



SYNTHESIZER CHANNEL PROGRAMMER INSTRUCTION MANUAL

Covers Models:

CP-SC-3

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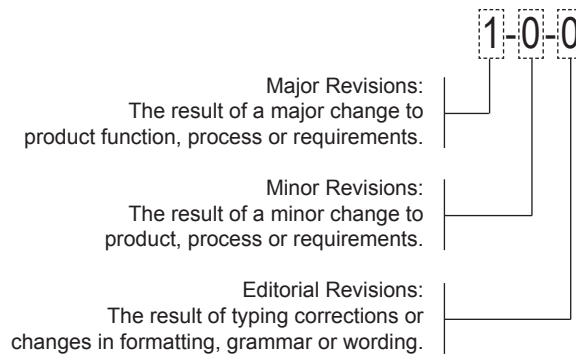
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DOCUMENT REVISION DEFINITION | Documentation uses a three-level revision system. Each element of the revision number signifies the scope of change as described in the diagram below.



Three-level revision numbers start at 1-0-0 for the first release. The appropriate element of the revision number is incremented by 1 for each subsequent revision, causing any digits to the right to be reset to 0.

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If the current revision = 2-1-1 Then the next major revision = 3-0-0

If the current revision = 4-3-1 Then the next minor revision = 4-4-0

If the current revision = 3-2-2 Then the next editorial revision = 3-2-3

Document revision history is provided at the back of the document.

NOTE | The user's authority to operate this equipment could be revoked through any changes or modifications not expressly approved by Codan Limited.

The design of this equipment is subject to change due to continuous development. This equipment may incorporate minor changes in detail from the information contained in this manual.

Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

RF Exposure Warning

Exposure to radio frequency (RF) energy has been identified as a potential environmental factor that must be considered before a radio transmitter can be authorized or licensed. The FCC and IC have therefore developed maximum permissible exposure (MPE) limits for field strength and power density, listed in FCC 47 CFR § 1.1310 and IC RSS-102 Issue 2 Sect 4. The FCC has furthermore determined that determination of compliance with these exposure limits, and preparation of an Environmental Assessment (EA) if the limits are exceeded, is necessary only for facilities, operations and transmitters that fall into certain risk categories, listed in FCC 47 CFR § 1.1307 (b), Table 1. All other facilities, operations and transmitters are categorically excluded from making such studies or preparing an EA, except as indicated in FCC 47 CFR §§ 1.1307 (c) and (d).

Revised FCC OET Bulletin 65 (Edition 97-01) and IC RSS-102 Issue 2 provide assistance in determining whether a proposed or existing transmitting facility, operation or device complies with RF exposure limits. In accordance with OET Bulletin 65, FCC 47 CFR § 1.1307 (b) and RSS-102 Issue Sect 2.5, the Codan Radio Communications transmitter manufactured in Canada is categorically excluded from routine evaluation or preparing an EA for RF emissions and this exclusion is sufficient basis for assuming compliance with FCC/IC MPE limits. This exclusion is subject to the limits specified in FCC 47 CFR §§ 1.1307 (b), 1.1310 and IC RSS-102 Issue 2 Sect 4. Codan Radio Communications has no reason to believe that the excluded transmitter encompasses exceptional characteristics that could cause non-compliance.

Notes:

- The FCC and IC's exposure guidelines constitute exposure limits, not emission limits. They are relevant to locations that are accessible to workers or members of the public. Such access can be restricted or controlled by appropriate means (i.e., fences, warning signs and others).
- The FCC and IC's limits apply cumulatively to all sources of RF emissions affecting a given site. Sites exceeding these limits are subject to an EA and must provide test reports indicating compliance.

RF Safety Guidelines and Information

Base and Repeater radio transmitters are designed to generate and radiate RF energy by means of an external antenna, typically mounted at a significant height above ground to provide adequate signal coverage. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that permitted for successful communication. The following antenna installation guidelines are extracted from Appendix A from OET Bulletin 65 and must be adhered to in order to ensure RF exposure compliance:

Non-building-mounted Antennas:

- Height above ground level to lowest point of antenna ≥ 10 m
- Power ≤ 1000 W ERP (1640 W EIRP)

Building-mounted Antennas:

Power ≤ 1000 W ERP (1640 W EIRP)

The following RF Safety Guidelines should be observed when working in or around transmitter sites:

- The minimum safe distance the user should be from the transmitter antenna while transmitting is 142 cm for transmitters 8W or less and 300 cm for amplifiers 30W or less. This assumes a maximum antenna EIRP of 15 dBi.
- Do not work on or around any transmitting antenna while RF power is applied.
- Before working on an antenna, disable the appropriate transmitter and ensure a "DO NOT USE" or similar sign is placed on or near the PTT or key-up control.
- Assume all antennas are active unless specifically indicated otherwise.
- Never operate a transmitter with the cover removed.
- Ensure all personnel entering a transmitter site have electromagnetic energy awareness training.

For more information on RF energy exposure and compliance, please refer to the following:

- FCC Code of Regulations; 47 CFR §§ 1.1307 and 1.1310
- FCC OET Bulletin 65, Edition 97-01, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields"
- <http://www.fcc.gov/oet/rfsafety/>
- IC RSS-102 Issue 2, "Radio Frequency Exposure Compliance of Radio Communication Apparatus"



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GENERAL INFORMATION

INTRODUCTION

The CP-SC-3 Synthesizer Channel Programmer is a tool developed to permit bench and field programming of the MT-3 family of synthesized radios. The CP-SC-3 Synthesizer Channel Programmer is packaged in the same enclosure as the MT-3 receiver module, thus allowing it to be conveniently mounted in any receiver subrack slot position. An interconnect cable (Type F to DB-9) connects the front panel of the CP-SC-3 Synthesizer Channel Programmer to any free standing synthesized receiver or transmitter.

The CP-SC-3 Synthesizer Channel Programmer is designed to interface with all Codan MT-3 Repeater System of synthesized receivers and transmitters. The main feature of the CP-SC-3 Synthesizer Channel Programmer is to permit the user to program any of the 15 desired channels and view all 16 channels.

NOTE: Channel 1 is set by the internal binary coded decimal switches.

