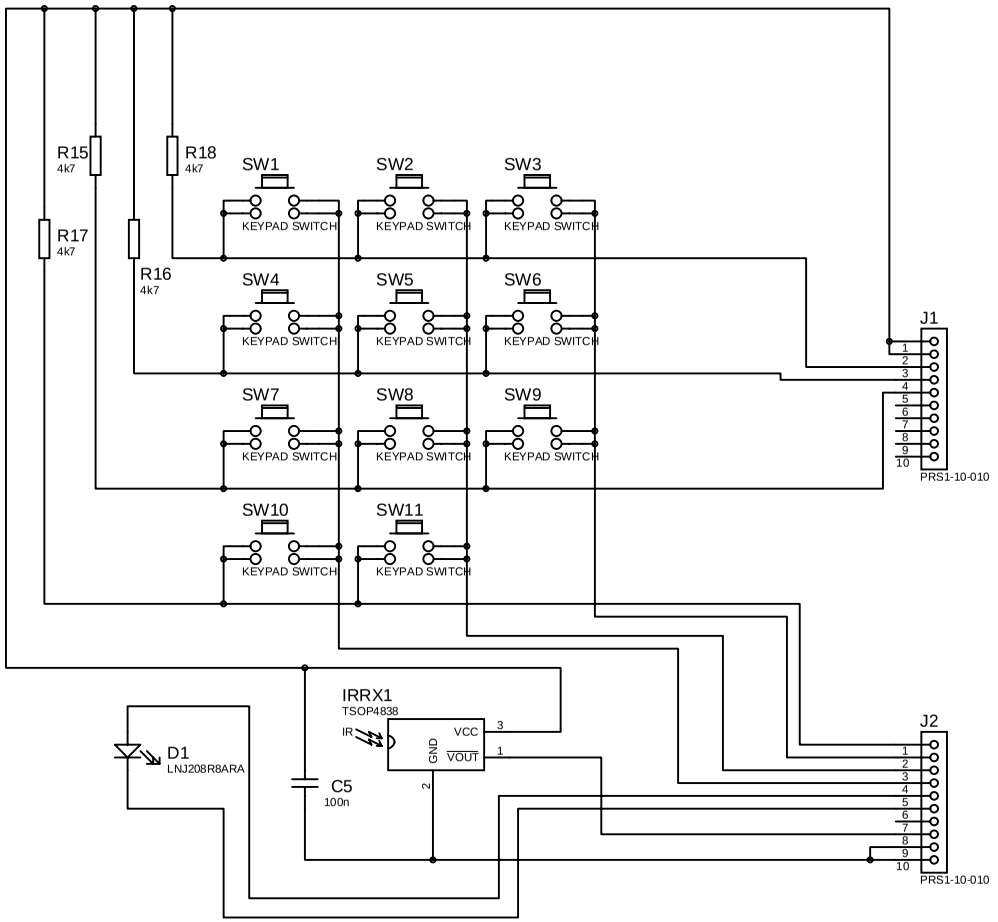

Note CMOS VDD connect +5V, VSS - GND

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S4.4 CMS
Drawn by:P. Cheney

No:
File: Q10461CD-2-0.DSN
Rev: 1
Modified: 12/02/2001
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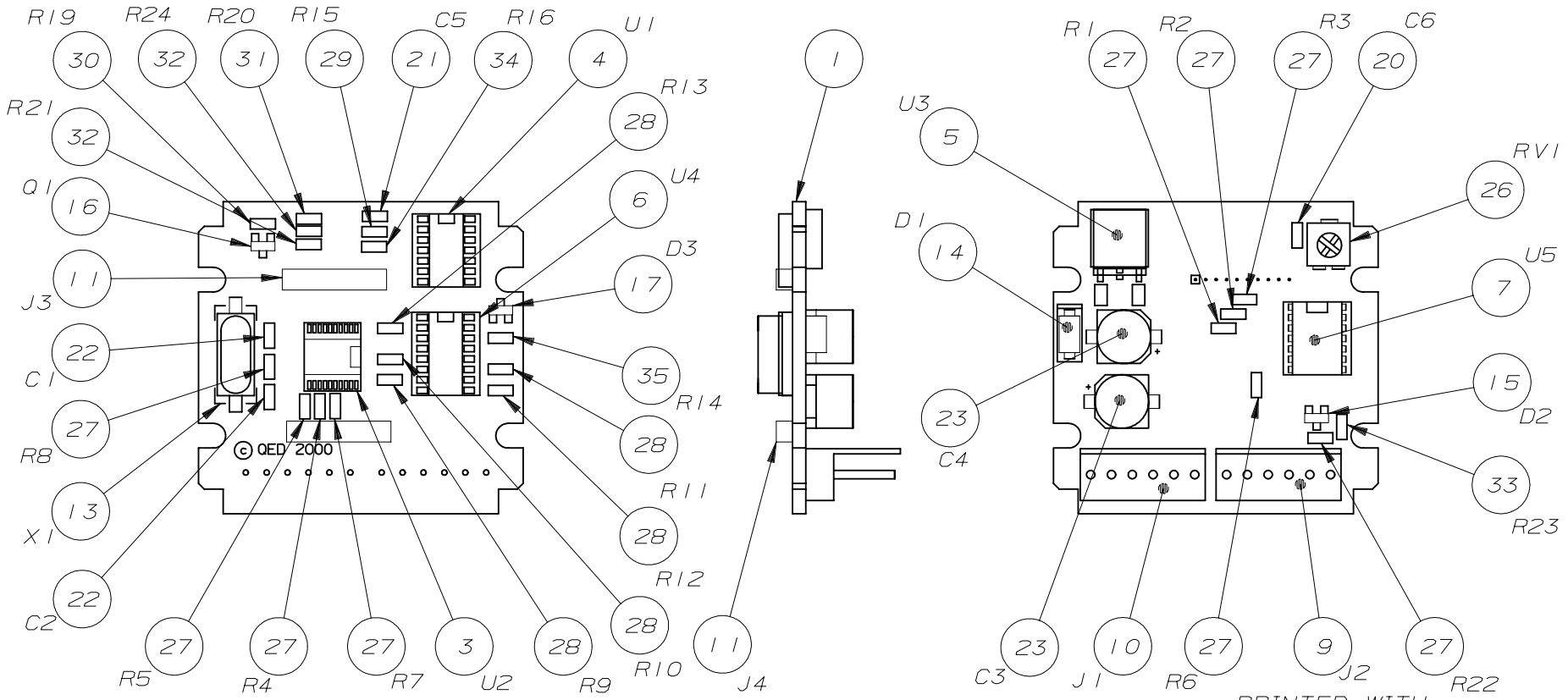
APPENDIX C

