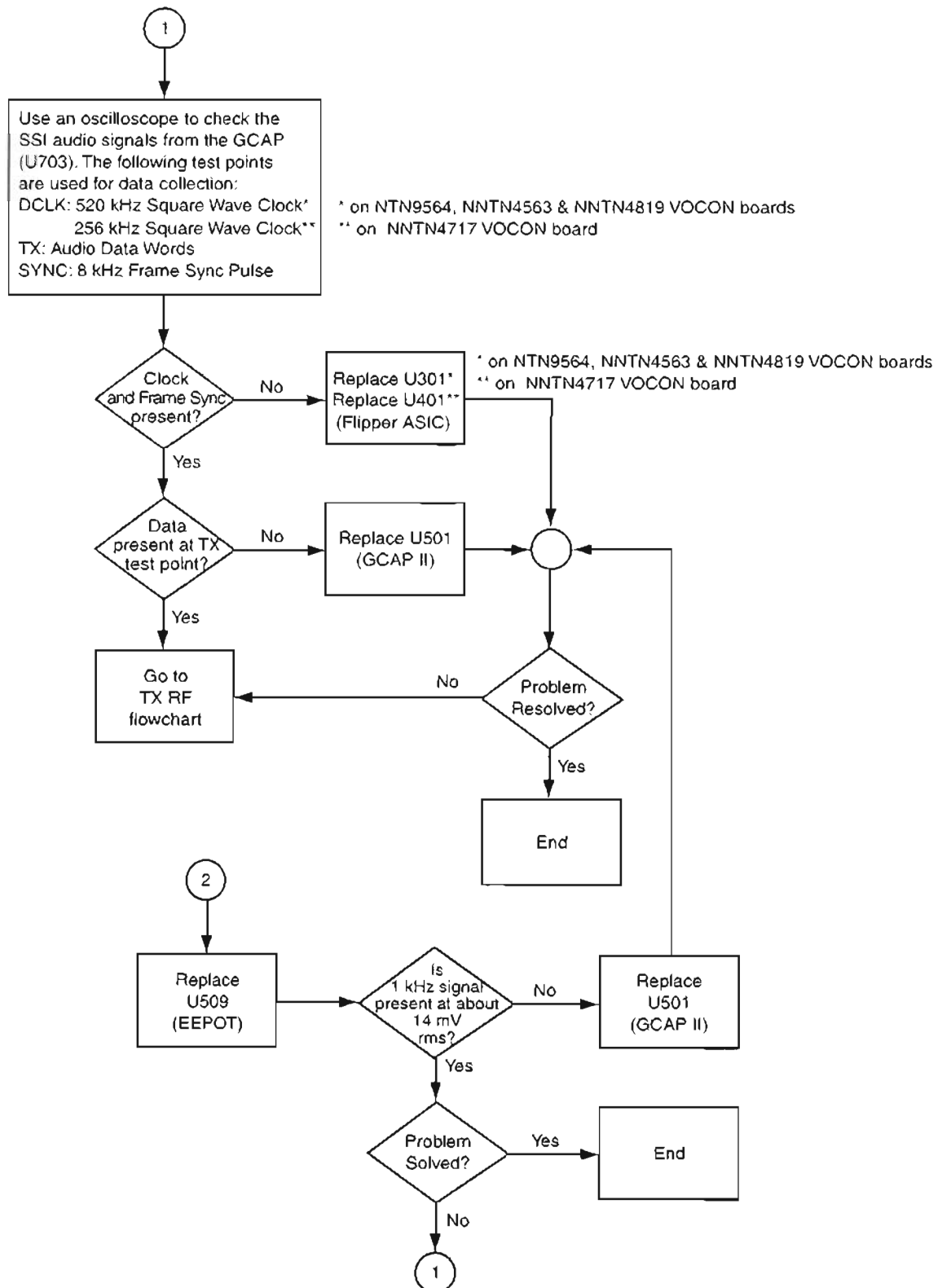
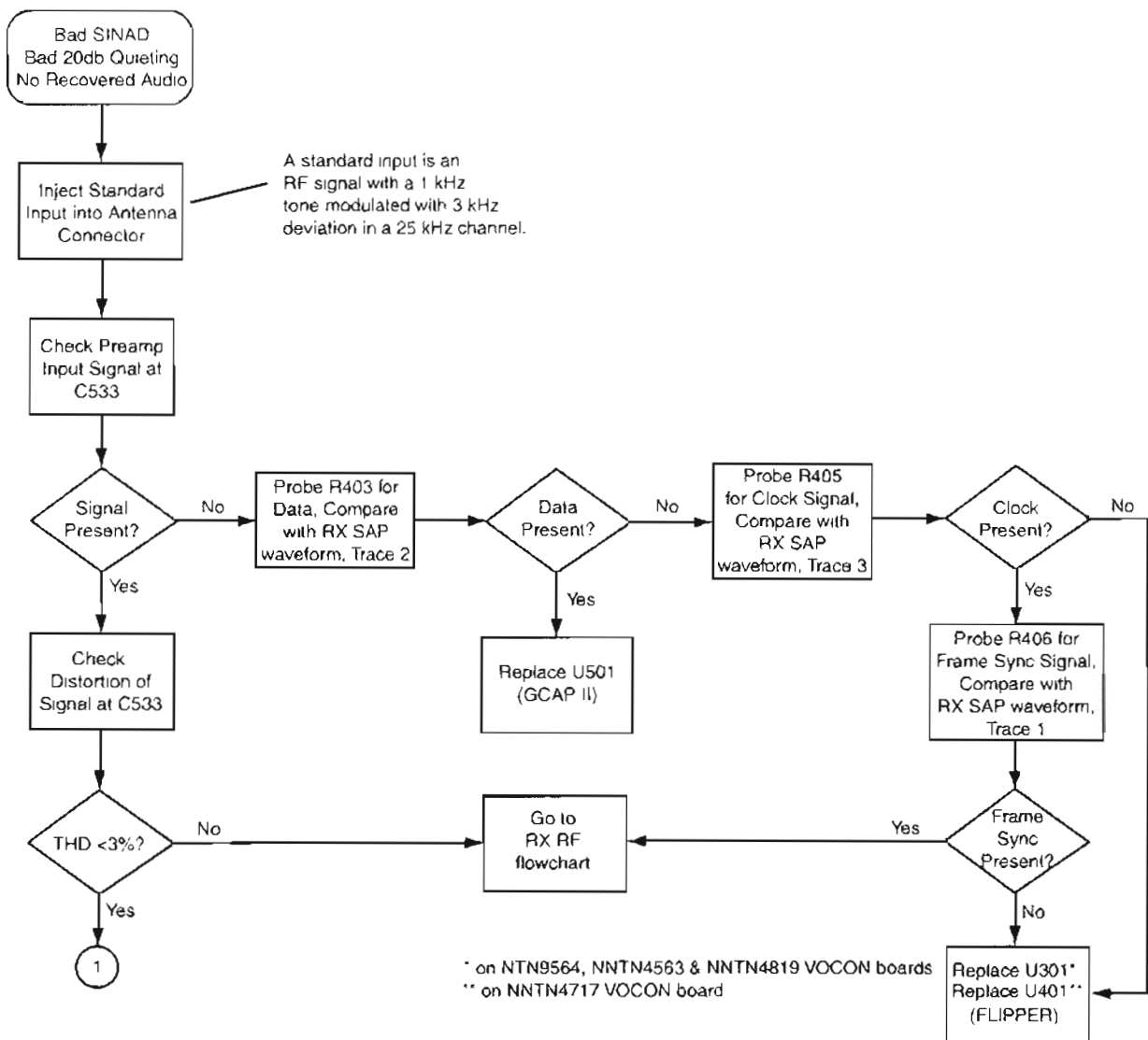


