

**CAF9500**  
**BASE STATION CONTROL**  
**WITH REPEATER OPERATION**

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CAF9500  
BASE STATION CONTROL  
WITH REPEATER OPERATION

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# CP9501

## REPEATER PANEL

### GENERAL DESCRIPTION

The CP9501 repeater panel board is part of the base station control CAF9500. CAF9500 consists of three printed circuit boards, the repeater panel board CP9501, the interface board IU9103 mounted on an aluminium plate, and the control panel CP9111/CP9112.

The unit is intended to work in the following four configurations:

- As a stand alone repeater station (CP9501 and IU9103).
- As a repeater station with control box operation through the CAF9100 serie's control panel CP9111 or CP9112. The connection between CP9501 and CP910x is ensured by the cable kit CC9104.  
Any communication from the control box will disable the repeater connection during control box PTT time.
- As a back-to-back repeater system with two CQF9000 base stations connected to each other through a multiwire CC9501 and with a CP9501 panel mounted in both, performing communication from one frequency to another.  
The initiating base station (called A-subscriber) controls the other one regarding timing and clear-down.
- As a link-to-link system with start criteria or continuous mode.  
The initiating base station (called A-subscriber) controls the other regarding timing and clear-down.

If the required system is to use a private line tone as carrier a separate module CG9011 has to be installed in the RX-tray of the CQF9000 base station and will be treated as squelch signal by the CP9501. See separate description of CG9011 in the CQF9000 modules manuals.

The operation modes, different times and start criteria coding are selected by 8 wire solder straps described in the section CODING OF CP9501.

The different start criterias are:

- carrier only
- single tone detect
- four tone sequence detect
- five tone sequence detect

which, depending on the strap coding, can initiate the repeater communication.

The different stop criterias are:

- carrier timer (SDT) end
- carrier control timer (CCT) end
- single tone detect

which, depending on the strap coding, can terminate the repeater communication.

A power failure input is provided for an error tone during communication, as well as for a warning tone before end of carrier control timer (CCT). This is valid for all communication modes except for continuous mode.



## CP9501 REPEATER PANEL

A repeater blocking timer (RBT) is also provided by strap selection. This timer blocks the start possibility for a specified period of time after each repeater communication.

The IU9103 printed circuit board serves as I/O interface to internal CQF9000 base station parts and provides a voltage regulator circuit for +5 volt used by the CP9501 board. The strapping and coding of the IU9103 is explained in the IU9103 chapter.

The CP9501 PCB contains the following main sub-parts:

- Control Logic
- Coding Field and Tone Decoder
- AF-Circuits

### CONTROL LOGIC

(Refer to electrical diagram, sheet 1 of 4)

#### MAIN CONTROLLER

The main controller is an 8031 MPU U7, which has access to the EPROM U1, containing the software for CP9501. The software is not EPROM programmable, instead all coding is done by the coding field described below.

The 8 bit latch, U10, works as address A0 - A7 latch on the ALE signal from MPU U7 since the low address byte and data is multiplexed from the MPU.

The MPU, U7, accesses the EPROM, U1, by its \*PSEN signal reading data on low signal.

The operating frequency of the MPU is 11.059 MHz running from the x-tal Y1. This frequency divided by 12 down to 921.58 kHz can be observed on the ALE pin of MPU when running.

A red LED indicates whether the MPU is working or not. The LED is ON during communication, and FLASHING during standby.

#### AUTONOME RESET TIMER

U13 is a 24-stage divider which operates on an internal 10 kHz clock, which can be observed on TP1. The timing elements of this oscillator are R18, R28 and C24.

The purpose of this timer circuit is to make sure the MPU is initiated every 14 minutes in standby or after communication start, as a repeater station may be mounted in places difficult of access. Furthermore it has to ensure that the MPU does not hang in a loop.

When Q24 goes high after 14 minutes, the MPU is reset by the flip-flop U11.2, output 13. The flip-flop itself resets through the delay net R29 - C29, restarts the counter U13 through the gate U12.3, and resets the communication flip-flop U11.1.

When communication starts, the MPU will set the signal SEROUT\_4 high, which will set the communication flip-flop U11.1 and through the C27 and gate U12.3 restart the counter U13. If the communication is not stopped by the MPU the counter will count the 14 minutes as described above and force a reset on the MPU.

When the communication is stopped by the signal SEROUT\_4, being set low, the flip-flop U11.1 is reset, which through its output 2, C19, gate U12.4, will again set the reset flip-flop and restart the MPU as described above.

## PROGRAMMABLE DIVIDER

U9 is a programmable divider generating the clock for the switched capacitor filter U17 used as tone decoder. Division factors are written by the MPU through its P3.6 port as a negative pulse. The output from the programmable divider SR\_CK is in the range 32 times the actual decoder frequency, eg. if the tone decoder is coded for ZVEI 1060 Hz the frequency will be  $32 \times 1060 = 33,920$  Hz.

## TONE DECODER AND CODE FIELD

(Refer to electrical diagram, page 2 of 4)

### TONE DECODER

The input amplifier U16.4 amplifies and limits the input signal from the receiver. The switched capacitor filter U17 is connected as a bandpass filter with a  $Q = 32$ . The filter has a clock/frequency ratio of 16:1, which is obtained from the counter U14.2, which divides the SR\_CK signal by 2 on its output Q0.

If the bandpass U17 is clocked on the input signal tone, the resulting signal is detected by the detector circuit U16.3. U16.3 produces a square wave of the detected frequency on its output if the level is high enough. The trigger level is set by resistors R19 and R21.

The square wave constantly resets the delay timer U14.1 causing the P3.0 signal to be low during tone detect.

When the tone is no longer detected the delay timer U14.1 starts counting and will set the P3\_0 signal high indicating no more detect to the MPU. The MPU will, if a sequence code is coded, load next tone division factor and wait a while for a new detect. If no more detect is found the MPU will return the division factor to the first tone value.

### CODING FIELD

The coding field is built up by eight 16-pin connector rows W1-W8, and scanned by the eight outputs of the shift registers U5 and P3.1 - P3.6. The MPU reads each value of the coding field by its input ports P1.0 - P1.7 to determine operation of this repeater panel.

#### NOTE

This is only done after reset, so changes during power on has no influence before the power is either removed/returned or the 14 minutes timer, U13, resets the MPU.

Two shift registers, U2 and U4, are used as input and output port expansion.

## AF-CIRCUITS AND INTERFACE

(Refer to electrical diagram, page 3 of 4)

Connectors P3 and P5 are used to connect two base stations together.

The RF-AF is attenuated in U16.1. The attenuated signal is connected to the TX-modulation mixer amplifier U8.4 via switch U6.2. It is also connected to the output buffer U8.3 and to the service handset amplifier U8.1.