PERFORMANCE SPECIFICATIONS

Type:	MT-3 Series Synthesizer Channel Programmer
Compatibility:	MT-3 Series of Synthesized Receivers and Transmitters
Channel Selection:	Programming capabilities for Channels 2 through 16 Viewing capabilities for Channels 1 through 16
Front Panel Controls:	PRGM (program), ADV (advance), RESET, FCTN (function)
Operating Voltage:	+9.5 VDC Regulated
Operating Temperature Range:	-30°C to +60°C

PHYSICAL SPECIFICATIONS

Physical Dimensions:	Width: 7.1 cm (2.8 in)	Height: 12.8 cm (5.05 in)	Depth: 19 cm (7.5 in)
Module Weight:	0.4 kg (1.0 lb)		
Corrosion Prevention:	Anodized aluminum construction. Stainless steel hardware. Glass epoxy two- layer printed circuit boards. Gold plated module connectors.		
Module Design:	Compact Eurostandard modular design. Plug-in modules mate with the Codan standard M3 repeater subrack. Subracks / modules comply with IEEE 1101, DIN 41494 and IEC 297-3 (mechanical size / modular arrangement).		
External Connections:	Synthesized RF module connections made through a DB-9 connector. Host Terminal connections made through a Mini-8 DIN connector. Motherboard Connections (+9.5 VDC and ground) are made through a 48-pin, gold plated, Type F connector on the rear of the CP-SC-3 programmer module. User connection made through mated 'motherboard' assembly of the repeater subrack. Type F standard connector complies with DIN 41612 Level 2 (200 mating cycles, 4-day 10 ppm SO ₂ gas test with no functional impairment and no change in contact resistance).		



THEORY OF OPERATION

CP-SC-3 PROGRAMMER MAINBOARD

The CP-SC-3 Synthesizer Channel Programmer Main PCB contains an M68HC11 E-series microcontroller unit (MCU), an RS-232 transmitter / receiver IC, a +5 VDC regulator, and digital multiplexers to control the data communication paths.

The CP-SC-3 Synthesizer Channel Programmer Main PCB requires a +9.5 VDC supply. The current drawn from this supply varies from typically 250 mA for the CP-SC-3 programmer plus the current draw from the specific synthesized RF module. An optional fuse for the +9.5 VDC line can be used in cases where external power is supplied other than from a subrack (this requires a special 48-pin Type F connector).

U1 and Q1 supply the +5 VDC regulated circuitry. U2 is the RS-232 transmitter / receiver for serial communication with a host terminal. U5 and U6 are digital switches offering serial communication data path control. U7 and diodes CR1 through CR4 provide isolation (protection) from the synthesized RF module connector (J2). U3 is an under voltage sense IC that shuts down U4 as a safety measure. U4 is the heart of the CP-SC-3 Synthesizer Channel Programmer and provides I/O, 256 bytes RAM, 2048 bytes EEPROM, Serial Communication Interface and Timer System control. JU8 allows U4 to be powered up in bootstrap mode. U8 allows for the initial burning of the EPROM.

JU12 through JU14 allow the digital switches to be controlled by the MCU or controlled manually. Transistor Q2 controls the bootstrap line to the synthesized RF module. J1 is a 38 conductor ribbon cable connecting the front panel board to the mainboard. J2 is a DB-9 connector for interfacing to the synthesized RF module. J2 supplies power, serial communication and bootstrap lines to the synthesized RF module. J3 is a 48-pin Type F connector supplying +9.5 VDC regulated to the CP-SC-3 programmer module. J4 is a Mini-8 DIN connector supplying serial communication to a host terminal.

CP-SC-3 PROGRAMMER FRONT PANEL BOARD

The CP-SC-3 Synthesizer Channel Programmer front panel PCB contains two alphanumeric displays and four user accessible push button switches. All the power, push button switches, address and data lines are routed via P1 to the Main PCB.

All address lines, data lines, power lines and control lines are routed to the two alphanumeric displays and the four push button switches. P1 is a 38-conductor ribbon cable connecting the front panel board to the mainboard.

CP-SC-3 PROGRAMMER MODES OF OPERATION

The CP-SC-3 programmer operates in four different modes.

Mode 1

Mode 1 is the user default mode. Communication occurs between the CP-SC-3 programmer (single chip mode) and the synthesized RF module (single chip mode). Upon power up or RESET the CP-SC-3 programmer is placed in mode one, where it displays the flashing message 'Data wait'. In this state the CP-SC-3 programmer sends out an ASCII carriage return and waits for a prompt ('>') from the synthesized RF module.

The synthesized RF module must be turned on after the CP-SC-3 programmer is in the 'Data wait' state, otherwise communication is not possible. The reason for this is that the synthesized RF module serial receive line is pulled low and is read at power up, so for communication to take place the CP-SC-3 programmer must pull that line high before the synthesized RF module is powered up. If no prompt is received, another ASCII carriage return is sent. This process is repeated every second.

Once the prompt is received from the synthesized RF module, the CP-SC-3 programmer sends a series of commands to retrieve the memory locations of all sixteen channels and stores them in internal RAM. When all the data has been received, the display will show Channel 1 and the current binary coded decimal switch settings. It is here that the user can view all channel locations and determine the status of the synthesized RF module (to find out the operating frequency of any channel the appropriate channel designation table must be used). Any improper channel code numbers will result in the RF module failure.

The user can now change any of the 15 memory locations. After all the changes are completed, the user simply presses the PRGM (program) key and waits for the CP-SC-3 programmer to finish programming (any improper channel code numbers will result in the RF module failure). Once the programming has finished, the CP-SC-3 programmer retrieves the new data and waits for a user key press. The CP-SC-3 programmer permits data retrieval from a fully programmed synthesized RF module and allows any number of synthesized RF modules to be programmed with the same data.

Communication configurations are as follows:

Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	1.0
Handshake:	None
Duplex:	Full

Mode 2

Mode 2 is intended as a non-user mode. To enter Mode 2, the FCTN key must be continuously pressed for at least 2.5 seconds, at which time the display will show 'Mode 2'. In this mode, communication between the synthesized RF module (single chip mode) and a host terminal is possible through application programs such as 'μASM-HC11' or 'White Knight'. This mode allows retrieval of the synthesized RF modules 'Version data' and permits interactive communication with the 'Menu commands'.

Communication configurations are as follows:

Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	1.0
Handshake:	None
Duplex:	Full

NOTE: To return to Mode 1, press the RESET key or the FCTN key for at least 2.5 seconds.

Mode 3

Mode 3 is intended as a non-user mode. To enter Mode 3, the FCTN key must be continuously pressed for at least 2.5 seconds, at which time the display will show 'Mode 2'. The ADV key must then be pressed once (the display will show 'Mode 3'). In this mode, communication between the CP-SC-3 programmer (single chip mode) and a host terminal is possible through application programs such as 'μASM-HC11' or 'White Knight'. This mode allows testing and support of the CP-SC-3 programmer.

Communication configurations are as follows:

Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	1.0
Handshake:	None
Duplex:	Full

Mode 4

Mode 4 is intended as a non-user mode. To enter Mode 4, the FCTN key must be continuously pressed for at least 2.5 seconds, at which time the display will show 'Mode 2'. The ADV key must then be pressed twice (the display will show 'Mode 4'). In this mode, communication between the synthesized RF module (bootstrap mode) and a host terminal is made possible through application programs such as 'LabVIEW' or 'PROG11'.