CMS Rear PCB Assembly

DRAWING NUMBER
Q10462/AS

DO NOT SCALE



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CH'KD	MATERIAL		FINISH				TOLERANCES: UNLESS OTHERWISE STATED ARE: 1 DP: ±0.4 2 DP: ±0.15 ANG.: ±1.0° DIMS : mm		
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TITLE

SYSTEMLINE CMS KEYPAD REAR PCB ASSEMBLY

DRAWING NUMBER
Q10462/AS

Drawing Number: Q10462/IL

Items List for: Q10462/AS **Approved for Production:** _____

SYSTEMLINE CMS REAR PCB ASSEMBLY

Issue: 1 **Date:** 05/02/2001 **Change Number:**

Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
A							
1	PCB-M-00002	SYSTEMLINE CMS REAR PCB	EA		1	1	
2							
3	ICP-S-0001	PIC16C54C-04/SS	EA		1		U2 - PROGRAM = S43KPM.ASM
4	ICL-S-0003	LOGIC HEF4001BT SOIC14	EA	RS 355-8120	1		U1
5	ICR-S-0001	REGULATOR L78M05CDT DPAK-R	EA		1		U3
6	ICL-S-0004	LOGIC HEF4502BT SOIC16	EA	RS 355-9202	1		U4
7	ICL-S-0007	LOGIC HEF4047BT SOIC14	EA	RS 355-8861	1		U5
8							
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-0002	CONNECTOR HEADER 10 WAY 1.27P	EA	TOBY QPRS1-10S1-02T-B	2		J3, J4
12							
13	CRY-S-00001	CRYSTAL 4MHz HC49 SMT	EA	ANGLIA 607-009	1		X1
14	DIO-S-0001	DIODE RECTIFIER GF1A SM DO214	EA	RS 422-242	1		D1
15	DIO-S-0010	DIODE ZENER BZX84C5V1LT1 SM SOT23	EA	RS 348-5971	1		D2
16	TRA-S-0001	TRANSISTOR BC856BLT1 SOT23 SMT	EA	RS112-6210	1		Q1
17	DIO-S-0023	DIODE SMALL SIGNAL BAS21 SM SOT23	EA	RS 287-241	1		D3
18							
19							
20	CAP-S-00195	CAP 1nF 5% 50V 0603	EA	RS 204-0678	1		C6
21	CAP-S-00200	CAP 100nF 5% 16V 0603	EA	RS 204-7922	1		C5
22	CAP-S-00181	CAP 22pF 5% 50V 0603	EA	RS 204-0498	2		C1, C2
23	CAP-S-00026	CAP ELEC SM 47uF 16V 85C CASE D	EA	RS 108-211	2		C3, C4
24							
25							