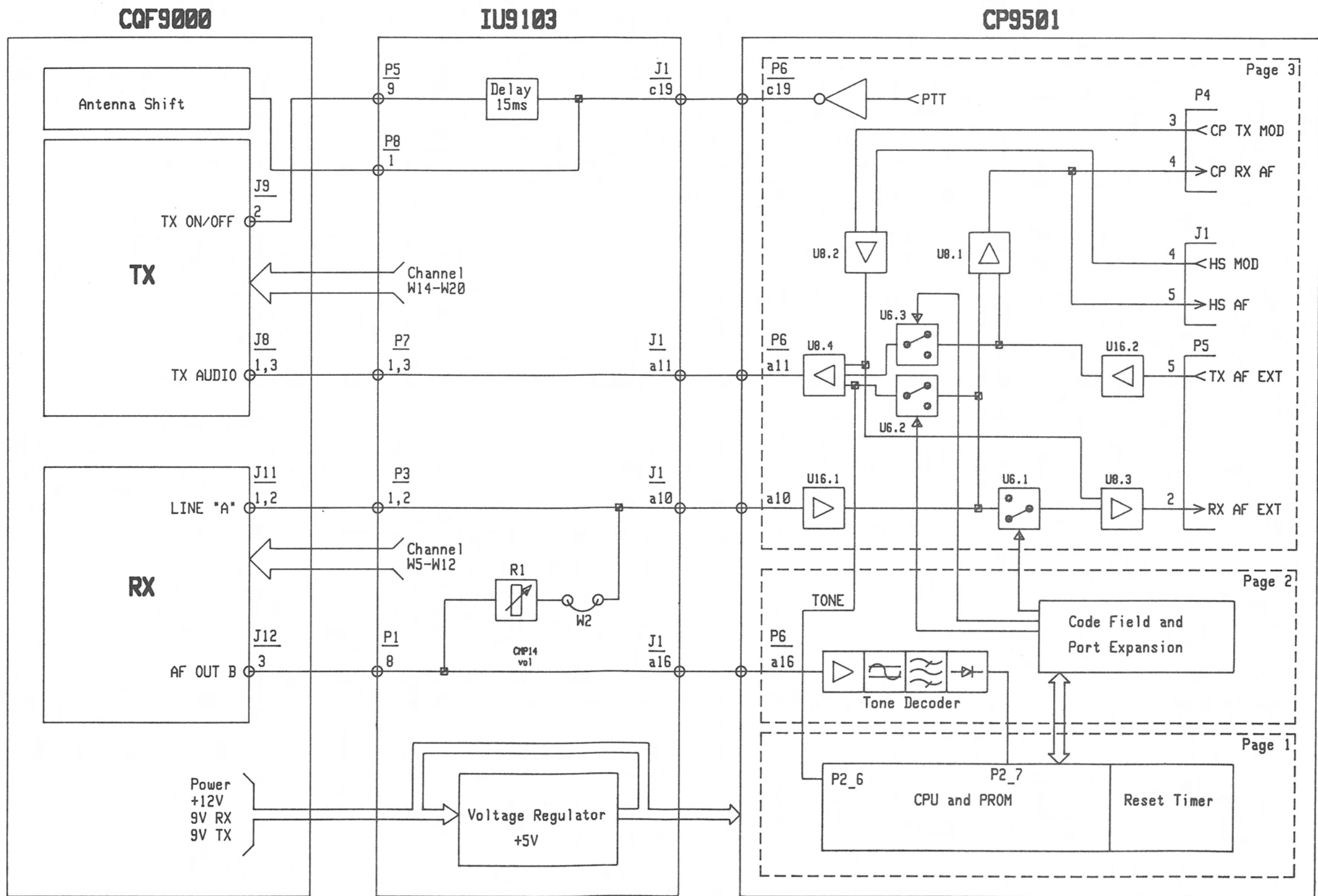
## CP9501 REPEATER PANEL

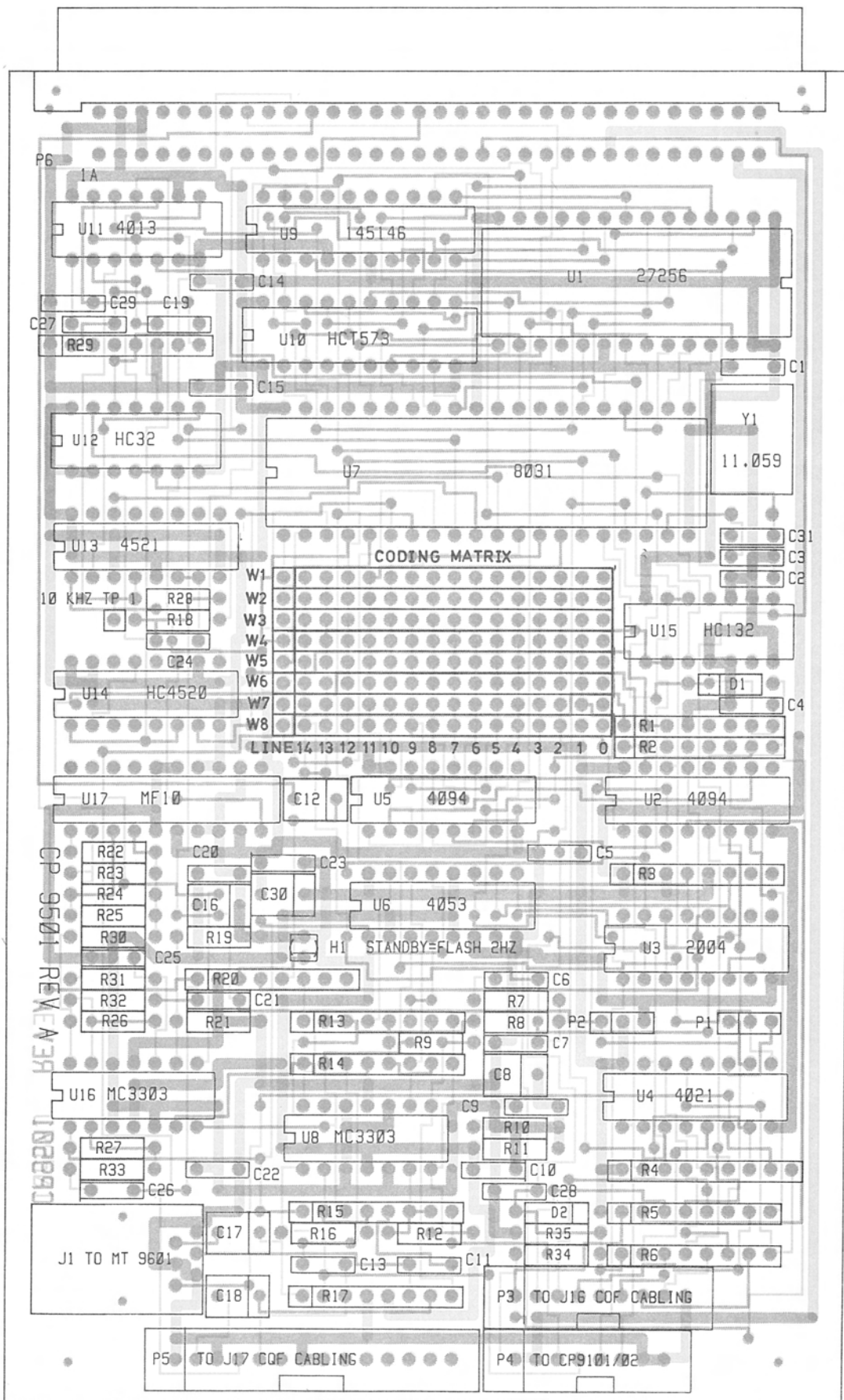
The external TX-modulation is buffered by amplifier U16.2 and fed to the TX-modulation amplifier U8.4 via switch U6.3

The base station can also be modulated from the service handset or from the control panel CP9111/CP9112.

The TX-modulation from these two sources are mixed together in amplifier U8.2, and fed to U8.4.

Buffer amplifier U8.1 distributes the RX-AF to the service handset and to the control panel CP9111/CP9112:





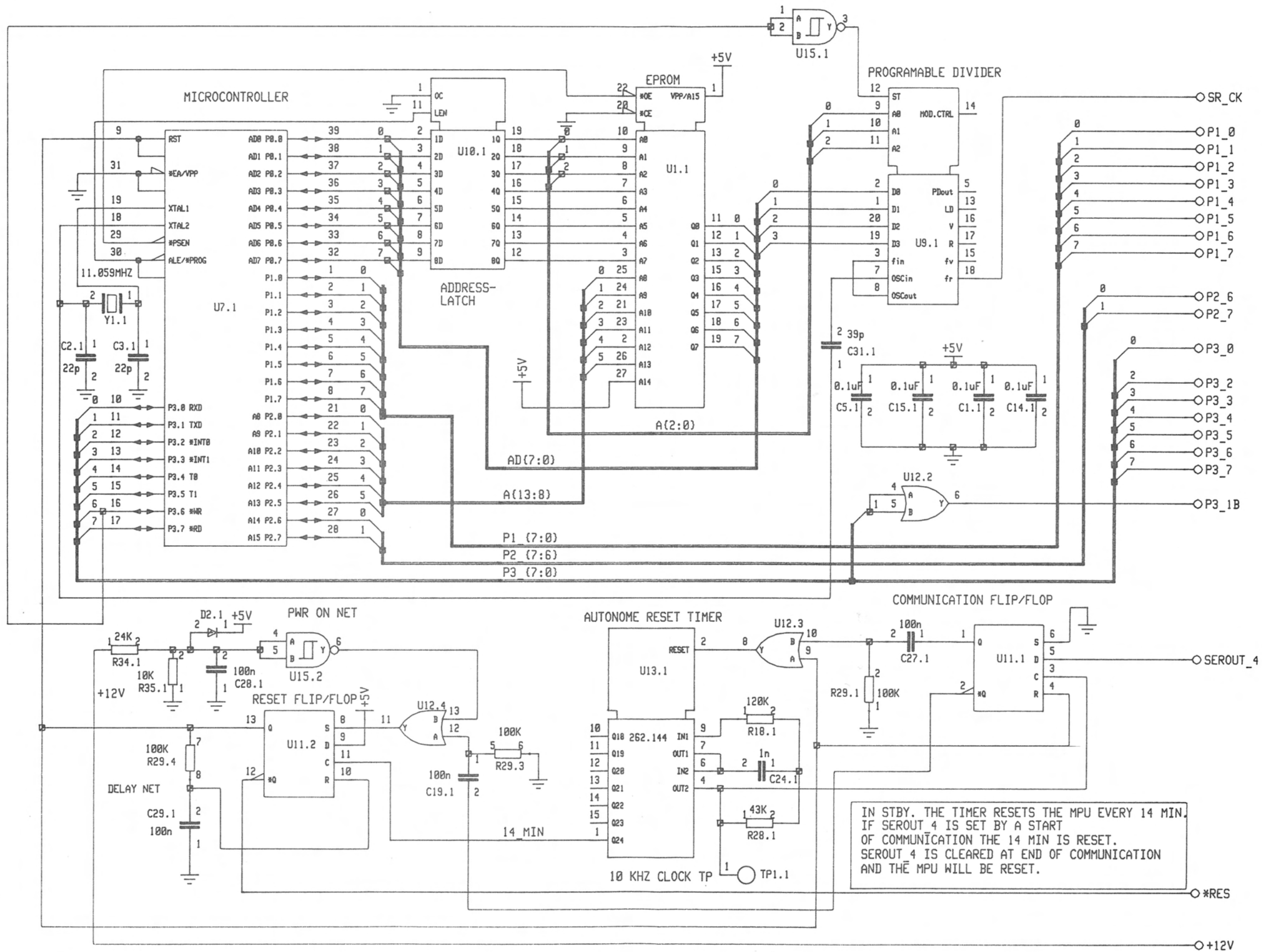
REPEATER PANEL CP9501  
COMPONENT LAYOUT