VOCON TX Audio—Page 2



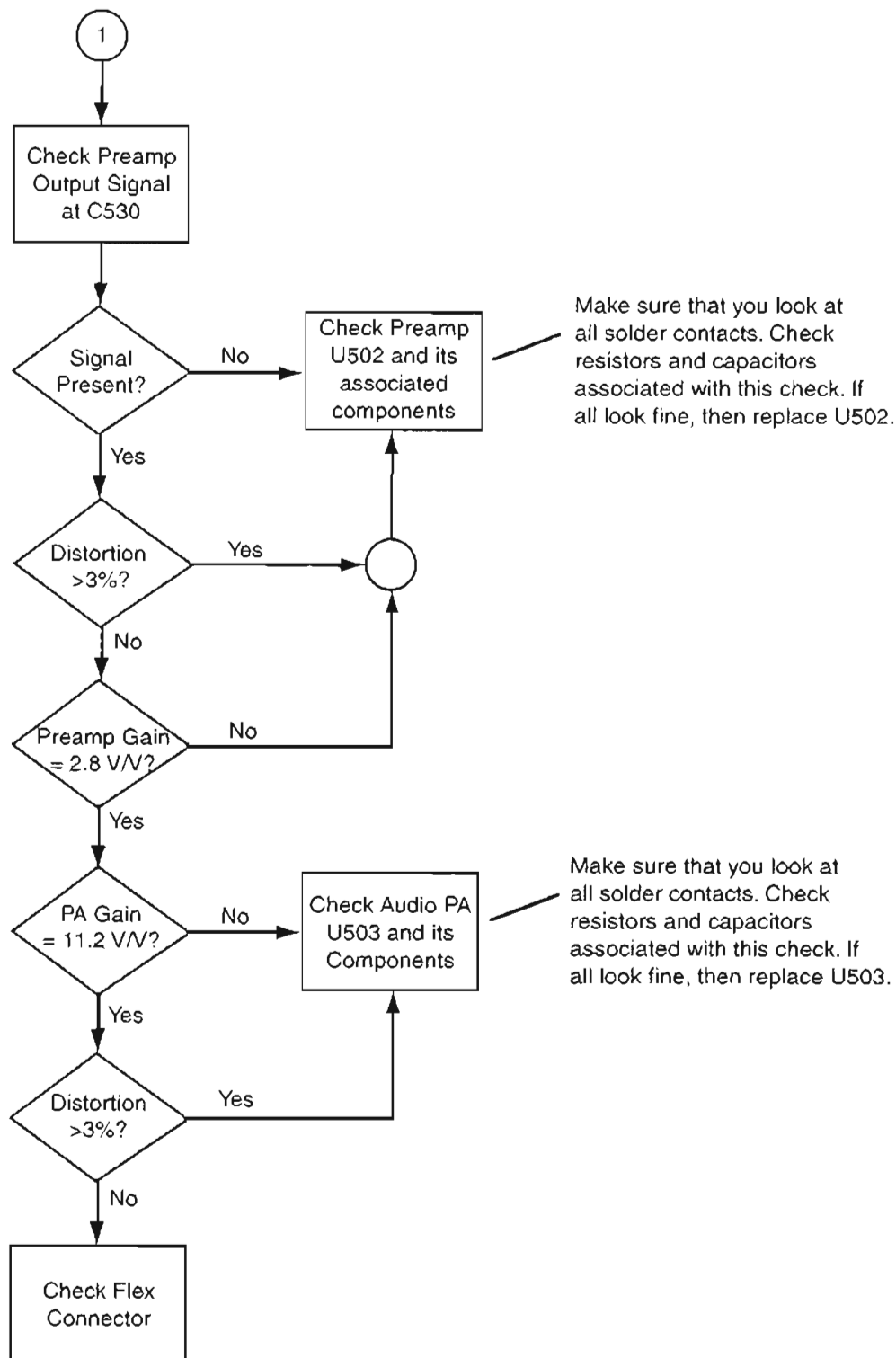
MAEPF-27397-A

5.13 VOCON RX Audio—Page 1



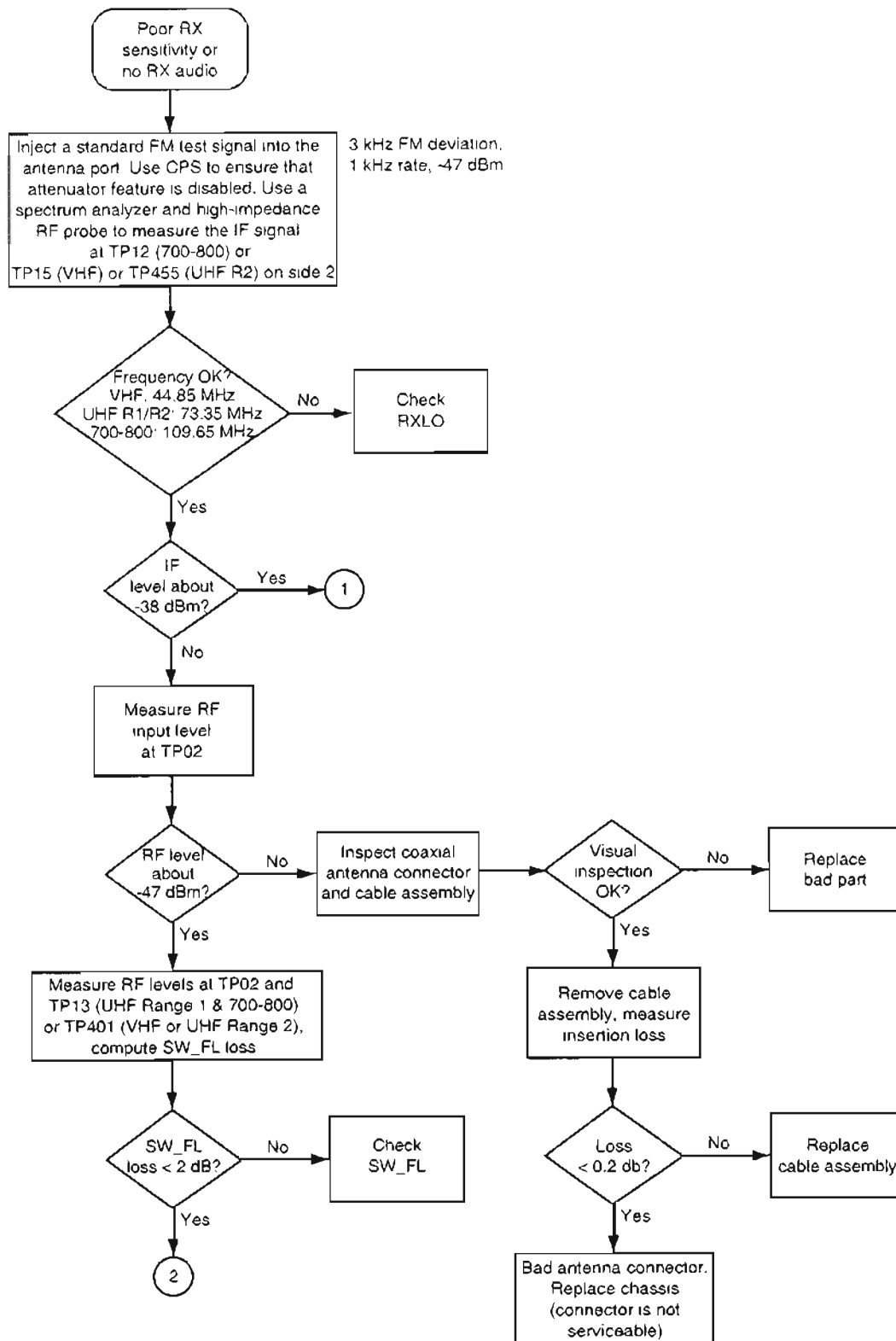
MAEPF-27394-A

VOCON RX Audio—Page 2



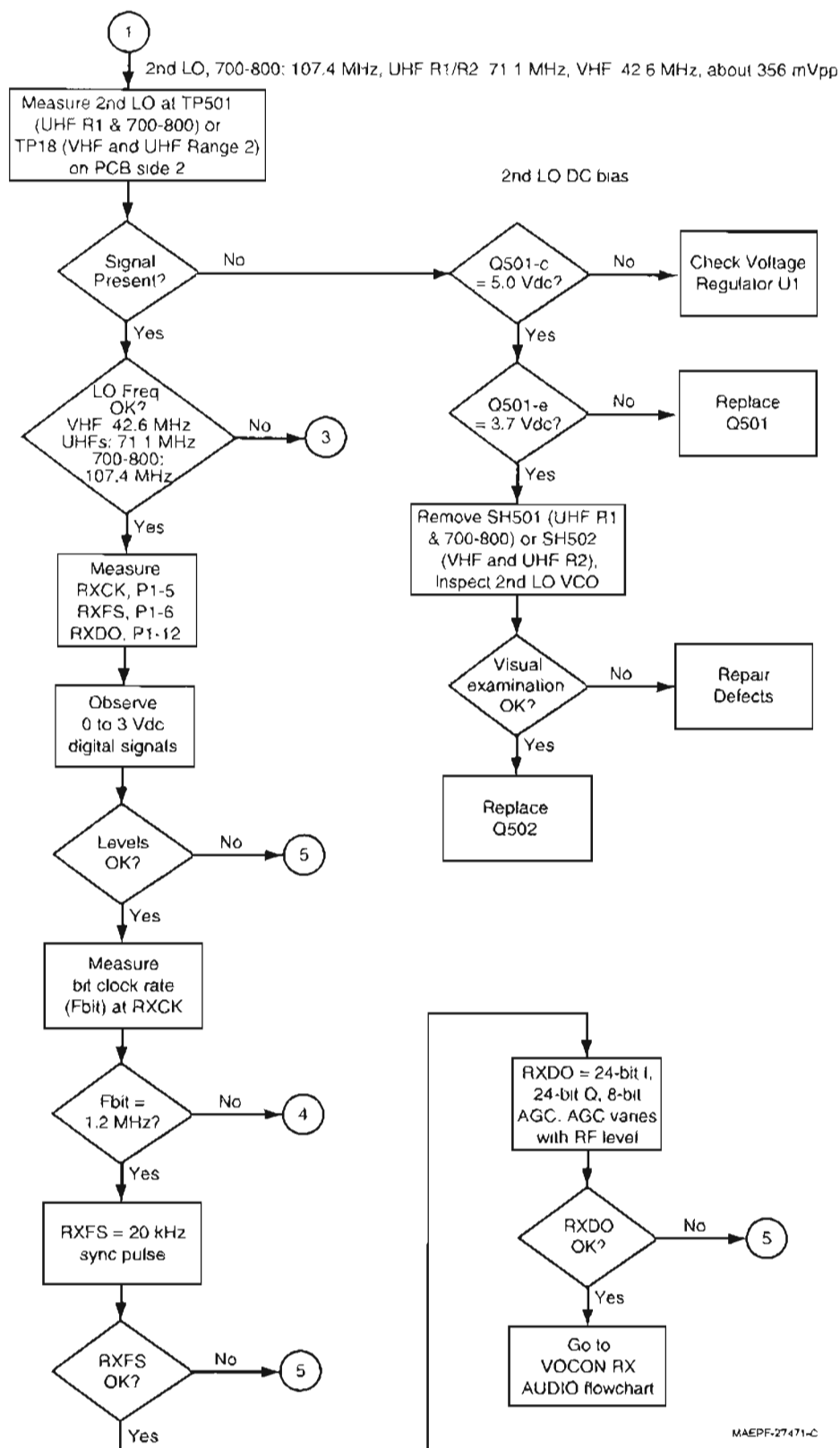
MAEPF-27395-O

5.14 RX RF—Page 1