CP-SC-3 PROGRAMMER STANDARD FACTORY SETTINGS

The CP-SC-3 programmer is configured at the factory with the following jumper configurations:

JU2	Installed	+5 VDC Supply to U2
JU3	Installed	U2 Unused Input
JU4	Installed	U2 Unused Input
JU5	Installed	Handshake I/O
JU6	Installed	RS-232 Data Out
JU7	Installed	RS-232 Data In
JU9	Installed	MODA
JU10	Installed	PE0
JU11	Installed	+5 VDC Supply to U4
JU15	Installed	+12.3 VDC Supply for Initial EPROM Programming

Header Jumpers:

JU1	Installed	+9.5 VDC to all circuitry
JU8	Not Installed	CP-SC-3 Programmer Bootstrap
JU12	Position A	Control 2 (CP-SC-3 Programmer <--> Host Terminal)
JU13	Position A	Control 1 (CP-SC-3 Programmer <--> ;RF Module)
JU14	Position A	Control 3 (RF Module <--> Host Terminal)





INSTALLATION AND OPERATION

BASIC OPERATION

To aid in operation of the CP-SC-3 programmer, the nomenclature in this manual differs slightly from that of any synthesized RF module manual. This manual refers to the memory locations in a synthesized RF module as channels (i.e., Channels 2 through 16) and refers the value programmed in a memory location as a four character code number (referred to as Chan. Num. in the Channel Designation Table of a synthesized RF module manual).

SETUP

Any SR-3 (with a System monitor) or SP-3 subrack will be required to power the CP-SC-3 Programmer.

1. Connect the Type F to DB-9 cable to the front panel TX/RX DATA I/O connector using the DB-9 connector end.
2. Install the CP-SC-3 Programmer into any MT-3 receiver slot in the subrack (SR-3 or PR-3).
3. Turn on the power to the CP-SC-3 programmer (apply power to the subrack).

After power-up or RESET, the display window indicates the status of the CP-SC-3 Programmer.

While the CP-SC-3 is waiting to receive data, the display will read 'Data Wait'. In normal operation, the channel number will be displayed above the corresponding code number.

4. Connect the synthesized RF module to the Type F to DB-9 cable using the Type-F connector end.

NOTE: Any synthesized RF module requiring External Reference Input must have the External Reference Input applied.

Transmitter module RF outputs can be active and should be properly terminated.

Always remove the CP-SC-3 programmer prior to subrack operation.

AM Modules with Frequency Select Handles

For AM modules with Frequency Select Handles only, disconnect the cable to the Digital Front Panel Handle before programming and reconnect after programming (see Figure 1).

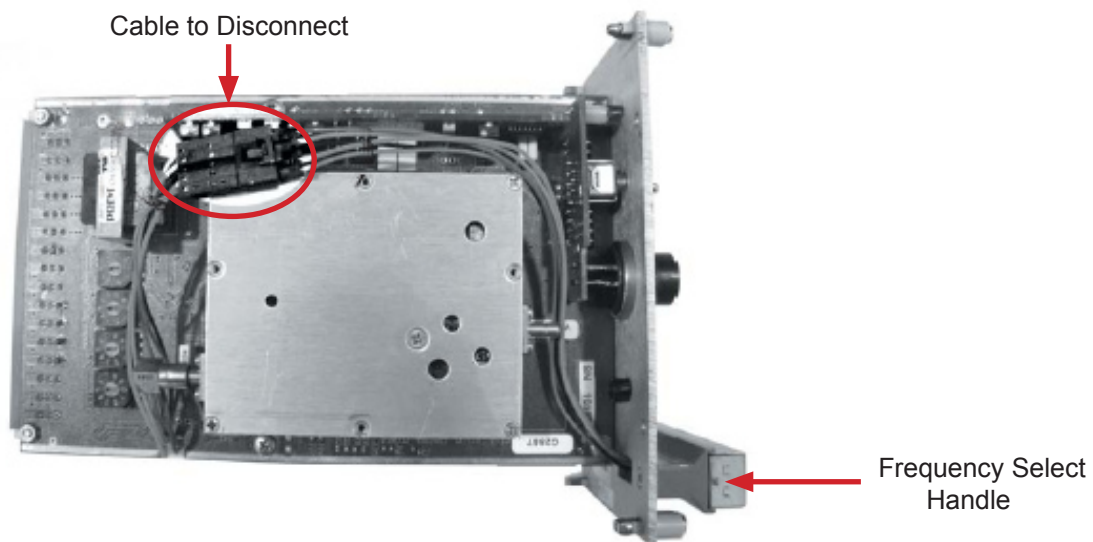


FIGURE 1: AM Module with Frequency Select Handle

FRONT PANEL DESCRIPTION

The front panel is comprised of four push button switches (keys), two external connectors and a display window. The RS232 I/O Mini-8 DIN connector permits communication with a host terminal. The TX/RX DATA I/O DB-9 connector permits communication with any synthesized RF module (via Type F to DB-9 cable). The display window informs the user of the status of the CP-SC-3 programmer module. See Figure 2.

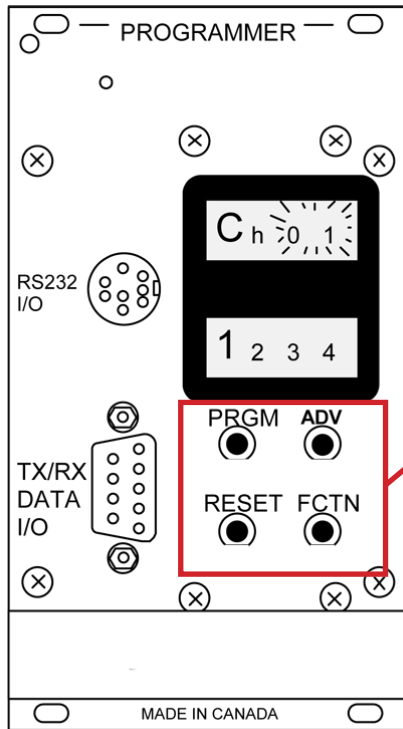


FIGURE 2: B0318 CP-SC-3 Front Panel

KEY	DESCRIPTION
PRGM	Programs the synthesized RF module with current date
ADV	Advances (increments) the flashing character
FCTN	Moves to the next character and flashes it for advancement.
RESET	Resets the CP-SC-3 programmer and waits for new data

Turn Power on Synthesized RF Module

Turn on the synthesized RF module power ('NORM' for receivers or 'KEY TX' for transmitters). After the data is received from the synthesized RF module, the display will indicate Channel 1 and the four character code number for that channel (see Figure 3).



FIGURE 3: CP-SC-3 Display Window

PROGRAMMING A CHANNEL CODE NUMBER

Select A Channel

1. Press the FCTN key until the presently displayed channel number is flashing on and off.
2. Press the ADV key until the desired channel number is selected.

Select A Code Number

1. Press the FCTN key until the displayed code character to be changed is flashing on and off.
2. Press the ADV key until the desired code character is selected.
3. Repeat Steps 1 and 2 until all four code characters are correct (see Note below).
4. Press the PRGM key and wait until the new data has been received.
The display will show Channel 1 and current binary coded decimal switch setting.

NOTE: The character code number for Channel 1 can only be changed by physically setting the four internal binary coded decimal switches.