D405.449

REV. A CODE NO. J711186G1 GLN 70787

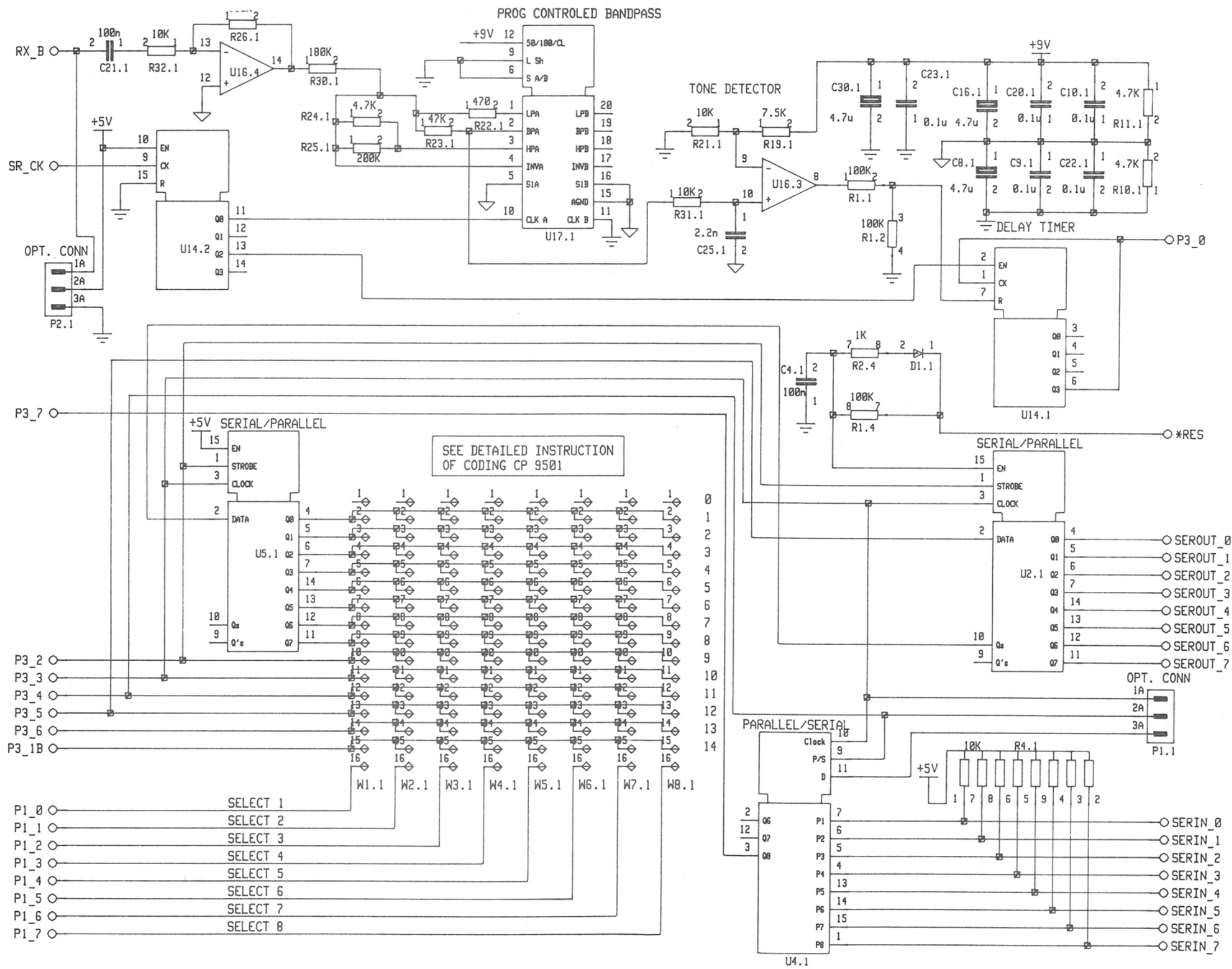
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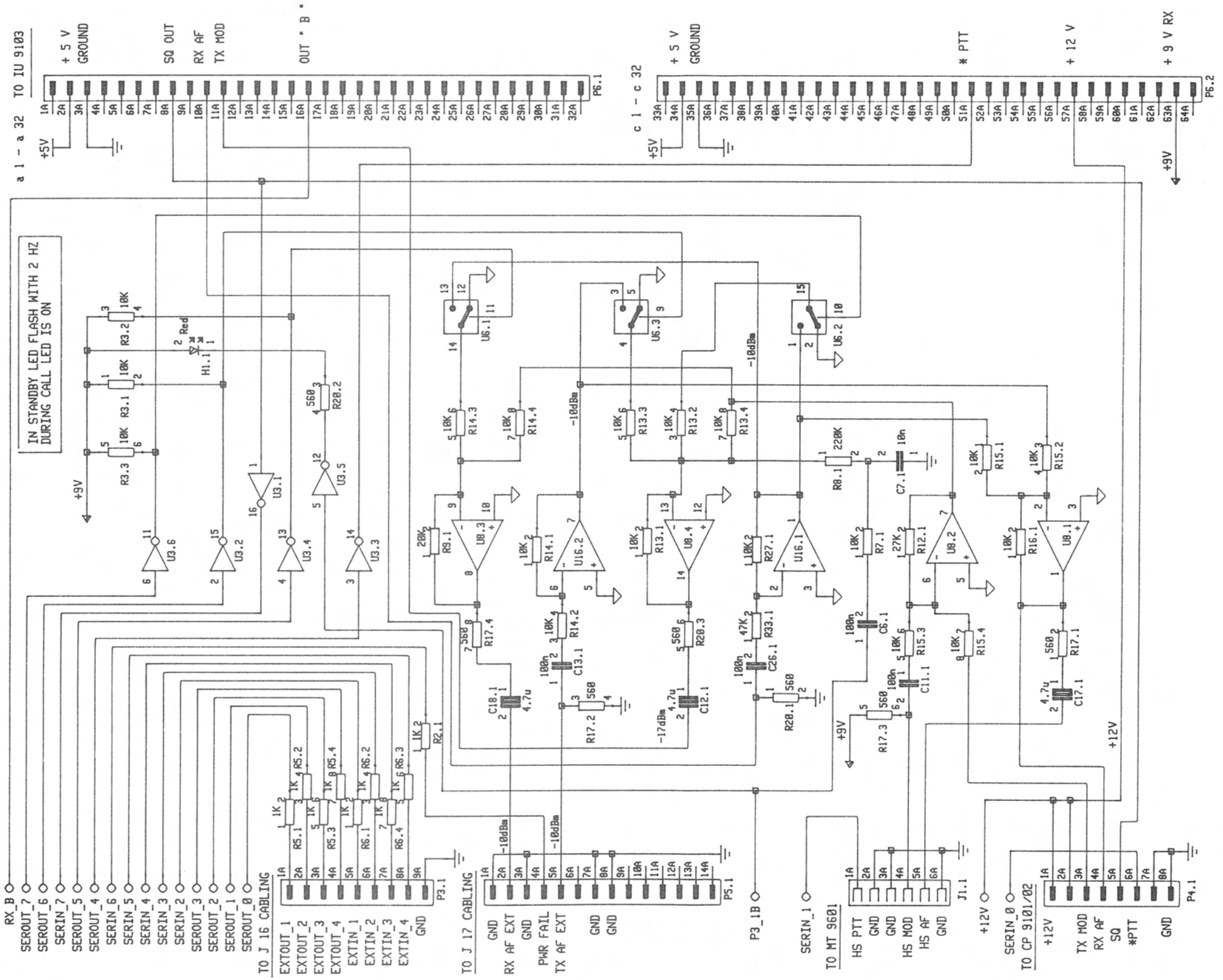


REPEATER PANEL CP9501  
CONTROL LOGIC





REPEATER PANEL CP9501  
TONE DECODER AND CODE FIELD

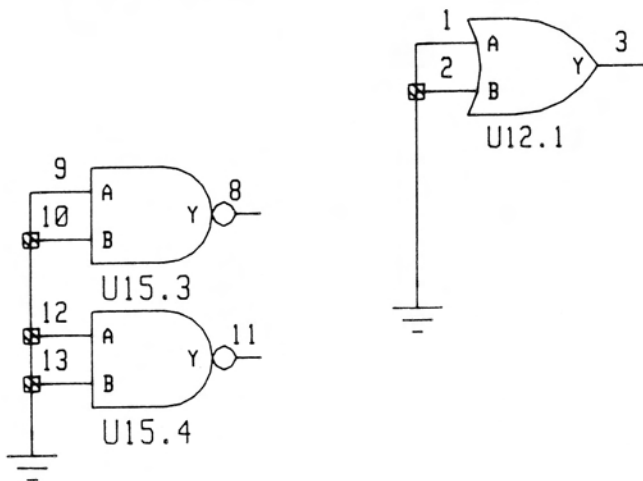


REPEATER PANEL CP9501  
AF CIRCUITS AND INTERFACE



REF	TYPE	PIN/POWER SIGNAL							
U1	27256	14	GND	28	VCC				
U2	4094	8	GND	16	VCC				
U3	ULN2004	8	GND						
U4	4021	8	GND	16	VCC				
U5	4094	8	GND	16	VCC				
U6	4053	16	+9V	8	GND	7	GND	6	GND
U7	8031	20	GND	40	VCC				
U8	MC3303	4	+9V	11	GND				
U9	145146	4	GND	6	VCC				
U10	74HCT573	10	GND	20	VCC				
U11	14013B	7	GND	14	VCC				
U12	74HC32	7	GND	14	VCC				
U13	4521	8	GND	16	VCC	3	GND	5	VCC
U14	74HC4520	16	VCC	8	GND				
U15	74HC132	7	GND	14	VCC				
U16	MC3303	4	+9V	11	GND				
U17	MF10	7	+9V	8	+9V	14	GND	13	GND