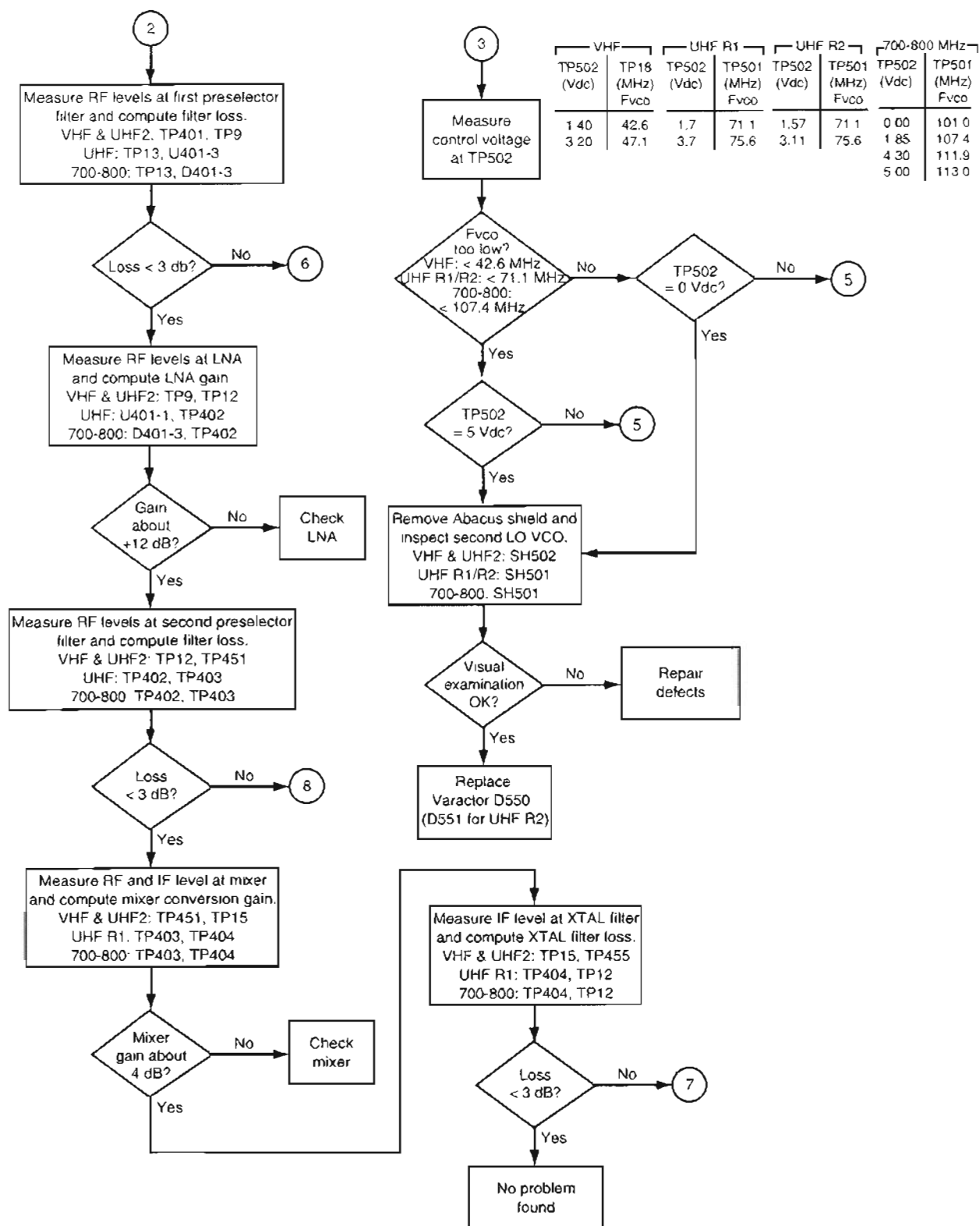


MAEPF 27470-C

RX RF—Page 2

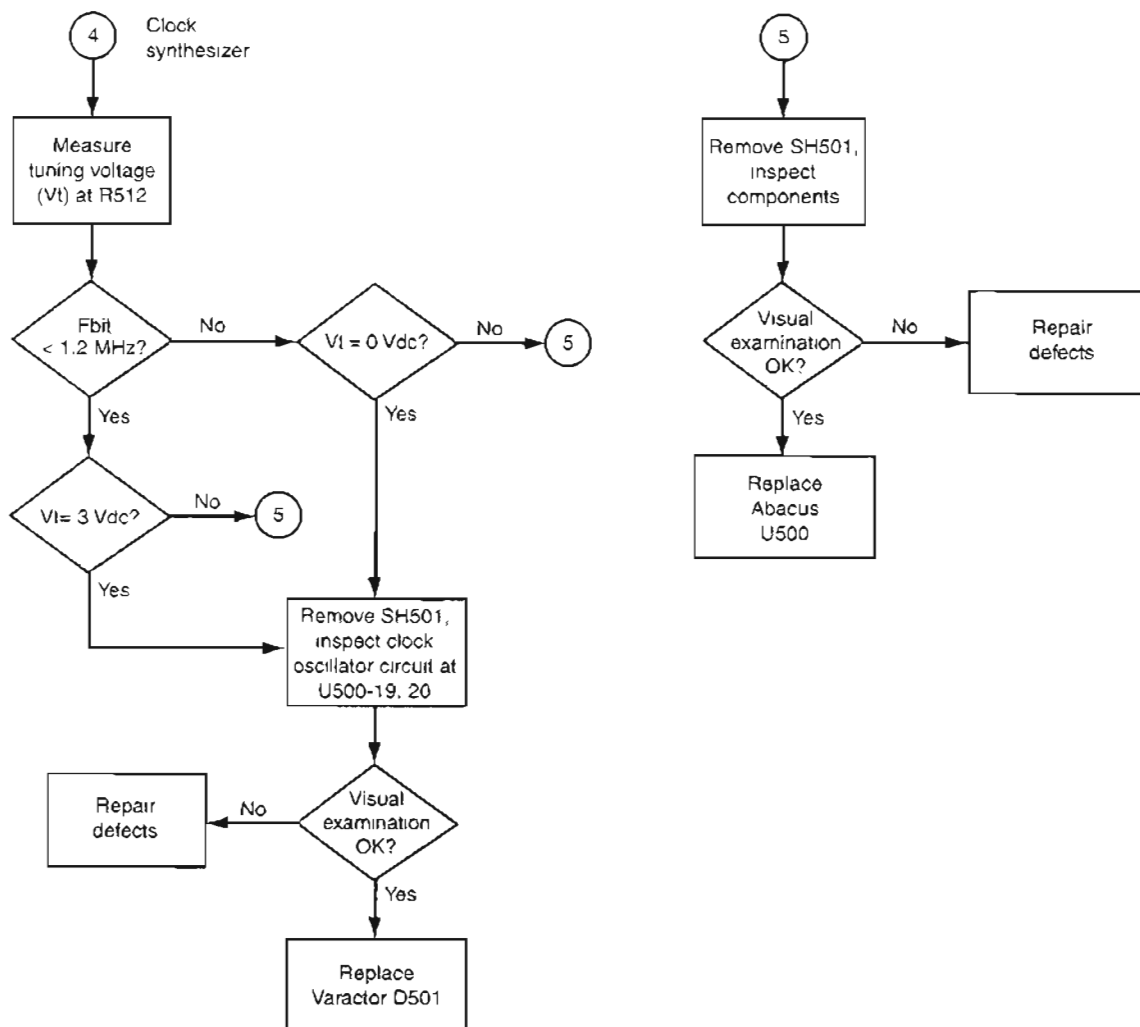


RX RF—Page 3



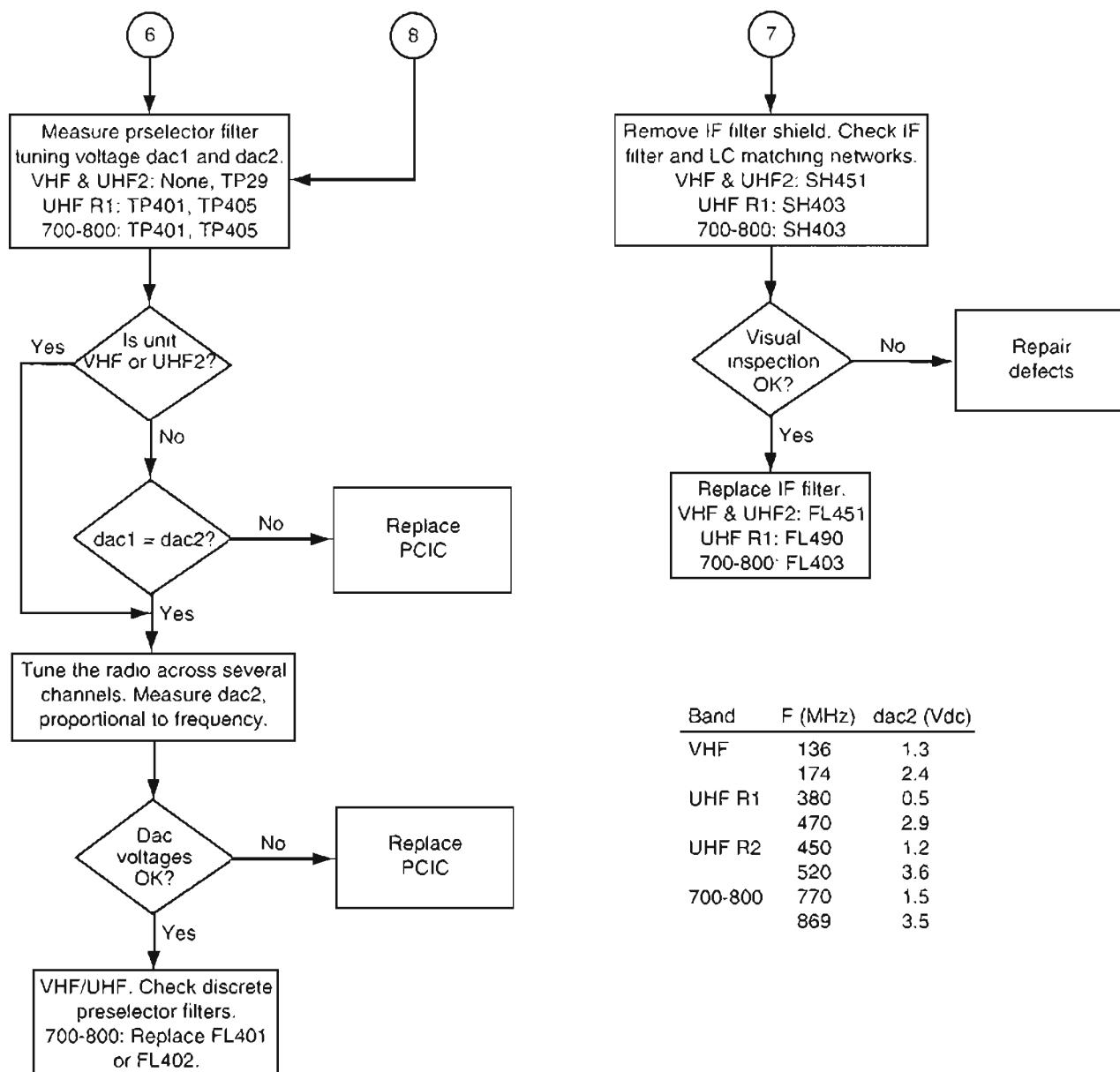
MAEPF-27472-C

RX RF—Page 4



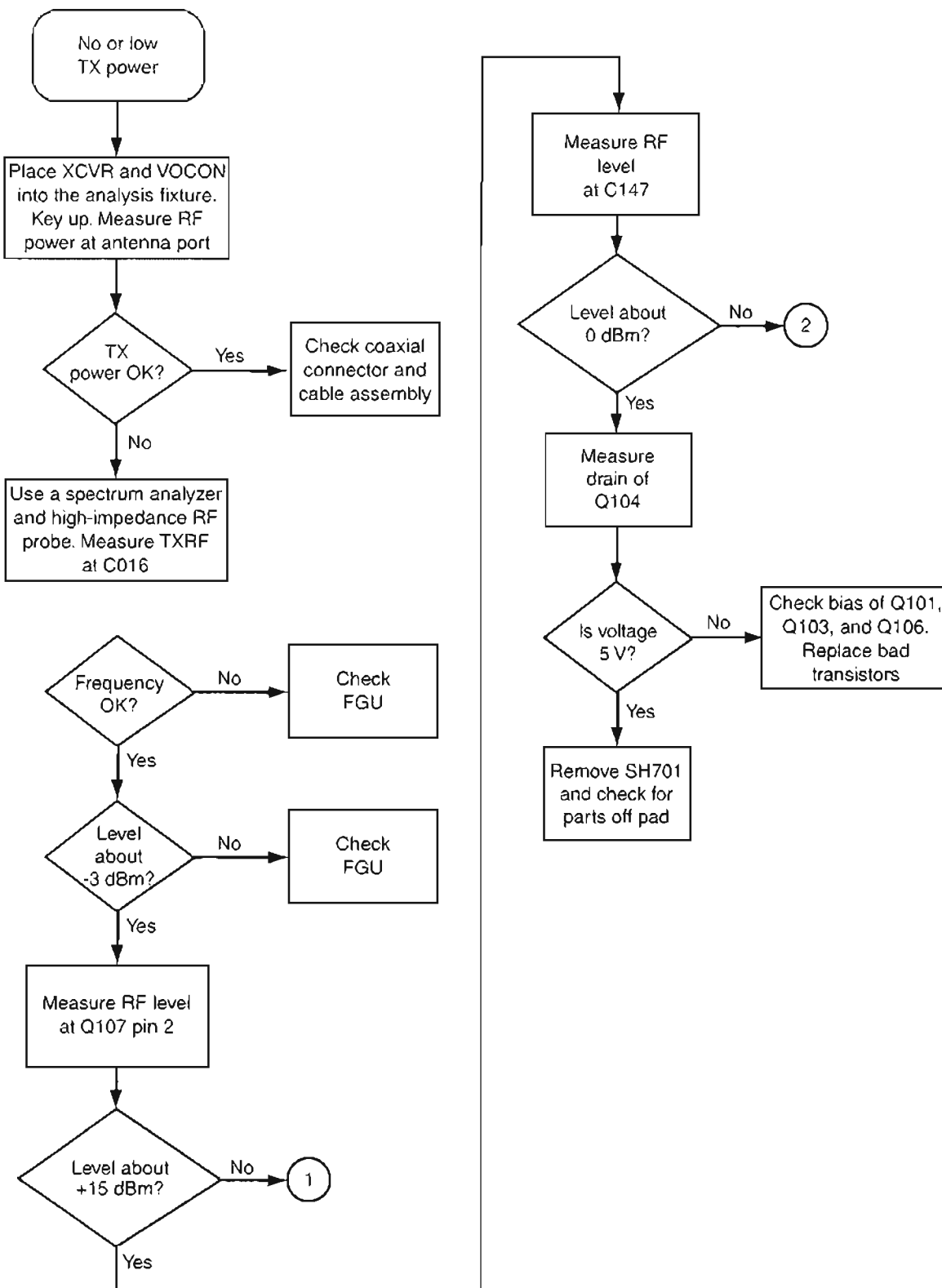
MAEPF-27473-0

RX RF—Page 5