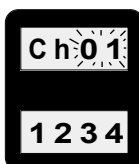
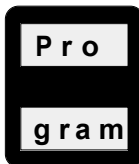
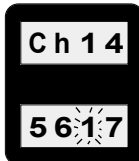
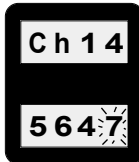
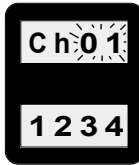
Each four character code number corresponds to a certain frequency. Use the Channel Designation Table appropriate to each synthesized RF module to determine the desired code characters. Erroneous code values will cause the RF module to fail.

Any code number changes can be deleted by pressing the RESET key prior to pressing the PRGM (program) key.

Program Example

Following is an example for programming Code Number 5617 into memory Channel 14.

After power up or RESET, the display window shows Channel 1 with code number 1234.



1. Press the **ADV** key.
2. Select Channel Number **14**.
The current code number is 5648 for this example.
3. Press the **FCTN** key once.
4. Select the '**8**' character.
It will flash on and off.
5. Press the **ADV** key.
6. Change the '**8**' to a '**7**'.
7. Press the **FCTN** key once.
8. Select the '**4**' character.
It will flash on and off.
9. Press the **ADV** key.
10. Change the '**4**' to a '**1**'.
11. Press the **PRGM** key.
12. Wait until the new data has been confirmed.

The display now shows Channel 1 and the current binary coded decimal switch settings.

The program sequence can now be verified by viewing the Channel 14 memory location.

How To Choose The Right Code Number – Frequency

Channel Designation Tables can be found in the back of the appropriate synthesized RF module Instruction Manual. The code number can be found by looking up the desired frequency—noting the code number (Chan. Num.) located to the left—and programming this new value.

For example, a frequency of 133.82500 megahertz translating to code number (Chan. Num.) 1165, can be programmed.

RF Module Duplicate Programming

The CP-SC-3 Synthesizer Channel Programmer permits data retrieval from a fully programmed synthesized RF module and allows any number of synthesized RF modules to be programmed with the same data. To do this, follow these steps:

1. Connect the fully programmed synthesized RF module.
2. Press **RESET** and wait for the new data.
The display will indicate Channel 1 and the four character code number for that channel.
3. Connect the new synthesized RF module.
4. Turn on its power ('NORM' for receivers or 'KEY TX' for transmitters).
5. Press **PRGM**.

NOTE: As long as the RESET is not pressed; or a code number is not changed; or power to the CP-SC-3 programmer is not interrupted, the data for Channels 2 through 16 will be retained.

6. Steps 3–5 can be repeated for as many times as required.

TROUBLESHOOTING

Error Codes

The CP-SC-3 Synthesizer Channel Programmer will display error messages on the following conditions:

Error Code	Cause
01	Overrun Error Flag / Framing Error
02	Input Data Buffer Overflow
03	Received Data Error
04	Received Data State Error
05	Received Data Length Error
06	Data Programmed Error

In the event that any of these errors occur,

1. Turn off the power to the synthesized RF module.
2. Press the CP-SC-3 programmer **RESET** key.
3. Turn on the power to the synthesized RF module.

Troubleshooting Guide

Problem	Possible Cause	Solution
Display is blank.	No power	Check power to subrack.
Display continuously flashes 'Data wait'.	R.F module not connected / powered on too soon	Connect RF module. Turn RF module off, then on again.
Display shows 'Mode xx'	New mode selected	Press RESET.
Display shows 'err. xx'	Communication error	Refer to error codes above.





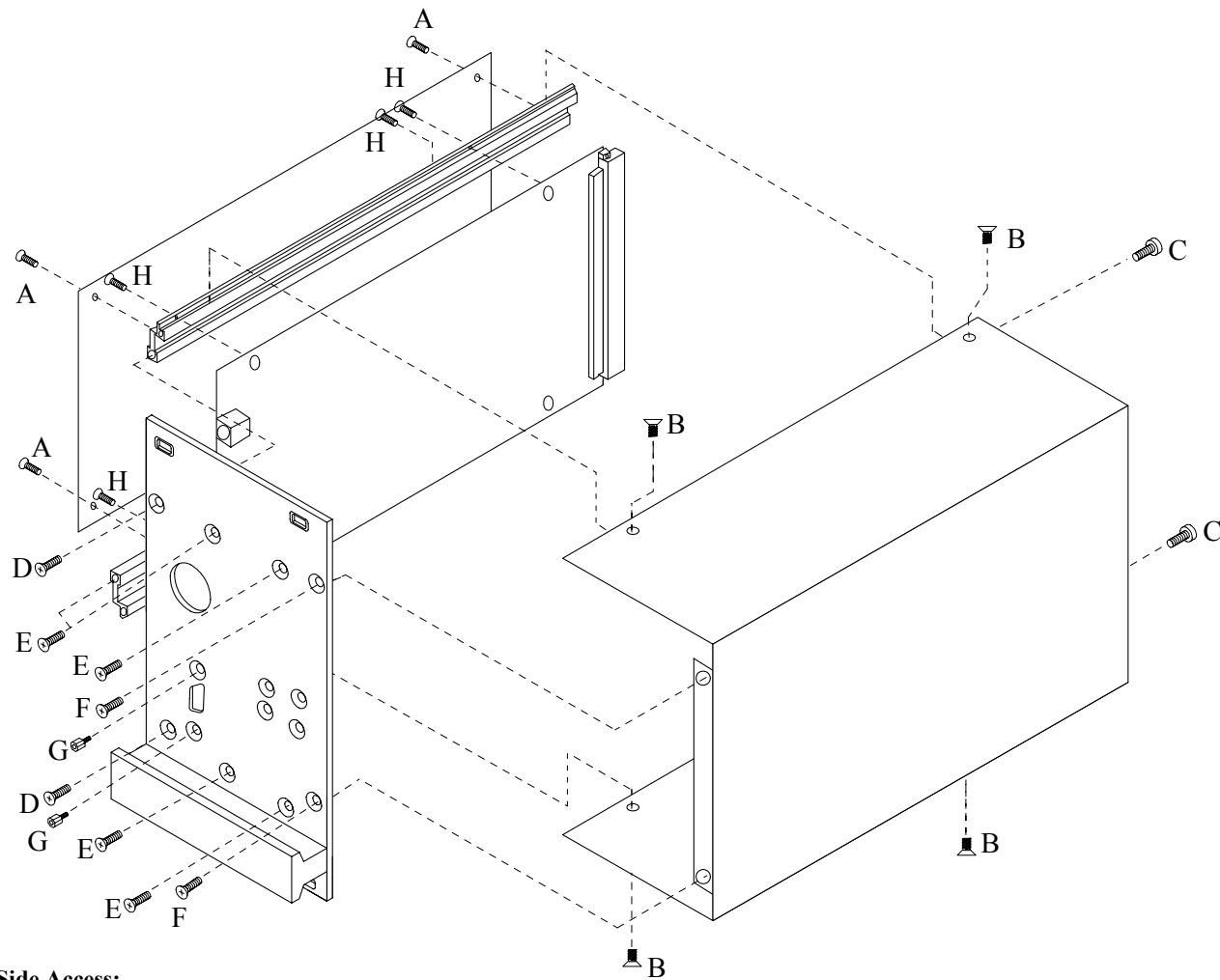
ILLUSTRATIONS AND SCHEMATICS

PRINTED CIRCUIT BOARD NUMBERING CONVENTION

Codan Radio Communications products manufactured in Canada have adopted a printed circuit board (PCB) numbering convention in which the last two digits of the circuit board number represent the circuit board version. All PCBs manufactured by Codan Radio Communications in Canada are identified by one of the following numbering conventions:

PCB number	43-912010
	Indicates circuit board Version 1.0
PCB number	50002-01 60003-01
	Indicates circuit board Version 1 (no decimal version)

CP-SC-3 EXPLODED VIEW



Solder Side Access:
Remove screws 'A' and lift off Tuning Cover (no components this side).