UNUSED GATES



REPEATER PANEL CP9501  
POWER CIRCUITS

PARTS LIST FOR REPEATER PANEL CP9501 : J711404G1

Pos	Code No.	Description	Qt	Pos	Code No.	Description	Qt
A001	J711449G1	CP 9501 KIT	1	C028	J707412P9	CAP,PYES 100N , 10%	1
-----				C029	J707412P9	CAP,PYES 100N , 10%	1
A001	J711185G1	IU 9103 (SEE X405.306)	1	C030	A701534P6	CAP,TA,SOL 4U7 , 35V	1
A002	J711186G1	CP 9501	1	C031	J711327P3	CAP,CER 39P	1
W001	J710339P445	JUMPER	1	D001	A700028P1	DIO,SI,SIG 1N4148	1
W002	J710339P445	JUMPER	1	D002	A700028P1	DIO,SI,SIG 1N4148	1
W003	J710339P445	JUMPER	1	H001	J711027P90	DIO,OPTO LED,3MM,RD	1
W004	J710339P445	JUMPER	1	J001	J706197P1	CONN,PWB 6POS,6CONT	1
W005	J710339P445	JUMPER	1	P001	J710339P134	CONN,MALE 03-CKT	1
W006	J710339P445	JUMPER	1	P002	J710339P134	CONN,MALE 03-CKT	1
W007	J710339P445	JUMPER	1	P003	J708068P9	CONN,PWB,MALE RECP,09-CKT	1
W008	J710339P445	JUMPER	1	P004	J708068P8	CONN,PWB,MALE RECP,08-CKT	1
W009	J710339P445	JUMPER	1	P005	J708068P14	CONN,PWB,MALE RECP,14-CKT	1
W010	J710339P445	JUMPER	1	P006	J711327P4	CONN,MALE 64-CKT	1
W011	J710339P445	JUMPER	1	R001	J711327P8	RES,NETW 4X 100K	1
W012	J710339P445	JUMPER	1	R002	J711327P7	RES,NETW 4X 1K0	1
W013	J710339P445	JUMPER	1	R003	J710339P23	RES,NETW 8X 10K	1
W014	J710339P445	JUMPER	1	R004	J711027P35	RES,NETW 8X 10KOHM	1
W015	J710339P445	JUMPER	1	R005	J711327P7	RES,NETW 4X 1K0	1
W016	J710339P445	JUMPER	1	R006	J711327P7	RES,NETW 4X 1K0	1
W017	J710339P445	JUMPER	1	R007	A701250P301	RES,MFLM,1/4W 10K00, 1%	1
W018	J710339P445	JUMPER	1	R008	A701250P434	RES,MFLM,1/4W 221K , 1%	1
W019	J710339P445	JUMPER	1	R009	A701250P330	RES,MFLM,1/4W 20K0 , 1%	1
W020	J710339P445	JUMPER	1	R010	A701250P266	RES,MFLM,1/4W 4K75, 1%	1
0003	J711027P151	CABLE CC 9102	1	R011	A701250P266	RES,MFLM,1/4W 4K75, 1%	1
0004	J711027P152	CABLE CC 9103	1	R012	A701250P334	RES,MFLM,1/4W 22K10, 1%	1
0005	J711027P153	CABLE CC 9104	1	R013	J710339P23	RES,NETW 8X 10K	1
0006	J711027P155	PLATE,AL MOUNTING	1	R014	J710339P23	RES,NETW 8X 10K	1
0007	J710339P321	SCR MRX M-3X 6	8	R015	J710339P23	RES,NETW 8X 10K	1
A002	J711186G1	CP 9501	1	R016	A701250P309	RES,MFLM,1/4W 12K1 , 1%	1
-----				R017	J711327P6	RES,NETW 4X 560R	1
C001	J707412P9	CAP,PYES 100N , 10%	1	R018	A701250P409	RES,MFLM,1/4W 121K , 1%	1
C002	A700235P17	CAP,CER,N150 22P , 5%	1	R019	A701250P285	RES,MFLM,1/4W 7K50, 1%	1
C003	A700235P17	CAP,CER,N150 22P , 5%	1	R020	J711327P6	RES,NETW 4X 560R	1
C004	J707412P9	CAP,PYES 100N , 10%	1	R021	A701250P301	RES,MFLM,1/4W 10K00, 1%	1
C005	J707412P9	CAP,PYES 100N , 10%	1	R022	A701250P166	RES,MFLM,1/4W 475R , 1%	1
C006	J707412P9	CAP,PYES 100N , 10%	1	R023	A701250P366	RES,MFLM,1/4W 47K5 , 1%	1
C007	J707412P3	CAP,PYES 10N , 10%	1	R024	A701250P266	RES,MFLM,1/4W 4K75, 1%	1
C008	A701534P6	CAP,TA,SOL 4U7 , 35V	1	R025	A701250P430	RES,MFLM,1/4W 200K , 1%	1
C009	J707412P9	CAP,PYES 100N , 10%	1	R026	A701250P426	RES,MFLM,1/4W 182K , 1%	1
C010	J707412P9	CAP,PYES 100N , 10%	1	R027	A701250P301	RES,MFLM,1/4W 10K00, 1%	1
C011	J707412P9	CAP,PYES 100N , 10%	1	R028	A701250P362	RES,MFLM,1/4W 43K2 , 1%	1
C012	A701534P6	CAP,TA,SOL 4U7 , 35V	1	R029	J711327P8	RES,NETW 4X 100K	1
C013	J707412P9	CAP,PYES 100N , 10%	1	R030	A701250P426	RES,MFLM,1/4W 182K , 1%	1
C014	J707412P9	CAP,PYES 100N , 10%	1	R031	A701250P301	RES,MFLM,1/4W 10K00, 1%	1
C015	J707412P9	CAP,PYES 100N , 10%	1	R032	A701250P301	RES,MFLM,1/4W 10K00, 1%	1
C016	A701534P6	CAP,TA,SOL 4U7 , 35V	1	R033	A701250P366	RES,MFLM,1/4W 47K5 , 1%	1
C017	A701534P6	CAP,TA,SOL 4U7 , 35V	1	R034	A701250P409	RES,MFLM,1/4W 121K , 1%	1
C018	A701534P6	CAP,TA,SOL 4U7 , 35V	1	R035	A701250P409	RES,MFLM,1/4W 121K , 1%	1
C019	J707412P9	CAP,PYES 100N , 10%	1	TP01	J710339P322	CONN,MALE 01-CKT	1
C020	J707412P9	CAP,PYES 100N , 10%	1	U001	J709355P2	IC,PROM,UV 27C256	1
C021	J707412P9	CAP,PYES 100N , 10%	1	U002	A700029P52	IC,DIG,REG 4094	1
C022	J707412P9	CAP,PYES 100N , 10%	1	U003	J711027P42	IC,DIG,BUFR ULN 2004	1
C023	J707412P9	CAP,PYES 100N , 10%	1	U004	A700029P15	IC,DIG,REG 4021	1
C024	J710339P74	CAP,POLY 1N0 ,160V	1	U005	A700029P52	IC,DIG,REG 4094	1
C025	J710339P75	CAP,POLY 2N2 ,100V	1	U006	A700029P38	IC,DIG,MUX 4053	1
C026	J707412P9	CAP,PYES 100N , 10%	1	U007	J711027P14	IC,MPU 8031	1
C027	J707412P9	CAP,PYES 100N , 10%	1	U008	J710339P131	IC,LIN,OP-AMP MC 3303	1
				U009	J711027P7	IC,FREQ,DIV 145146	1

## PARTS LIST FOR REPEATER PANEL CP9501 : J711404G1

Pos	Code No.	Description	Qt	Pos	Code No.	Description	Qt
U010	J711027P11	IC,OCTAL,LTH 74HC573	1				
U011	A700029P9	IC,DIG,FF-D 4013	1				
U012	J710339P129	IC,DIG,S-TRIG 74HC132	1				
U013	J711327P9	IC,DIG,DIV 4521	1				
U014	J711027P229	IC,DIG,CNTR 74HC4520	1				
U015	J710339P129	IC,DIG,S-TRIG 74HC132	1				
U016	J710339P131	IC,LIN,OP-AMP MC 3303	1				
U017	J711027P51	IC,FLTR MF 10	1				
W001	J711327P5	CONN,MALE 16-CKT	1				
W002	J711327P5	CONN,MALE 16-CKT	1				
W003	J711327P5	CONN,MALE 16-CKT	1				
W004	J711327P5	CONN,MALE 16-CKT	1				
W005	J711327P5	CONN,MALE 16-CKT	1				
W006	J711327P5	CONN,MALE 16-CKT	1				
W007	J711327P5	CONN,MALE 16-CKT	1				
W008	J711327P5	CONN,MALE 16-CKT	1				
Y001	J711027P17	CRYSTAL UNIT 11.059MHZ	1				
	J711327P2	PCB CP 9501	1				
	K806145P1	COMPONENT BOARD ASM					



# IU9103

## INTERFACE BOARD

### GENERAL

IU9103 is an interface board used to interface CP9101, CP9102 or CP9501 with the CQF9000 base station.

### FUNCTIONS

Channel number or division factors are set by inserting/removing straps W4-W19 (see note on schematic diagram).

In case of a synthesizer station the strap W20 should be inserted (see note on schematic diagram).

A potentiometer, R3, is provided for level adjustment when the non-deemphased RX-output (OUT "B") is used. This is the case of the CP9101 and CP9102 installations where strap W2 should be inserted.

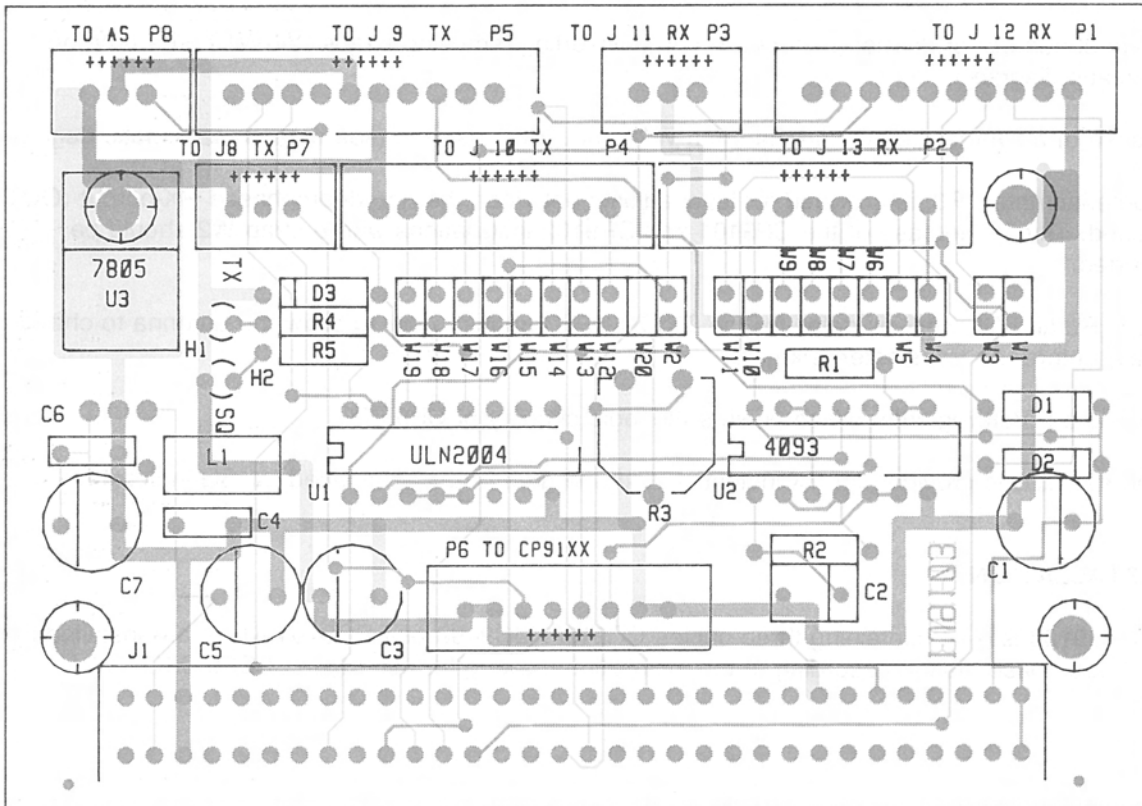
U2.1, R2 and C2 work as delay for the TX/ON/OFF signal in order to allow the antenna to change relay, before the transmitter is keyed.