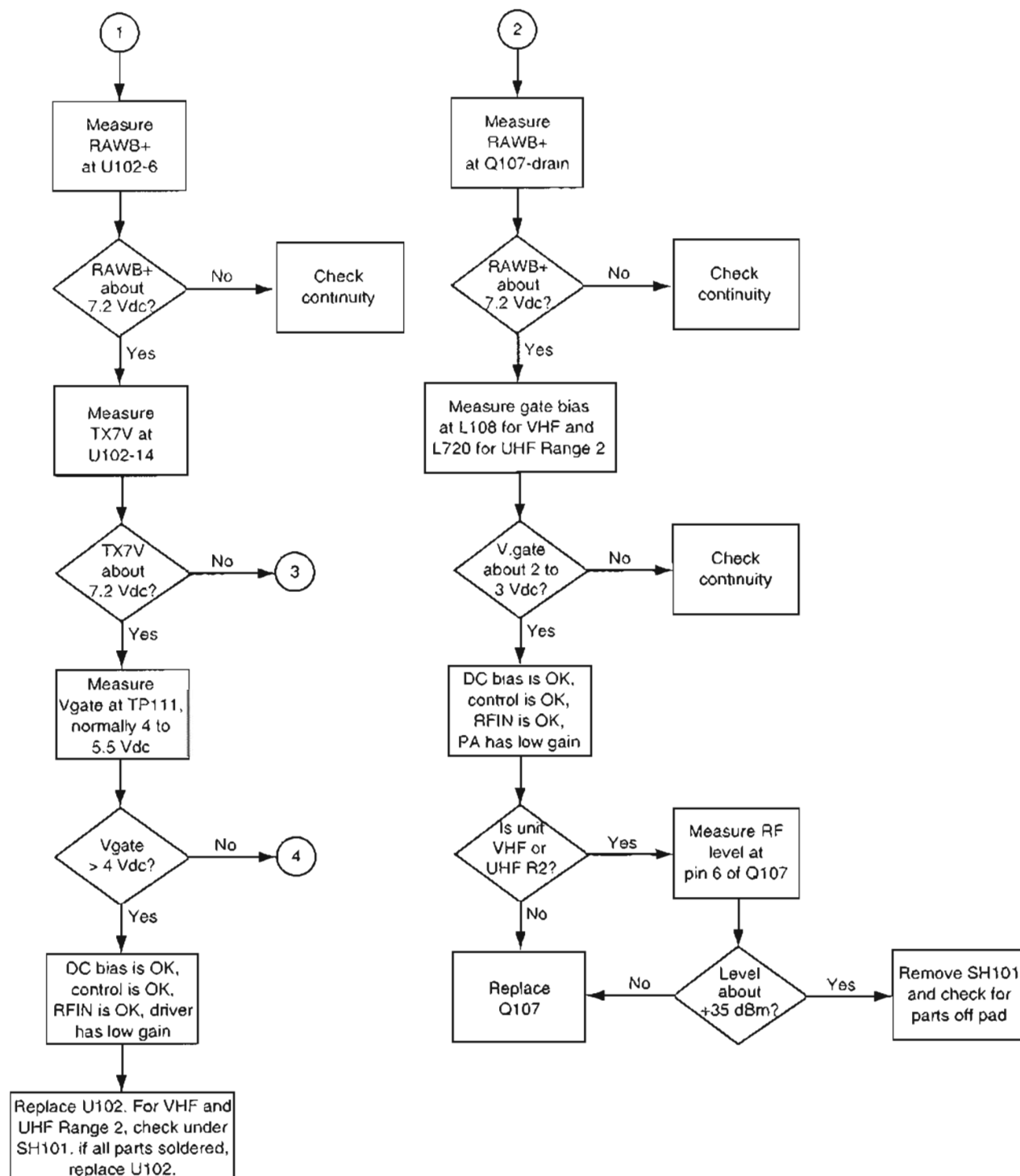
MAEPF-27474-C

5.15 TX RF (VHF and UHF Range 2)—Page 1



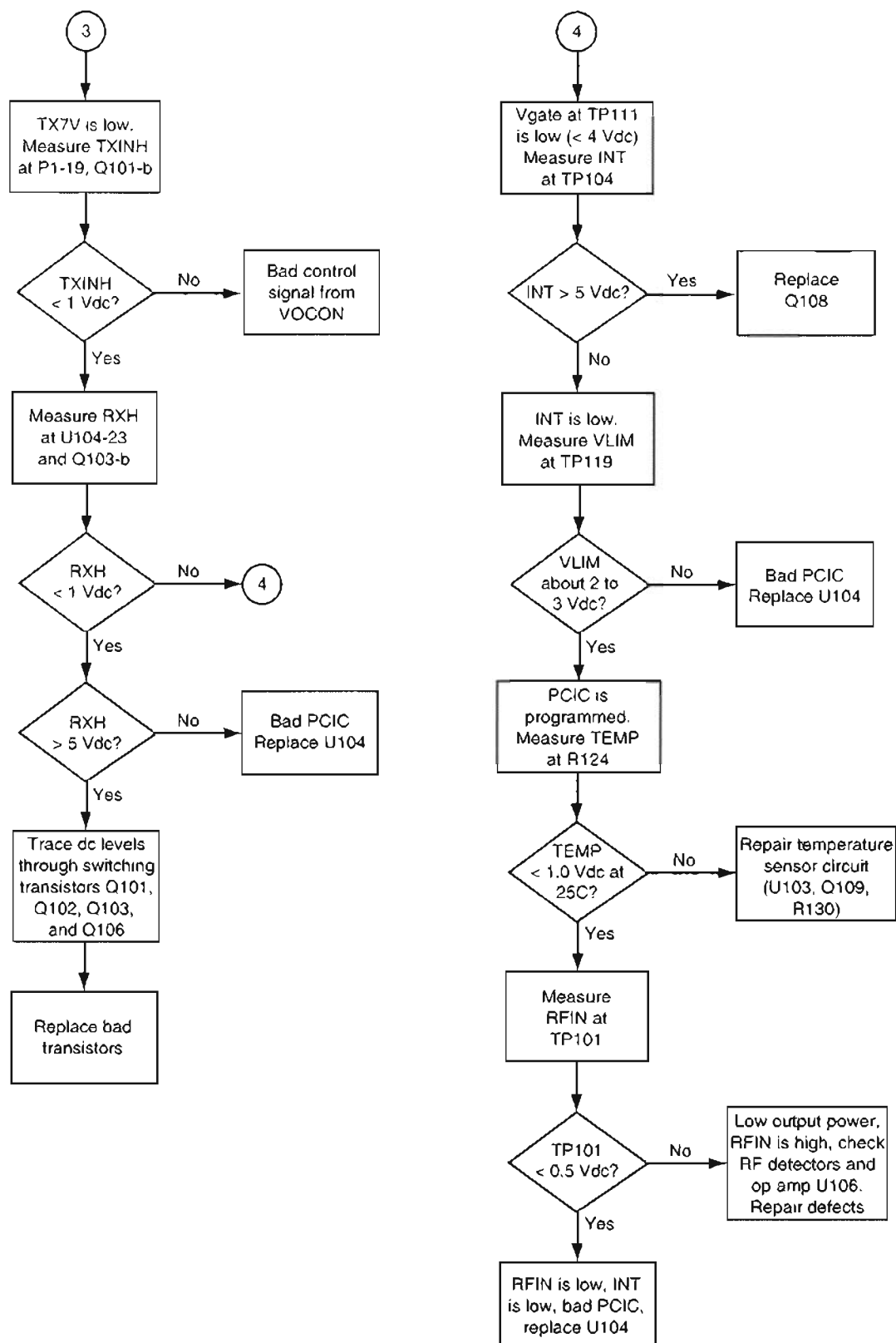
MAEPF-27635-Q

TX RF (VHF and UHF Range 2)—Page 2



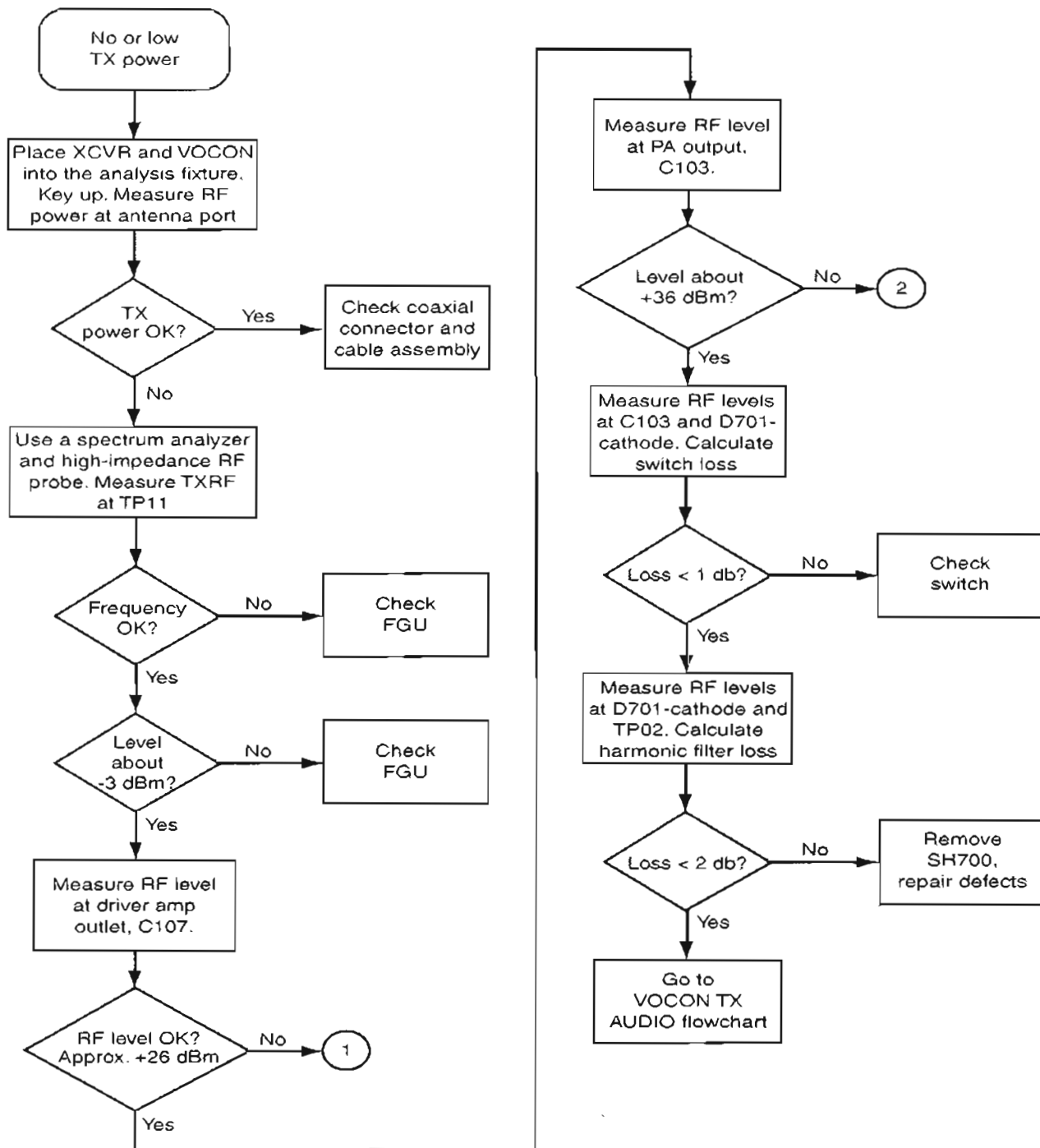
MAEPF-27420-C

TX RF (VHF and UHF Range 2)—Page 3