Component Side Access:
Remove screws 'B', 'C' and 'F' then lift off Wrap Around Cover.

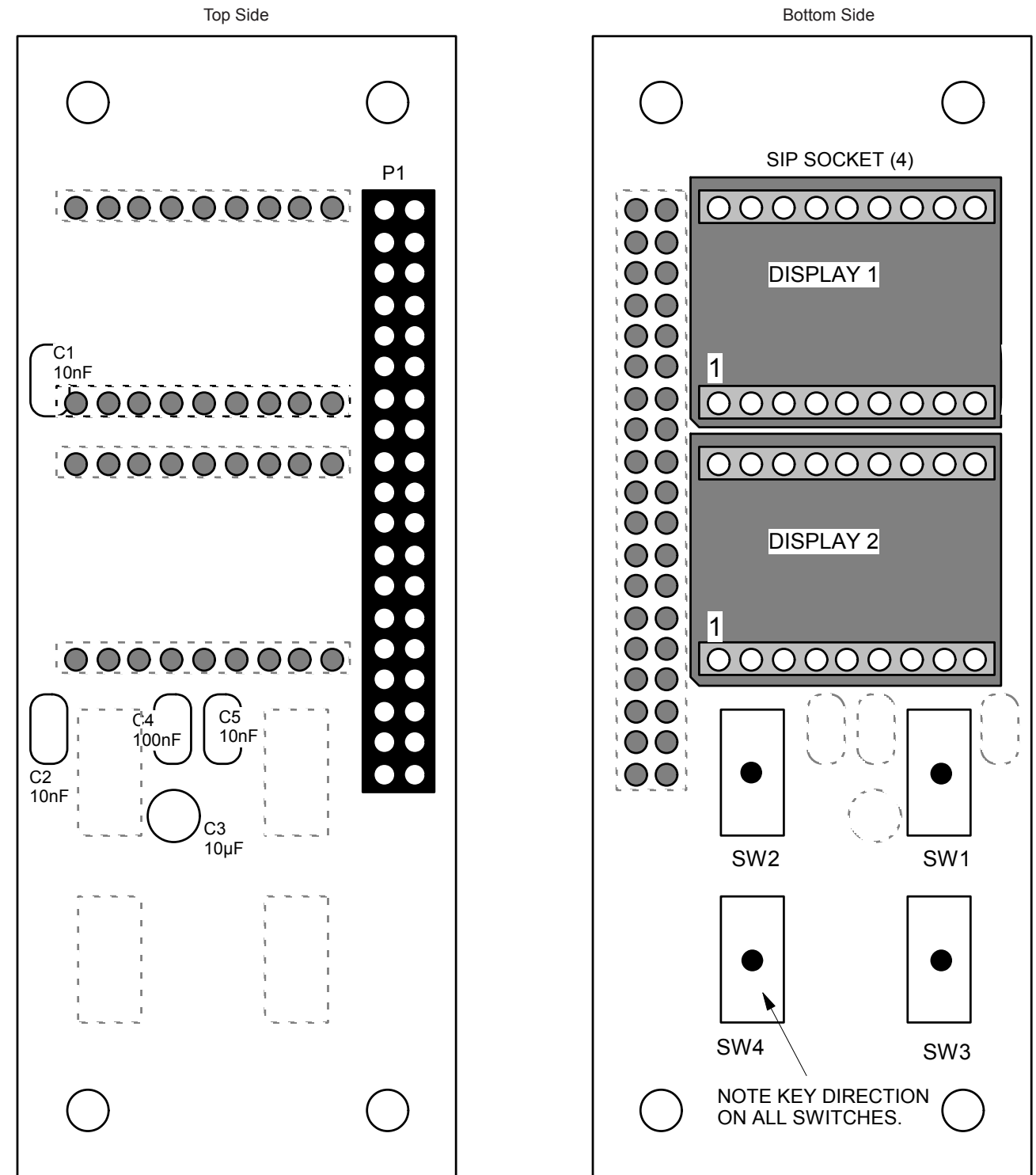
Main Circuit Board Removal:
1 Remove Tuning Cover and Wrap Around Cover as described above.
2 Remove screws 'H' .
3 Remove screws 'D' .
4 Remove screwlocks 'G' .
5 Slide out circuit board.

Front Panel Circuit Board Removal:
Remove screws 'E'.