U3.1 is a 5 Volt regulator which powers the logic circuitry of CP9XXX.

One red LED is provided for TX indication and one green LED is provided for SQ indication.

### INSTALLATION

The IU9103 is a kit containing three cables CC9102, CC9103 and CC9104 which are installed in the CQF9000 base station according to the installation drawing for each type of CP9XXX.



INTERFACE UNIT BOARD IU9103  
 COMPONENT LAYOUT

D405.182

CODE NO.J711185G1 REV.A

DOC. ISSUE 07.20.89

TO CP 9XXX a 1 - a 32

+ 5 V GROUND  
SQ  
RX AF  
TX MOD  
CTRL " A "  
GATE " B "  
OUT " B "  
OUT " C "  
+ 9 V CONT

c 1 - c 32

+ 5 V GROUND  
\* PTT  
+ 12 V  
CG MOD  
+ 9 V RX  
+ 9 V CONT

OPTION SQ CONTROL STRAPS  
NORMALLY INSTALLED

USED WITH CP9101 OR CP9102:  
STRAP FOR NO DEEMPHASIS ON RX  
BY INSERTING W2 AND ADJUST R3  
FOR CORRECT AF RX LEVEL.  
SPECIAL CABLES CC9102 AND CC  
9103 SHOULD BE USED. SEE INSTAL-  
LATION DRAWING.  
USED WITH CP9501:  
REMOVE STRAP WHEN CP9501 IS  
USED.  
SPECIAL CABLES CC9102, CC9103  
AND CC9104 SHOULD BE USED. SEE  
INSTALLATION DRAWING.

NOTE: IN CASE OF SYNTH BASE STATION CUT ALL STRAPS  
OF RX AND TX DIVISION FACTORS WITCH ARE "1" AS  
"CALCULATED BITS" USING THE STORNO BASIC RADIO  
MANUAL CQF9000 SECTION 60.935-E1.  
NOTE: IN CASE OF SYNTH BASE STATION STRAP W20.  
PCB: S BEFORE REV A ON SOLDER SIDE.

TO J 12 RX  
RX GND  
9 V RX  
CONTROL "A"  
GATE "B"  
SQ OUT  
OUT "B"  
OUT "C"

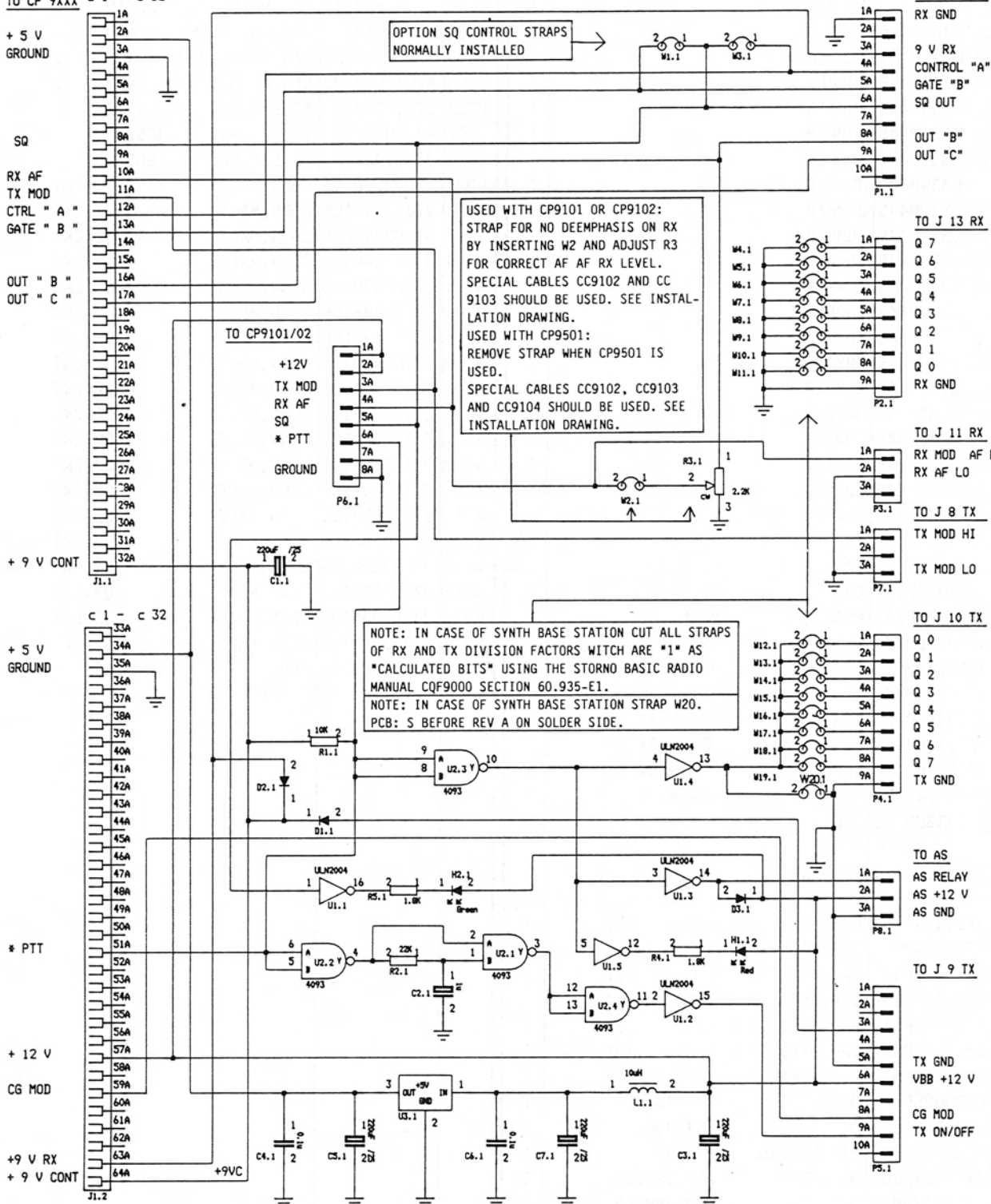
TO J 13 RX  
Q 7  
Q 6  
Q 5  
Q 4  
Q 3  
Q 2  
Q 1  
Q 0  
RX GND

TO J 11 RX  
RX MOD AF HI  
RX AF LO  
TO J 8 TX  
TX MOD HI  
TX MOD LO

TO J 10 RX  
Q 0  
Q 1  
Q 2  
Q 3  
Q 4  
Q 5  
Q 6  
Q 7  
TX GND

TO AS  
AS RELAY  
AS +12 V  
AS GND

TO J 9 TX  
TX GND  
VBB +12 V  
CG MOD  
TX ON/OFF



INTERFACE UNIT BOARD IU9103  
CODE NO.J711185G1 REV.A

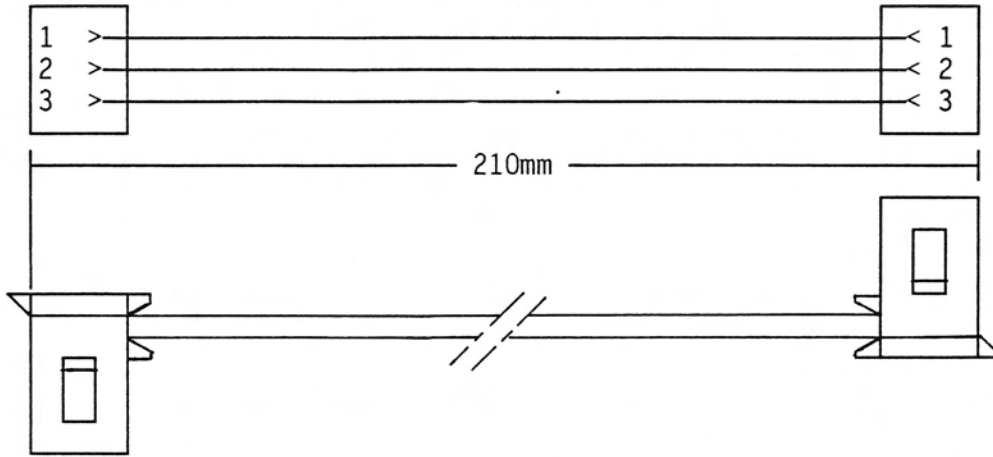
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## PARTS LIST FOR INTERFACE BOARD IU9103 : J711376G1