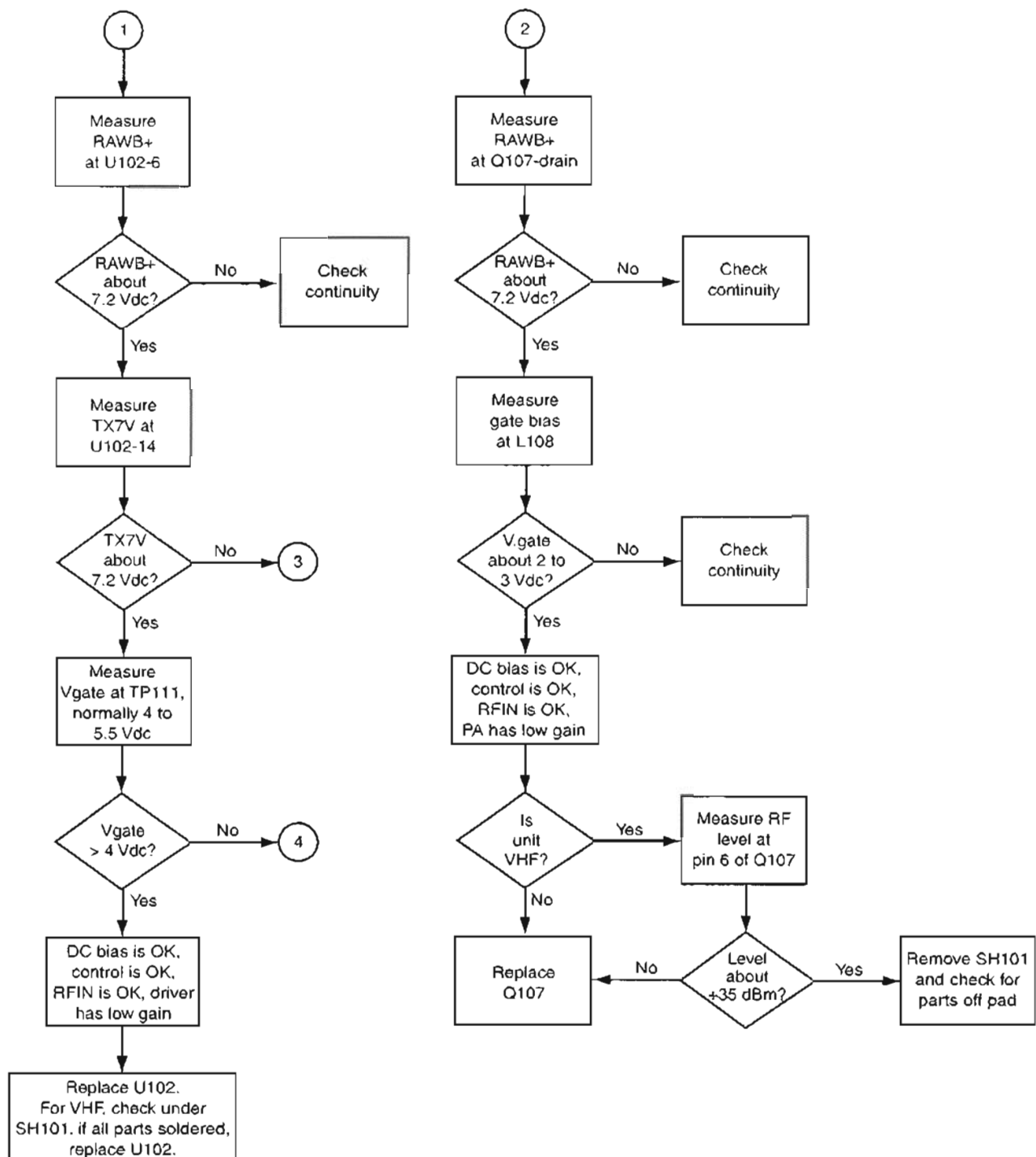
MAEPF-27476-A

5.16 TX RF (UHF R1/700-800 MHz)—Page 1



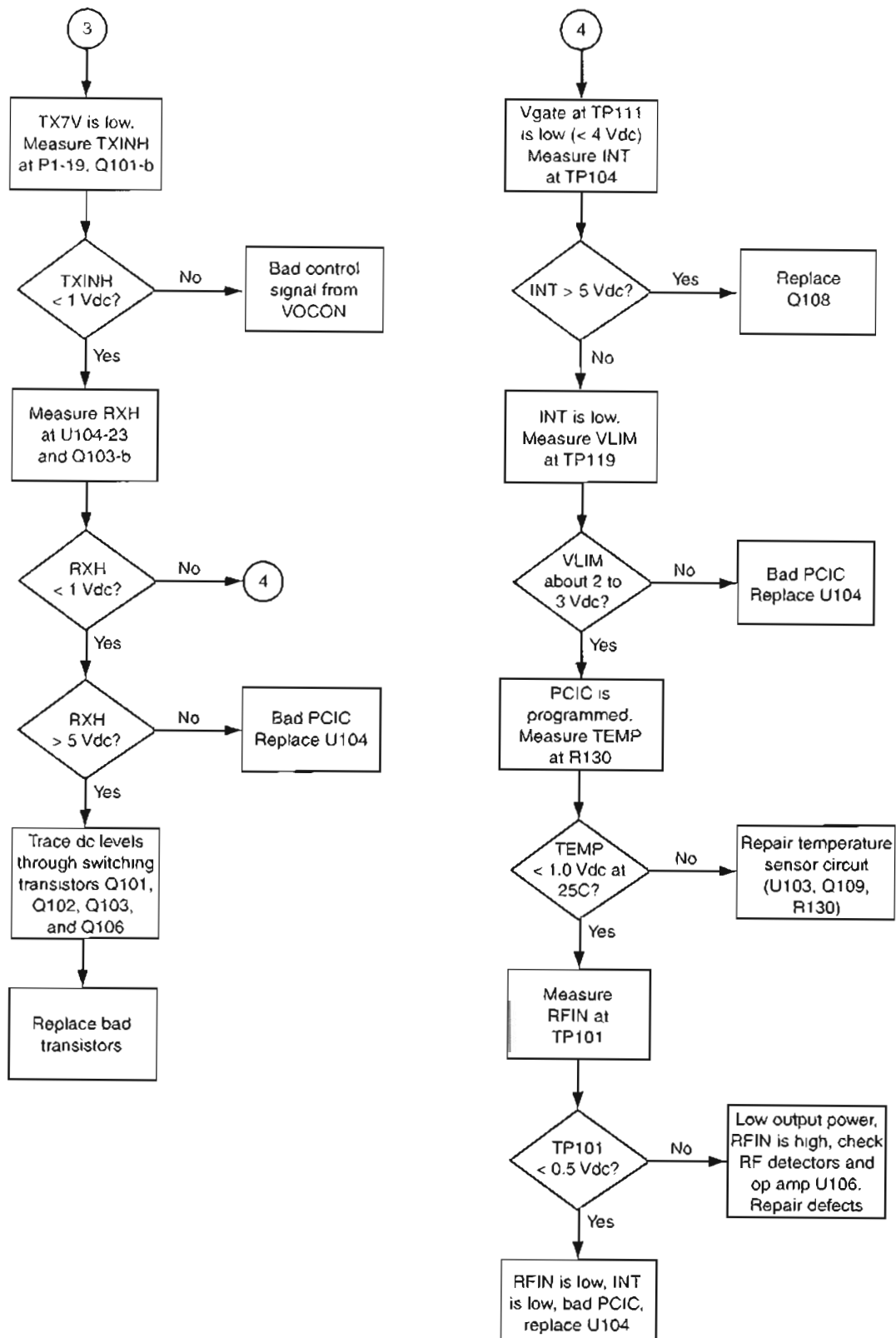
MAEPF-27475-B

TX RF (UHF R1/700-800 MHz)—Page 2



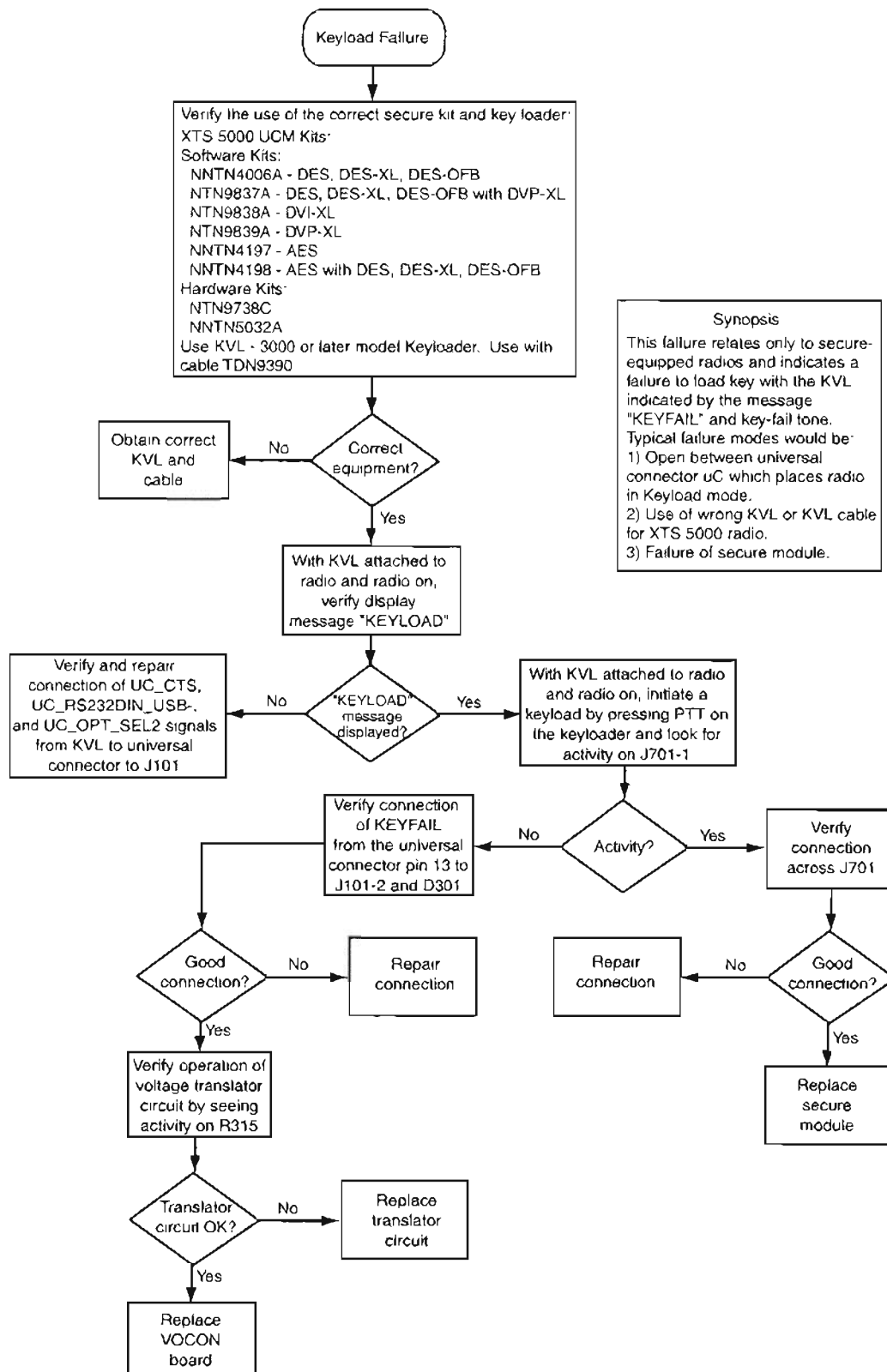
MAEPF-27420-B

TX RF (UHF R1/700-800 MHz)—Page 3