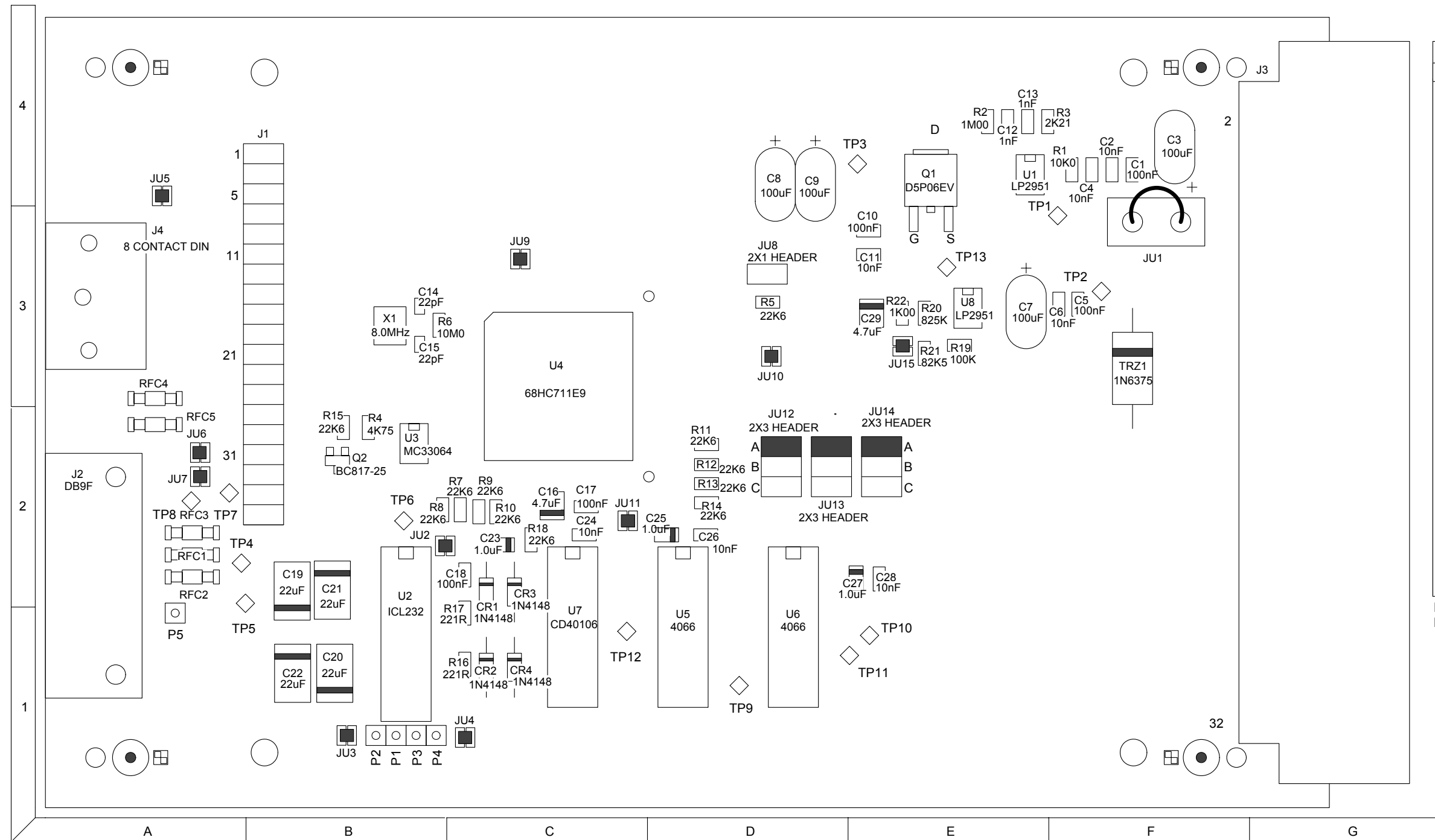
- A- M2.5x5 Flat /Phil
- B- M2.5x5 Flat/Phil
- C - M3x8 Pan/Phil
- D - M3x8 Oval CS/ Phil
- E - M3x6 Oval C/S Phil
- F - M3x6 Oval C/S Phil
- G - Female screwlocks
- H - M3x8 Oval C/S Phil