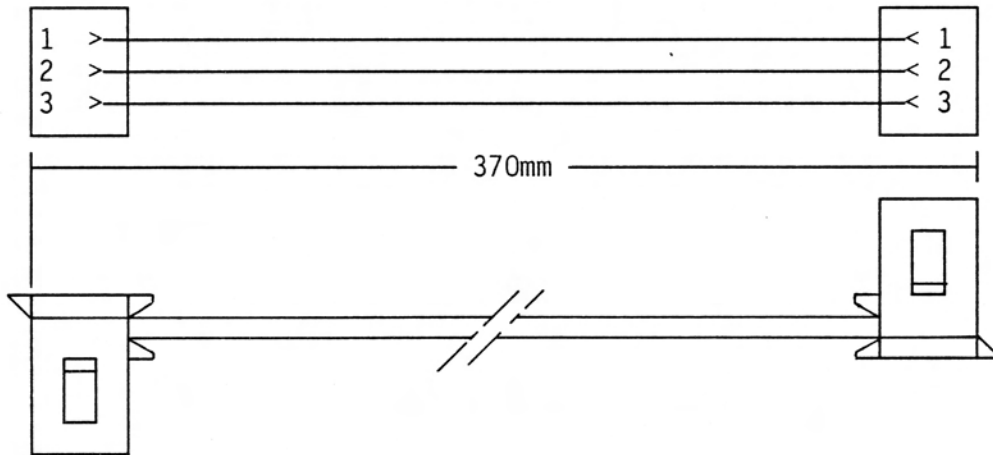
Pos	Code No.	Description	Qt	Pos	Code No.	Description	Qt
A001	J711448G1	IU 9103 KIT	1	P008	J708068P3	CONN,PWB,MALE RECP,03-CKT	1
-----	-----	-----	-----	R001	A701250P301	RES,MFLM,1/4W 10K00, 1%	1
A001	J711185G1	IU 9103	1	R002	A701250P334	RES,MFLM,1/4W 22K10, 1%	1
W001	J710339P445	JUMPER	1	R003	J706008P3	RES,VAR,CERM 2K2, 20%	1
W002	J710339P445	JUMPER	1	R004	A701250P226	RES,MFLM,1/4W 1K82, 1%	1
W003	J710339P445	JUMPER	1	R005	A701250P226	RES,MFLM,1/4W 1K82, 1%	1
W004	J710339P445	JUMPER	1	U001	J711027P42	IC,DIG,BUFR ULN 2004	1
W005	J710339P445	JUMPER	1	U002	A700029P38	IC,DIG,MUX 4053	1
W006	J710339P445	JUMPER	1	U003	J706032P1	IC,LIN,VR,FIX 7805	1
W007	J710339P445	JUMPER	1	W001	J710339P106	CONN,MALE 02-CKT	1
W008	J710339P445	JUMPER	1	W002	J710339P106	CONN,MALE 02-CKT	1
W009	J710339P445	JUMPER	1	W003	J710339P106	CONN,MALE 02-CKT	1
W010	J710339P445	JUMPER	1	W004	J710339P106	CONN,MALE 02-CKT	1
W011	J710339P445	JUMPER	1	W005	J710339P106	CONN,MALE 02-CKT	1
W012	J710339P445	JUMPER	1	W006	J710339P106	CONN,MALE 02-CKT	1
W013	J710339P445	JUMPER	1	W007	J710339P106	CONN,MALE 02-CKT	1
W014	J710339P445	JUMPER	1	W008	J710339P106	CONN,MALE 02-CKT	1
W015	J710339P445	JUMPER	1	W009	J710339P106	CONN,MALE 02-CKT	1
W016	J710339P445	JUMPER	1	W010	J710339P106	CONN,MALE 02-CKT	1
W017	J710339P445	JUMPER	1	W011	J710339P106	CONN,MALE 02-CKT	1
W018	J710339P445	JUMPER	1	W012	J710339P106	CONN,MALE 02-CKT	1
W019	J710339P445	JUMPER	1	W013	J710339P106	CONN,MALE 02-CKT	1
W020	J710339P445	JUMPER	1	W014	J710339P106	CONN,MALE 02-CKT	1
0003	J711027P151	CABLE CC 9102	1	W015	J710339P106	CONN,MALE 02-CKT	1
0004	J711027P152	CABLE CC 9103	1	W016	J710339P106	CONN,MALE 02-CKT	1
0005	J711027P153	CABLE CC 9104	1	W017	J710339P106	CONN,MALE 02-CKT	1
0005	J711027P155	PLATE,AL MOUNTING	1	W018	J710339P106	CONN,MALE 02-CKT	1
0006	J710339P321	SCR MRX M-3X 6	1	W019	J710339P106	CONN,MALE 02-CKT	1
0007	J710339P321	SCR MRX M-3X 6	8		J711027P95	PCB IU 9103	1
0008	J710339P321	SCR MRX M-3X 6	1				
0009	J710339P321	SCR MRX M-3X 6	1				
0010	J710339P321	SCR MRX M-3X 6	1				
0011	J710339P321	SCR MRX M-3X 6	1				
0012	J710339P321	SCR MRX M-3X 6	1				
0013	J710339P321	SCR MRX M-3X 6	1				
A001	J711185G1	IU 9103	1				
-----	-----	-----	-----				
C001	J710339P51	CAP,ELECT 220U 25V	1				
C002	A701534P4	CAP,TA,SOL 1U , 35V	1				
C003	J710339P51	CAP,ELECT 220U 25V	1				
C004	J707412P9	CAP,PYES 100N , 10%	1				
C005	J710339P51	CAP,ELECT 220U 25V	1				
C006	J707412P9	CAP,PYES 100N , 10%	1				
C007	J710339P51	CAP,ELECT 220U 25V	1				
D001	A700028P1	DIO,SI,SIG 1N4148	1				
D002	A700028P1	DIO,SI,SIG 1N4148	1				
D003	A700028P1	DIO,SI,SIG 1N4148	1				
H001	J711027P90	DIO,OPTO LED,3MM,RD	1				
H002	J711027P91	DIO,OPTO LED,3MM,GN	1				
J001	J711027P31	CONN,FEM 64-CKT	1				
L001	J711027P92	COIL 10UH	1				
P001	J708068P10	CONN,PWB,MALE RECP,10-CKT	1				
P002	J708068P9	CONN,PWB,MALE RECP,09-CKT	1				
P003	J708068P3	CONN,PWB,MALE RECP,03-CKT	1				
P004	J708068P9	CONN,PWB,MALE RECP,09-CKT	1				
P005	J708068P10	CONN,PWB,MALE RECP,10-CKT	1				
P006	J708068P8	CONN,PWB,MALE RECP,08-CKT	1				
P007	J708068P3	CONN,PWB,MALE RECP,03-CKT	1				



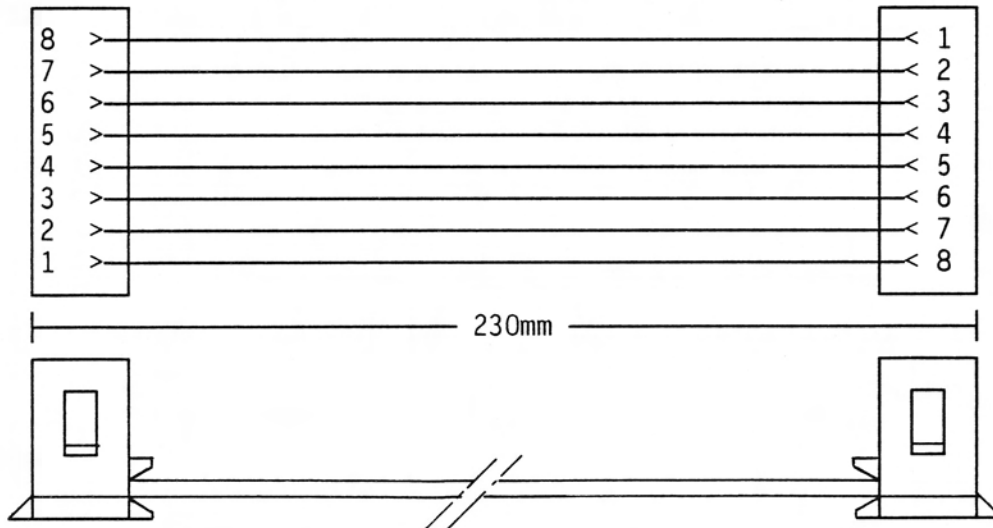
CC9102 : From P3 on IU9103 to J11 on CQF9000



CC9103 : From P7 on IU9103 to J8 on CQF9000



CC9104 : From P6 on IU9103 to P2 on CP9101/02 (IU9103-CP9501).  
From P4 on CP9501 to P2 on CP9101/02 (IU9103-CP9501-CP9101/02).



IU9103 CABLES : CC9102, CC9103, CC9104

REV.A

M405.676

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3

# CC9501

## INTERCONNECT CABLE

The interconnect cable CC9501 is used in a back-to-back repeater system for connecting two CQF9000 base stations with a repeater panel CP9501 mounted in both.

The CC9501 consists of a 1.4 m 10 lead multicable, 2 pcs female 34 position connectors, 2 connector housings, 4 couplings, 4 gaskets, 4 washers and 4 screws for mounting on the radio and the Control Panel.