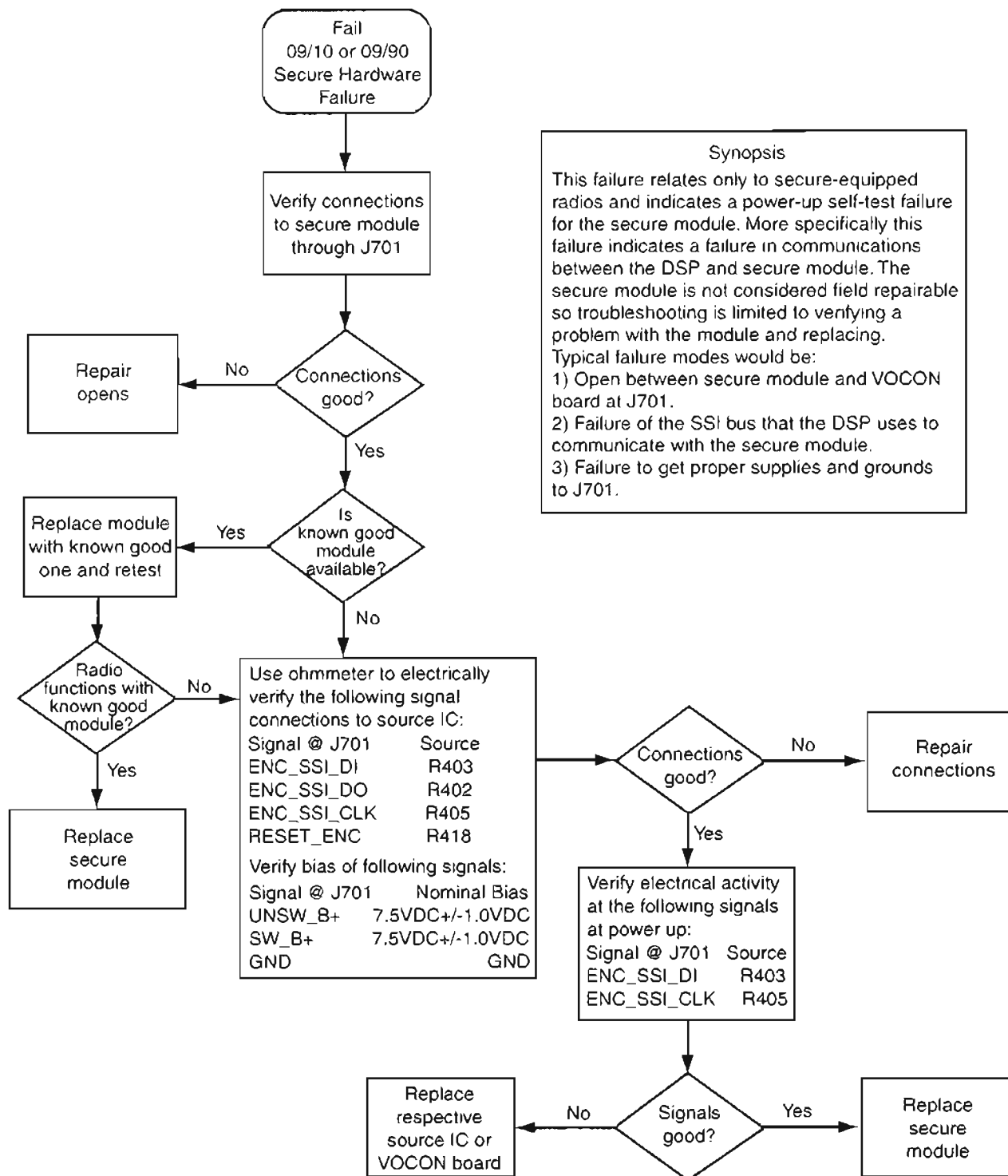
MAEPF-27476-0

5.17 Keyload Failure



MAEPF-27368-B

5.18 Secure Hardware Failure



MAEPF-27387-O

Notes

Chapter 6 Troubleshooting Waveforms

This chapter contains images of waveforms that might be useful in verifying operation of certain