Solder side - A
Component Side - B,C,F
Main PCB - H,D,G
Front Panel PCB - E

CP-SC-3 FRONT PANEL BOARD COMPONENT LAYOUT



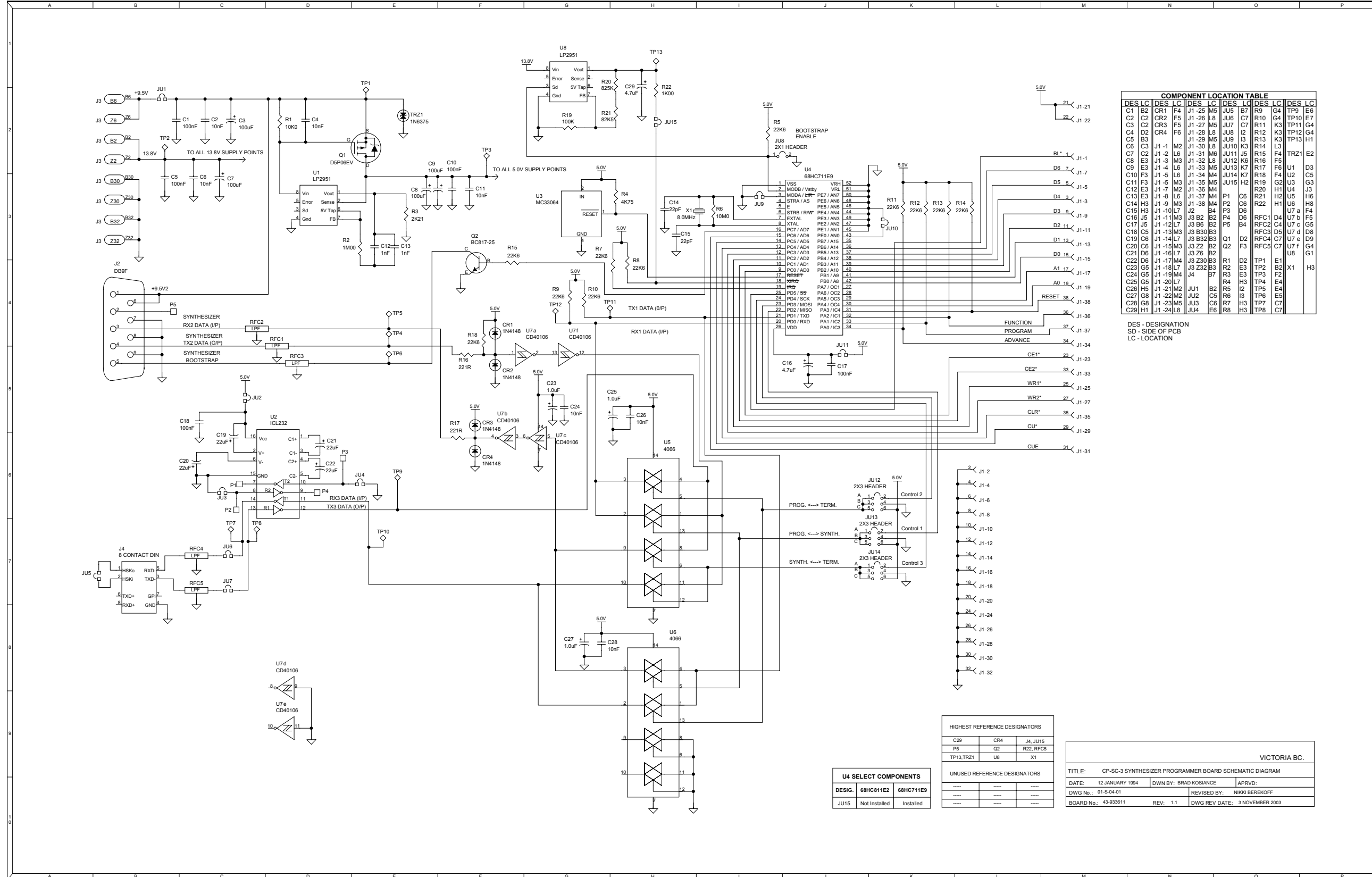
CP-SC-3 MAINBOARD COMPONENT LAYOUT



COMPONENT LOCATION TABLE							
DES	LC	DES	LC	DES	LC	DES	LC
C1	F4	J1	B4	R6	B3	TP11	E1
C2	F4	J2	A1	R7	C2	TP12	C1
C3	F4	J3	G4	R8	B2	TP13	E3
C4	F4	J4	A3	R9	C2		
C5	F3			R10	C2	TRZ1	F2
C6	F3	JU1	F3	R11	D2		
C7	E3	JU2	B2	R12	D2	U1	E4
C8	D4	JU3	B1	R13	D2	U2	B2
C9	D4	JU4	C1	R14	D2	U3	B2
C10	E3	JU5	A4	R15	B2	U4	C3
C11	E3	JU6	A2	R16	C1	U5	D2
C12	E4	JU7	A2	R17	C2	U6	D2
C13	E4	JU8	D3	R18	C2	U7	C2
C14	B3	JU9	C3	R19	E3	U8	E3
C15	B3	JU10	D3	R20	E3		
C16	C2	JU11	C2	R21	E3	X1	B3
C17	C2	JU12	D2	R22	E3		
C18	C2	JU13	D2				
C19	B2	JU14	E2	RFC1	A2		
C20	B1	JU15	E3	RFC2	A2		
C21	B2			RFC3	A2		
C22	B1	P1	B1	RFC4	A3		
C23	C2	P2	B1	RFC5	A2		
C24	C2	P3	B1				
C25	D2	P4	B1	TP1	F3		
C26	D2	P5	A1	TP2	F3		
C27	E2			TP3	E4		
C28	E2	Q1	E4	TP4	A2		
C29	E3	Q2	B2	TP5	A2		
CR1	C1	R1	F4	TP6	B2		
CR2	C1	R2	E4	TP7	A2		
CR3	C1	R3	E4	TP8	A2		
CR4	C1	R4	B2	TP9	D1		
		R5	D3	TP10	E1		

DES - DESIGNATION
LC - LOCATION

CP-SC-3 MAINBOARD SCHEMATIC DIAGRAM



COMPONENT LOCATION TABLE

DES	LC	DES	LC	DES	LC	DES	LC	DES	LC
C1	B2	CR1	F4	J1-25	M5	JU5	B7	R9	G4
C2	C2	CR2	F5	J1-28	L9	JU6	C7	R10	G4
C3	C2	CR3	F5	J1-27	M5	JU7	C7	R11	K3
C4	D2	CR4	F6	J1-28	L8	JU8	I2	R12	K3
C5	B3			J1-29	M5	JU9	I3	R13	K3
C6	C3	J1-1	M2	J1-30	L8	JU10	K3	R14	L3
C7	C2	J1-2	L6	J1-31	M6	JU11	J5	R15	F4
C8	E3	J1-3	M3	J1-32	L8	JU12	K6	R16	F5
C9	E3	J1-4	L6	J1-33	M5	JU13	K7	R17	F6
C10	F3	J1-5	L6	J1-34	M4	JU14	K7	R18	F4
C11	F3	J1-5	M3	J1-35	M5	JU15	H2	R19	G2
C12	E3	J1-7	M2	J1-36	M4			R20	H1
C13	E3	J1-8	L6	J1-37	M4	P1	C6	R21	H2
C14	H3	J1-9	M3	J1-38	M4	P2	C6	R22	H1
C15	H3	J1-10	L7	J2	B4	P3	D6	R23	F4
C16	J5	J1-11	M3	J3	B2	B2	P4	R24	F5
C17	J5	J1-12	L7	J3	B6	B2	P5	R25	G5
C18	C5	J1-13	M3	J3	B32	B3	Q1	R26	D5
C19	C6	J1-14	L7	J3	B32	B3	Q2	R27	D8
C20	C6	J1-15	M3	J3	Z2	B2	Q2	R28	D9
C21	D6	J1-16	L7	J3	Z6	B2			G1
C22	D6	J1-17	M4	J3	Z30	B3	R1	D2	E1
C23	G5	J1-18	L7	J3	Z32	B3	R2	E3	X1
C24	G5	J1-19	M4	J4	B7	R3	E3	TP3	F2
C25	G5	J1-20	L7			R4	H3	TP4	E4
C26	H5	J1-21	M2	JU1	B2	R5	I2	TP5	E4
C27	G8	J1-22	M2	JU2	C5	R6	I3	TP6	E5
C28	G8	J1-23	M5	JU3	C6	R7	H3	TP7	H2
C29	H1	J1-24	L8	JU4	E6	R8	H3	TP8	C7

DES - DESIGNATION
SD - SIDE OF PCB
LC - LOCATION

HIGHEST REFERENCE DESIGNATORS

C29	CR4	J4, JU15
P6	Q2	R22, RFC5
TP13, TR21	U8	X1

UNUSED REFERENCE DESIGNATORS

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U4 SELECT COMPONENTS

DESIG.	68HC811E2	68HC711E9
JU15	Not Installed	Installed

VICTORIA BC.

TITLE: CP-SC-3 SYNTHESIZER PROGRAMMER BOARD SCHEMATIC DIAGRAM

DATE: 12 JANUARY 1994	DWN BY: BRAD KOSIANCE	APPRD:
DWG No.: 01-S-04-01	REVISED BY: NIKKI BERKOFF	
BOARD No.: 43-933611	REV: 1.1	DWG REV DATE: 3 NOVEMBER 2003



PARTS LIST

CP-SC-3 MAINBOARD ELECTRICAL PARTS

Part Number	Description	Qty.	Narration
CP-SC-3	PROGRAMMER, MT-3 SYNTH CHANNEL		
1008-5B104K5R	CAP/1206,100nF CER,10%,50V,X7R	5	C1, C5, C10, C17, C18
1008-3B102K1G	CAP/1206, 1nF CER,10%,100V,C0G	2	C12, C13
1008-1A220J1G	CAP/0805, 22pF CER,5%,100V,C0G	2	C14, C15
1055-5B475K16	CAP/SM/TANTALUM, 4.7uF,10%,16V	2	C16, C29
1055-6D226M20	CAP/SM/TANTALUM, 22uF, 20%,20V	4	C19, C20, C21, C22
1008-4B103K5R	CAP/1206, 10nF CER,10%,50V,X7R	7	C2, C4, C6, C11, C24, C26, C28
1055-5A105M16	CAP/SM/TANTALUM, 1uF, 20%, 16V	3	C23, C25, C27
1054-7M107M20	CAP/DIP/TANTALUM,100uF,20%,20V	4	C3, C7, C8, C9
2000-1N414800	DIODE/SWITCHING,300mA,75V,DO35	4	CR1, CR2, CR3, CR4
5010-H219ST7L	HEADER,.1", 2 ROWX19 PIN,Au	1	J1
5030-E09S13BR	CONN,D-SUB/9 SOCKET,PCB R/A	1	J2
3720-6048M0RA	CONNECTOR, F/48 MALE, R/A PCB	1	J3
5042-6S01801F	CONN,CIRC/DIN,8 CCT,R/A PCB	1	J4
5010-H102ST7L	HEADER, .1", 1 ROW X 2 PIN, Au	1	JU8
5010-H203ST7L	HEADER, .1", 2 ROW X 3 PIN, Au	3	JU12, JU13, JU14
5010-J01G0BLK	SHUNT JUMPER, .1",GOLD PL.,BLK	4	JU8, JU12-C, JU13-B, JU14-B
4351-10933611	PCB,MAIN,SYNTH CHAN PROGRMR	1	PCB
1150-2B2210FP	RES/1206, 221R, 1%,1/4W,100ppm	2	R16, R17
1150-3B1001FP	RES/1206, 1K00, 1%,1/4W,100ppm	1	R22
1150-3B2211FP	RES/1206, 2K21, 1%,1/4W,100ppm	1	R3
1150-3B4751FP	RES/1206, 4K75, 1%,1/4W,100ppm	1	R4
1150-4B1002FP	RES/1206, 10K0, 1%,1/4W,100ppm	1	R1
1150-4B2262FP	RES/1206, 22K6, 1%,1/4W,100ppm	11	R5, R7, R8, R9, R10, R11, R12, R13, R14, R15, R18
1150-4B8252FP	RES/1206, 82K5, 1%,1/4W,100ppm	1	R21
1150-5B1003FP	RES/1206, 100K, 1%,1/4W,100ppm	1	R19