**BASE STATION 1**

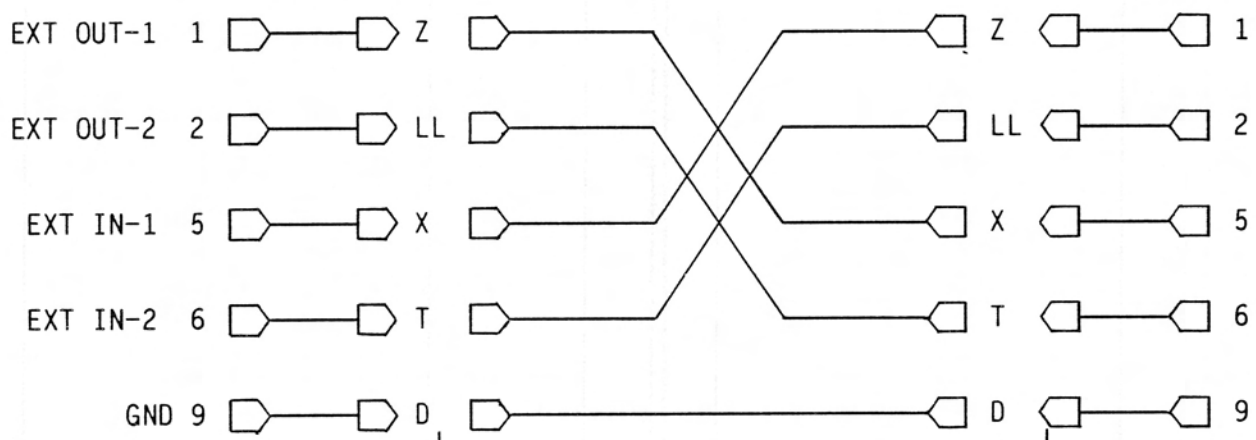
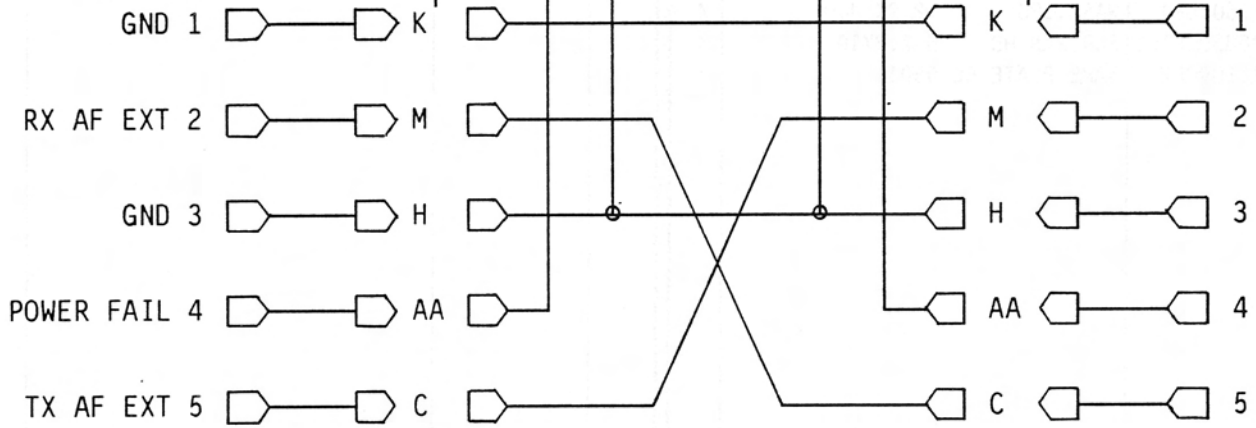
**BASE STATION 2**

POWER FAIL CONTACT

POWER FAIL CONTACT

**CP9501**

**CP9501**



**CC9501**

CABLE BETWEEN TWO CQF9000 WITH CP9501

REV.A

M405.678

MECHANICAL PARTS LIST FOR CABLE KIT CC9501 : L856236G1

Pos	Code No.	Description	Qt	Pos	Code No.	Description	Qt
1	L855822P2	CONNECTOR HOUSE	2				
2	J706566P27	CONN,FEM 34-CKT	1				
3	J706566P27	CONN,FEM 34-CKT	1				
4	J709976P1	GUIDE CODE	2				
5	J706285P1	LOCKING RING	4				
6	J709979P1	SCR,SOC HD M-4.0X18.0	4				
7	J708149P210	CABLE,MULTI 10-COND	1				
8	J708563P1	WASHER	4				
9	J708562P1	COUPLING THREAD CABLE	4				
10	J708566P1	GASKET	2				
11	J709052P1	GASKET,PLSTC CONICAL	2				
12	J706076P4	WASH,SPG 2.7X 4.9	4				
13	J708300P105	SCR,PAN HD D-2.2X10	4				
14	J711090P2	NAME PLATE CC 9501	1				



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4

# CODING OF CP9501

The CP9501 has the possibility to work in different modes and to start/stop communication on different criterias coded through 8 select lines and a strap field area configured as an 8 x 14 matrix.

The select lines are called SELECT 1 to 8 (W1 - W8). Each select line can be strapped to digits 0 - 13.

The function of each select line coding is described below:

## CODING MATRIX

First tone or single tone freq	W1																
Second tone frequency	W2																
Third tone frequency	W3																
Fourth tone frequency	W4																
Fifth tone frequency	W5																
Tone system: Receiver start: Clear down:	W6			NONE car- rier start	EEA 5 tone 200ms	EEA 4 tone 200ms	EEA 1 tone /400ms 800ms	EEA 1 tone /200ms 400ms	CCIR 5 tone 500ms	CCIR 4 tone 500ms	CCIR 1 tone /1.0 s 2.0 s	CCIR 1 tone /500ms 1.0 s	ZVEI 5 tone 500ms	ZVEI 4 tone 500ms	ZVEI 1 tone /700ms 1.4 s	ZVEI 1 tone /350ms 700ms	
SDT: CCT:	W7				14.0 s 3.6 mn	10.5 s 3.6 mn	7.0 s 3.6 mn	3.5 s 3.6 mn	14.0 s 2.4 mn	10.5 s 2.4 mn	7.0 s 2.4 mn	3.5 s 2.4 mn	14.0 s 1.2 mn	10.5 s 1.2 mn	7.0 s 1.2 mn	3.5 s 1.2 mn	
RBT: Contin. mode: Local traffic: Configuration:	W8											0.0 s Yes No D	10.0 s No Yes A,B,C	0.0 s No Yes A,B,C	10.0 s No No D	0.0 s No No D	
		SELECT LINE	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

SEE FREQUENCY TABLE

SDT: Carrier delay timer  
CCT: Carrier control timer  
RBT: Repeater Block timer

### SELECT 1 - 5

The SELECT 1 - 5 lines control the ID of the CP9501 tone receiver and each select line can be coded to one of 14 tones in the currently used tone system. In case of a four/five tone sequence the ID is coded as it is actually received. No automatic repeat tone is inserted so 1 1 1 1 has to be coded 1 R 1 R 1 and 1 1 1 1 has to be coded 1 R 1 R, where R is the digit of the used repeat tone of the tone system used. Note that, in case of four tones, the SELECT 5 line can be coded to anything as the unit will be indifferent to this coding.

In case of a single tone ID only the SELECT 1 line is coded to the digit of the used tone system, and the unit will not care about the SELECT 2 - 5 lines, no matter what coding they may have.

If no tone system is chosen (setting 12), communication is terminated either by the carrier delay timer (SDT) or by maximum conversation time (CCT).



## CODING OF CP9501

If a tone system is chosen, communication may also be terminated by the detection of a clear-down tone from mobiles. The clear-down tone is the tone chosen by the SELECT 1 setting, the same as the first tone of the initiating call.

The frequencies of the tone system are the following:

Digit	ZVEI	CCIR	EEA
0	2400	1981	1981
1	1060	1124	1124
2	1160	1197	1197
3	1270	1275	1275
4	1400	1358	1358
5	1530	1446	1446
6	1670	1540	1540
7	1830	1640	1640
8	2000	1747	1747
9	2200	1860	1860
10	2800	2400	2400
11	970	1055	1055
12	885	2247	2247
13	2600	2110	2110

### SELECT 6

The SELECT 6 line controls the start requirement of the repeater panel CP9501 and tone system.

The list below represents possible combinations:

Select 6 value	Tone system	Tone receiver start	Carrier start	Clear-down
0	ZVEI	yes 1 tone 350 ms	no	700 ms
1	ZVEI	yes 1 tone 700 ms	no	1400 ms
2	ZVEI	yes 4 tone	no	500 ms
3	ZVEI	yes 5 tone	no	500 ms
4	CCIR	yes 1 tone 500 ms	no	1000 ms
5	CCIR	yes 1 tone 1000 ms	no	2000 ms
6	CCIR	yes 4 tone	no	500 ms
7	CCIR	yes 5 tone	no	500 ms
8	EEA	yes 1 tone 200 ms	no	400 ms
9	EEA	yes 1 tone 400 ms	no	800 ms
10	EEA	yes 4 tone	no	200 ms
11	EEA	yes 5 tone	no	200 ms
12	none	none	yes	none

**SELECT 7**

The SELECT 7 line controls the values of the carrier delay timer (SDT) and carrier control timer (CCT).

The list below represents possible combinations:

SELECT 7 value	SDT time	CCT time
0	3.5 sek.	1.2 min.
1	7.0 sek.	1.2 min.
2	10.5 sek.	1.2 min.
3	14.0 sek.	1.2 min.
4	3.5 sek.	2.4 min.
5	7.0 sek.	2.4 min.
6	10.5 sek.	2.4 min.
7	14.0 sek.	2.4 min.
8	3.5 sek.	3.6 min.
9	7.0 sek.	3.6 min.
10	10.5 sek.	3.6 min.
11	14.0 sek.	3.6 min.

**SELECT 8**

The SELECT 8 line controls the values of the repeater block timer (RBT) and operation modes. To enable mobile to mobile traffic over the base, "Local traffic" has to be "Yes".