Drawing Number: Q10462/IL

Items List for: Q10462/AS **Approved for Production:** _____

SYSTEMLINE CMS REAR PCB ASSEMBLY

Issue: 1 **Date:** 05/02/2001 **Change Number:**

Item No.	Part No.	Description	Units	Manf. Part No.	Qty	Iss	Remarks
26	POT-S-0001	POT 20K SINGLE TURN 3MM SMT	EA	RS 177-100	1		RV1
27	RES-S-0266	RES 100R 1% 0.01W 0603	EA	RS 213-2143	9		R1 - R8, R22
28	RES-S-0272	RES 330R 1% 0.01W 0603	EA	RS 213-2200	5		R9 - R13
29	RES-S-0315	RES 2M2 1% 0.01W 0603	EA		1		R15
30	RES-S-0288	RES 6K8 1% 0.01W 0603	EA	RS 213-2389	1		R19
31	RES-S-0296	RES 33K 1% 0.01W 0603	EA	RS 213-2474	1		R20
32	RES-S-0293	RES 18K 1% 0.01W 0603	EA	RS 213-2446	2		R21, R24
33	RES-S-0295	RES 27K 1% 0.01W 0603	EA	RS 213-2468	1		R23
34	RES-S-0282	RES 2K2 1% 0.01W 0603	EA	RS 213-2317	1		R16
35	RES-S-0274	RES 470R 1% 0.01W 0603	EA	RS 213-2222	1		R14
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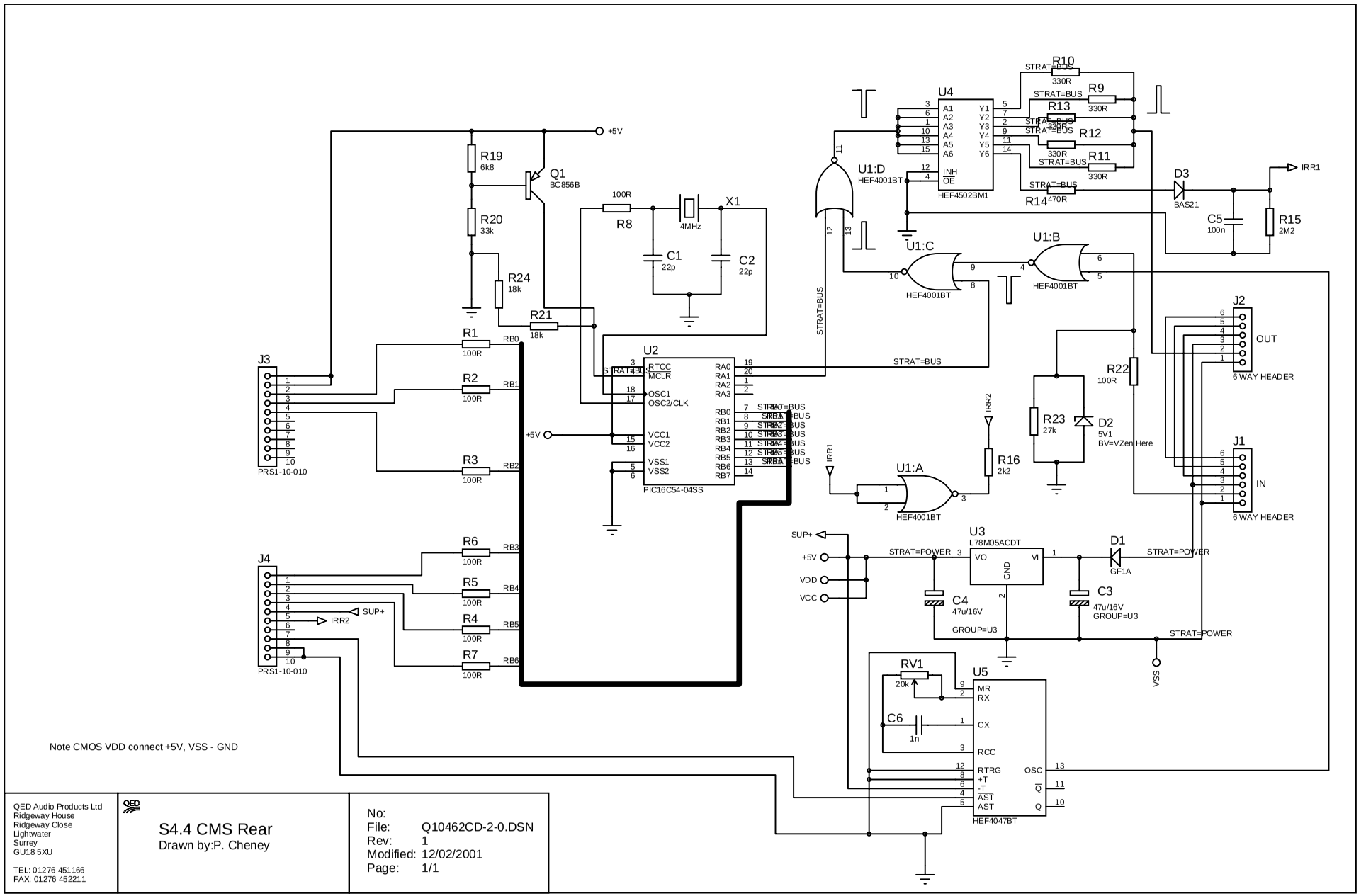

QED Audio Products Ltd Ridgeway House Ridgeway Close Lightwater Surrey GU18 5XU TEL: 01276 451166 FAX: 01276 452211	S4.4 CMS Rear Drawn by:P. Cheney	No: File: Q10462CD-2-0.DSN Rev: 1 Modified: 12/02/2001 Page: 1/1