CP-SC-3 Mainboard Electrical Parts (Continued)

Part Number	Description	Qty.	Narration
1150-5B8253FP	RES/1206, 825K, 1%,1/4W,100ppm	1	R20
1150-6B1004FP	RES/1206, 1M00, 1%,1/4W,100ppm	1	R2
1151-7B0106JG	RES/1206, 10M0, 5%,1/4W,400ppm	1	R6
1306-T361F2D5	FILTER, SM, EMI/LPF, 360pF,FER	5	RFC1, RFC2, RFC3, RFC4, RFC5
2120-BC817025	TRANSISTOR/NPN, GEN PURP,SOT23	1	Q2
2144-D5P06V00	MOSFET/POWER,P CHAN,38W,D-PAK	1	Q1
2007-1N637500	DIODE/TRANSIENT SUPPRESSOR,10V	1	TRZ1
2305-29510N08	IC/VOLT REG, 5V-ADJ,LDO,uP,SO8	2	U1, U8
2279-2320IP16	IC,ICL232,DUAL RS-232,16DIP	1	U2
2308-33064N08	IC/UNDER VOLTAGE SENSOR, SO-8	1	U3
2380-68711P52	IC/8BIT uCONTRLR,OTPROM,PLCC52	1	U4
2275-40660014	IC, 4066,QUAD ANLG SW,14DIP	2	U5, U6
2275-41060014	IC, 40106,HEX SCMITT TR,14P	1	U7
1575-8001816A	RESONATOR, SM, 8.0MHz, CERAMIC	1	X1

CP-SC-3 FRONT PANEL MAINBOARD ELECTRICAL PARTS

Part Number	Description	Qty.	Narration
1004-4A103Z5V	CAP., 10nF CER, 100V,X7R,.1"SP	3	C1, C2, C5
1007-5B104M5U	CAP., 100nF MONO., 20%,50V,Z5U 1	C4	
1054-6E106M25	CAP/DIP/TANTALUM, 10uF,20%,25V 1	C3	
4351-11933710	PCB,F/P,SYNTH CHAN PRGRMR	1	PCB
5010-H219ST7L	HEADER,.1", 2 ROWX19 PIN,Au	1	P1
5234-309V01TB	SWITCH, PB,SPST/MOM.,PCB,STRHT	4	SW1, SW2, SW3, SW4

CP-SC-3 MECHANICAL PARTS

Part Number	Description	Qty.
CBLC41-43012122	CABLE, 12,TYPE F- D-SUB9,1.22M	1
5011-S219D02A	CABLE STRIP,2X19 FEM/FEM,2"	1
3702-62201100	COVER, TUNING, MT-3 SERIES	1
3702-62301105	COVER, WRAP AROUND,MT-3 SERIES	1
2018-D457618R	DISPLAY, 4 CHAR,5x7 DOT MATRIX	2
3702-10000614	HANDLE, FRONT PANEL, 14HP,GRAY	1
3537-40511005	LABEL, HP92, CP-SC-3 F/P DISP.	1
5814-2M5LK00S	LOCKWASHER,M2.5,SPLIT,A2 STEEL	4
5814-3M0LK00S	LOCKWASHER, M3, SPLIT,A2 STEEL	2
5814-3M0LK00S	LOCKWASHER, M3, SPLIT,A2 STEEL	4
5813-2M5HX50S	NUT, M2.5, HEX, 5.0mm FLATS,A2	4
5813-2M5SQ50S	NUT, M2.5, SQUARE-5mm, A2 S/S	2
3802-61005105	PANEL/FRONT,W/IDENT:CP-SC-3	1
3802-12141030	PLATE/IDENT,14HP MODULES,BLACK	1
3802-61801005	RAIL,PCB SUPPORT,MT-3 SYST	2
5030-SLK00503	SCREWLOCK KIT, FOR D-SUB. CONN	1
5812-2M5FP05S	SCREW, M2.5 x 5, FLAT/PHIL.,A2	8
5812-2M5PP10S	SCREW, M2.5 x 10 PAN/PHIL, A2	4
5812-2M5FP14S	SCREW, M2.5 x 14 FLAT/PHIL, A2	2
5812-3M0VP06S	SCREW, M3 x 6,OVAL C/S/PHIL,A2	2
5812-3M0PP06S	SCREW, M3 X 6, PAN/PHILLIPS,A2	4
5812-3M0VP08S	SCREW, M3 x 8,OVAL C/S/PHIL,A2	4
5812-3M0VP08S	SCREW, M3 x 8,OVAL C/S/PHIL,A2	6
5812-3M0PP08S	SCREW, M3 x 8, PAN/PHIL, A2	2
5812-3M0PP08S	SCREW, M3 x 8, PAN/PHIL, A2	2
5016-SS110M07	SOCK. STRIP, 1 ROW x 10 PIN,Au	4
5926-4A12M300	STANDOFF,4.5mmOD,12mm,M3,HX	4
5917-7B4BM30T	STANDOFF, 7/32OD,1/4L,M3,SWAGE	4





REVISION HISTORY

Revision	Date	Action #	Description
			SEE PREVIOUS VERSION FOR PRIOR REVISION HISTORY
2-1-0	Nov 2003	790	<ul style="list-style-type: none"> The microprocessor MC68HC811E2 is obsolete and is being replaced by the MC68HC711E9 Updated Illustrations, Schematics and Parts Lists New Manual format
3-0-0	May 2012	6580	<ul style="list-style-type: none"> Zinc-plated square nut replaced by stainless steel Updated front panel BOM
		---	Updated the manual to the new template
4-0-0	Jan 2013	6773	<ul style="list-style-type: none"> Replacement of colour-coded, DE-branded Lexan label with silkscreened Codan-branded plate Updated CP-SC-3 mechanical BOM Delete handle colour specification
		---	Updated to Codan template