The list below represents possible combinations:

SELECT 8 value	RBT time	Continuous mode	Local traffic	Configuration
0	0.0 sek.	No	No	D
1	10.0 sek.	No	No	D
2	0.0 sek.	No	Yes	A,B,C
3	10.0 sek.	No	Yes	A,B,C
4	0.0 sek.	Yes	No	D

# CODING OF CP9501

## CODING FIELD LAYOUT

This is the layout of the coding field on CP9501 printed circuit board coded to:

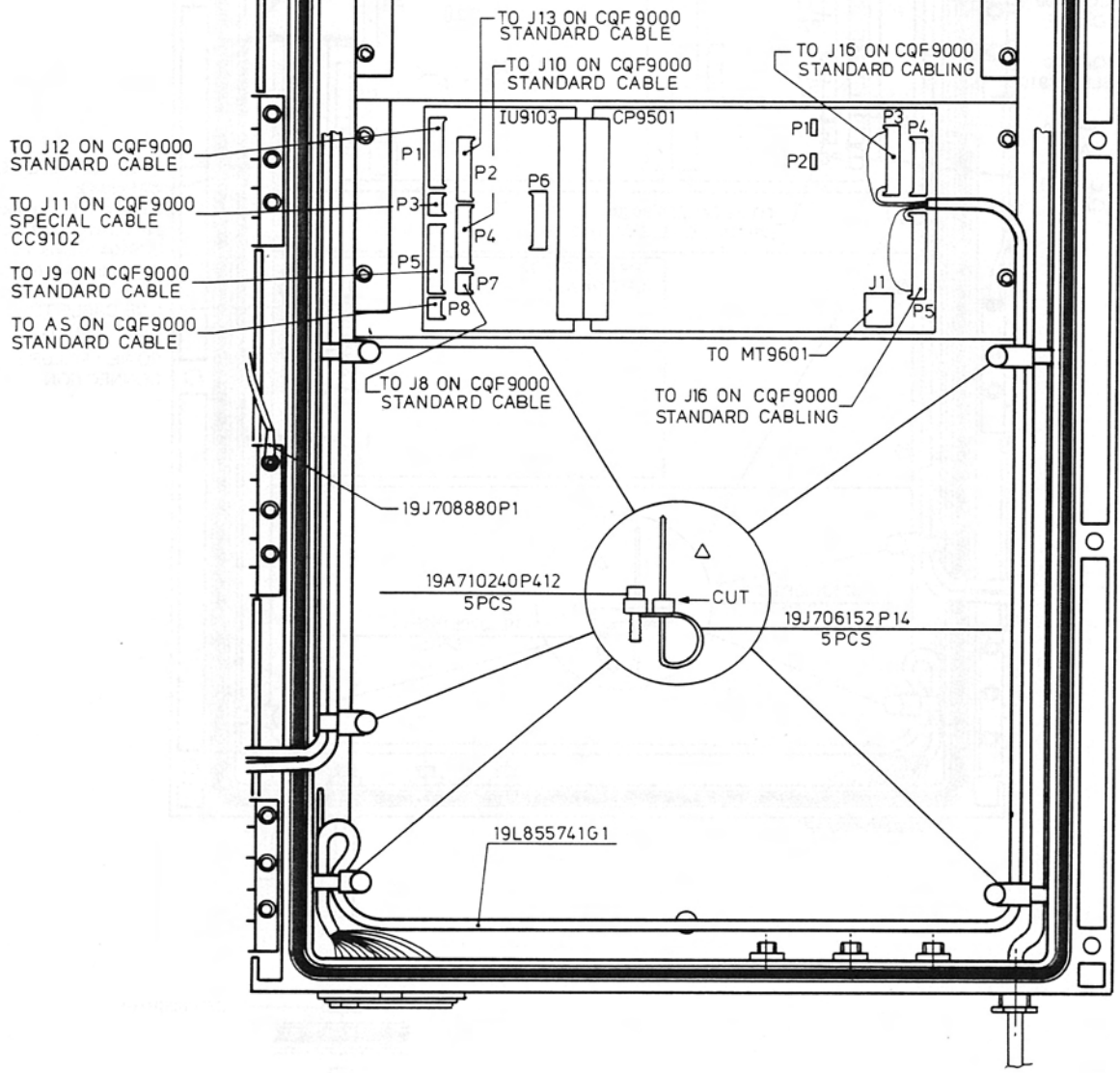
- start on 5 tone sequence 1,2,3,4,5 1 = 1060, 2 = 1160, 3 = 1270, 4 = 1400, 5 = 1530
- ZVEI tone system
- SDT = 7.0 sek., CCT = 1.2 min.
- RBT = 0.0 sek., no continuous mode, local traffic, config. A,B,C.

First tone or single tone freq	W1	[Line with circle at position 1]															
Second tone frequency	W2	[Line with circle at position 2]															
Third tone frequency	W3	[Line with circle at position 3]															
Fourth tone frequency	W4	[Line with circle at position 4]															
Fifth tone frequency	W5	[Line with circle at position 5]															
Tone system: Receiver start: Clear down:	W6		NONE car- rier start	EEA 5 tone 200ms	EEA 4 tone 200ms	EEA 1 tone /400ms 800ms	EEA 1 tone /200ms 400ms	CCIR 5 tone 500ms	CCIR 4 tone 500ms	CCIR 1 tone /1.0 s 2.0 s	CCIR 1 tone /500ms 1.0 s	ZVEI 5 tone 500ms	ZVEI 4 tone 500ms	ZVEI 1 tone /700ms 1.4 s	ZVEI 1 tone /350ms 700ms		
SDT: CCT:	W7		14.0 s 3.6 mn	10.5 s 3.6 mn	7.0 s 3.6 mn	3.5 s 3.6 mn	14.0 s 2.4 mn	10.5 s 2.4 mn	7.0 s 2.4 mn	3.5 s 2.4 mn	14.0 s 1.2 mn	10.5 s 1.2 mn	7.0 s 1.2 mn	3.5 s 1.2 mn			
RBT: Contin. mode: Local traffic: Configuration:	W8										0.0 s Yes No D	10.0 s No Yes A,B,C	0.0 s No Yes A,B,C	10.0 s No No D	0.0 s No No D		
		SELECT LINE	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

SDT: Carrier delay timer  
CCT: Carrier control timer  
RBT: Repeater Block timer

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5



**MOUNTING INSTRUCTION**  
**IU9103 - CP9501 IN CQF9000**

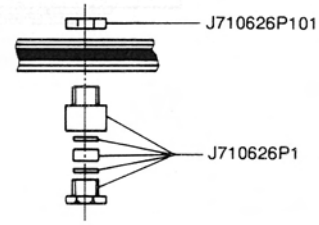
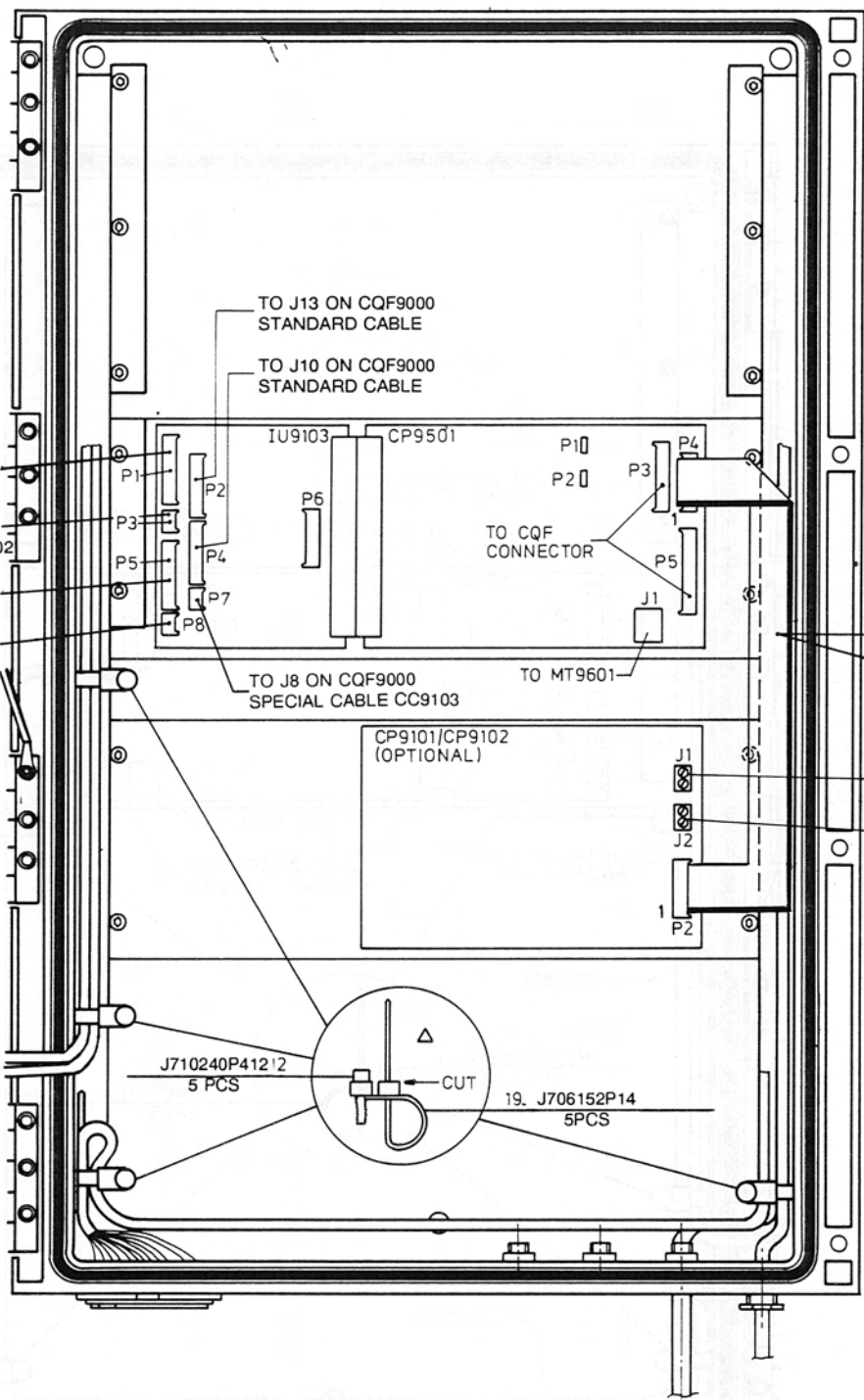
**M405.693**

TO J12 ON CQF9000  
STANDARD CABLE

TO J11 ON CQF9000  
SPECIAL CABLE CC9102

TO J9 ON CQF9000  
STANDARD CABLE

TO AS ON CQF9000  
STANDARD CABLE



**MOUNTING INSTRUCTION**  
IU9103 - CP9501 - CP9101/02 IN CQF9000

M405.694