parts of the circuitry. These waveforms are for reference only; the actual data depicted will vary depending on operating conditions.

6.1 List of Waveforms

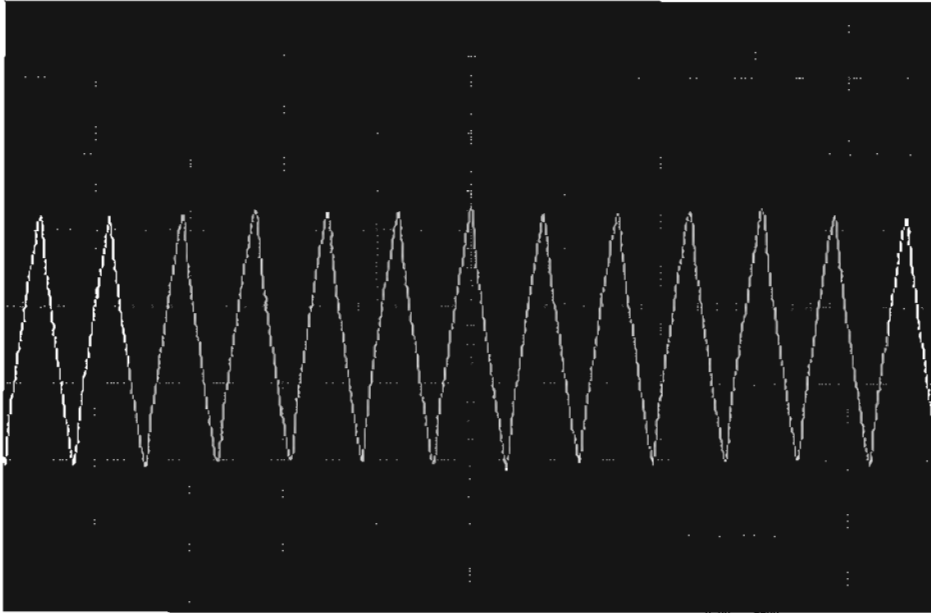
Table 6-1 lists each waveform and the page on which the waveform can be found.

Table 6-1. List of Waveforms

Waveform	Page No.
13 MHz Clock	6-2
16.8 MHz Buffer Input and Output	6-3
32 768 kHz Clock Outputs	6-4
SPI B Data	6-5
Receive Serial Audio Port (SAP)	6-6
Receive Baseband Interface Port (RX BBP)	6-7
Transmit Baseband Interface Port (TX BBP)	6-8

6.2 13 MHz Clock

Saved: 04 JAN 2002 10:16:55



Acquisition Sampling mode real time Configuration 4GSa/s
 Memory depth automatic Memory depth 1004pts
 Sampling rate automatic Sampling rate 1.00 GSa/s
 Averaging off
 9-bit BW Filter off Interpolation on

Channel 1 Scale 200 mV/div Offset 1.604 V Coupling DC Impedance 1M Ohm
 Attenuation 10.00 : 1 Atten units ratio Skew 0.0 s
 Ext adapter None Ext coupler None
 Ext gain 1.00E+00 Ext offset 0.0E+00

Time base Scale 100 ns/div Position 92.181816 μ s Reference center

Trigger Mode edge Sweep auto
 Hysteresis normal Holdoff time 60 ns Coupling DC
 Source channel 1 Trigger level 1.379 V Slope rising

MAEPF-27493-0

13 MHz clock from U301 to U501.

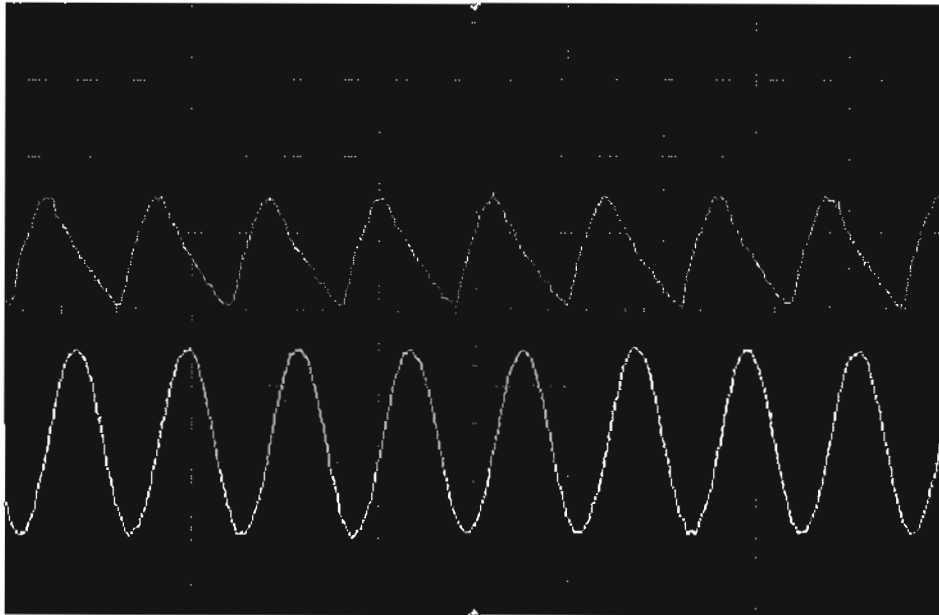
Trace 1: Trace recorded at C303 on the NTN9564 board.

Similar waveform is visible on C339 on the NNTN4563, NNTN4819, & NNTN4717 VOCON boards.

Figure 6-1. 13 MHz Clock Waveform

6.3 16.8 MHz Buffer Input and Output

Saved: 03 JAN 2002 14:53:03



Acquisition: Sampling mode real time Configuration 4GSa/s
Memory depth automatic Memory depth 1004pts
Sampling rate automatic Sampling rate 2.00 GSa/s
Averaging off
9-bit BW Filter off Interpolation on

Channel 1: Scale 500 mV/div Offset 1.937 V Coupling DC Impedance 1M Ohm
Attenuation 10.00 : 1 Atten units ratio Skew 0.0 s
Ext adapter None Ext coupler None
Ext gain 1.00E+00 Ext offset 0.0E+00

Channel 2: Scale 500 mV/div Offset -323 mV Coupling DC Impedance 1M Ohm
Attenuation 10.00 : 1 Atten units ratio Skew 0.0 s
Ext adapter None Ext coupler None
Ext gain 1.00E+00 Ext offset 0.0E+00

Time base: Scale 50.0 ns/div Position 0.0 s Reference center

Trigger: Mode edge Sweep auto
Hysteresis normal Holdoff time 60 ns Coupling DC
Source channel 2 Trigger level 50 mV Slope rising

MAEPF-27461-O

Trace 1: Buffer input at R452.

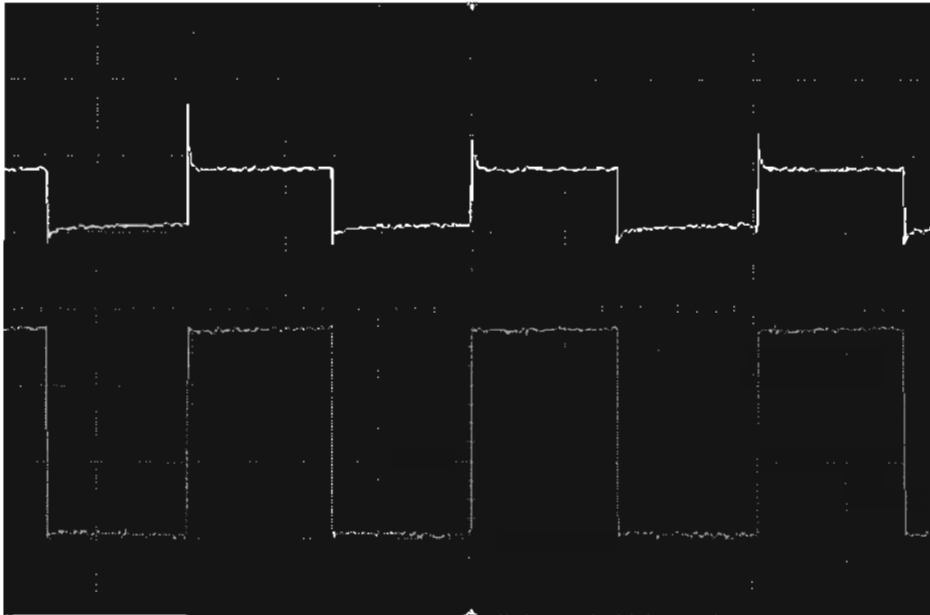
Trace 2: Buffer output at C452.

Note: These components are under shield SH101 on the NNTN4563, NNTN4819, & NNTN4717 VOCON boards.

Figure 6-2. 16.8 MHz Buffer Input and Output Waveforms

6.4 32.768 kHz Clock Outputs

Saved: 03 JAN 2002 14:47:53



Acquisition Sampling mode real time Configuration 4GSa/s
Memory depth automatic Memory depth 1004pts
Sampling rate automatic Sampling rate 10.0 MSa/s
Averaging off
9-bit BW Filter off Interpolation on

Channel 1 Scale 1.00 V/div Offset -1.58 V Coupling DC Impedance 1M Ohm
Attenuation 10.00 : 1 Atten units ratio Skew 0.0 s
Ext adapter None Ext coupler None
Ext gain 1.00E+00 Ext offset 0.0E+00

Channel 2 Scale 1.00 V/div Offset 2.97 V Coupling DC Impedance 1M Ohm
Attenuation 10.00 : 1 Atten units ratio Skew 0.0 s
Ext adapter None Ext coupler None
Ext gain 1.00E+00 Ext offset 0.0E+00

Time base Scale 10.0 μ s/div Position 0.0 s Reference center

Trigger Mode edge Sweep auto
Hysteresis normal Holdoff time 60 ns Coupling DC
Source channel 2 Trigger level 1.400 V Slope rising

MAEPF-27492-0

Trace 1: Output at C313 (to real-time clock of GCAP II IC).

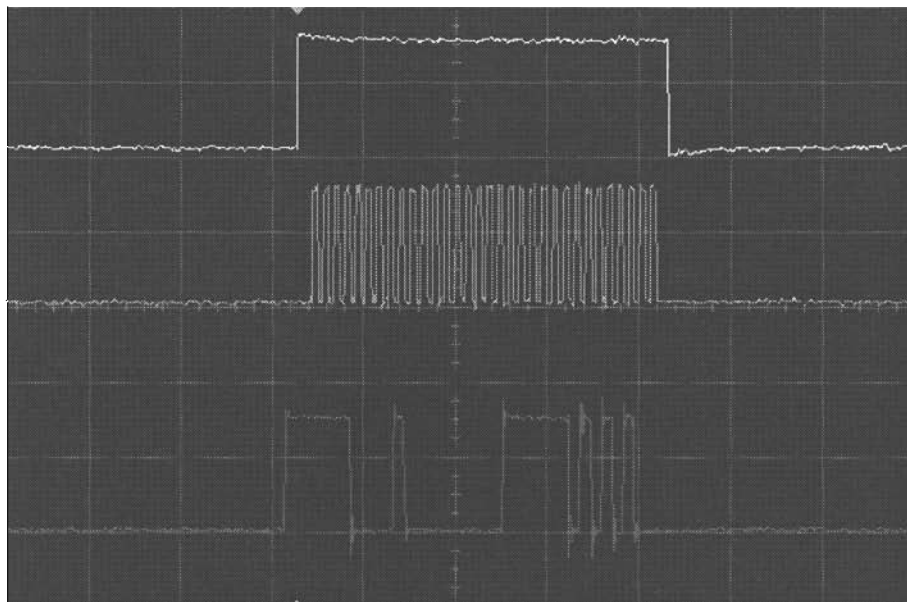
Trace 2: Output at U302, pin 2 (to Patriot IC CKIL input).

Note: These components are under shield SH102 on the NNTN4563, NNTN4819, & NNTN4717 VOCON boards.

Figure 6-3. 32.768 kHz Clock Outputs Waveforms

6.5 SPI B Data

Saved: 03 JAN 2002 15:04:16



Acquisition	Sampling mode: real time Configuration: 4GSa/s Memory depth: automatic Memory depth: 1004pts Sampling rate: automatic Sampling rate: 50.0MSa/s Averaging: off 9-bit BW Filter: off Interpolation: on
Channel 1	Scale: 1.99 V/div Offset: -4.21 V Coupling: DC Impedance: 1M Ohm Attenuation: 10.00 : 1 Atten units ratio Skew: 0.0 s Ext adapter: None Ext coupler: None Ext gain: 1.00E+00 Ext offset: 0.0E+00
Channel 2	Scale: 2.00 V/div Offset: -260 mV Coupling: DC Impedance: 1M Ohm Attenuation: 10.00 : 1 Atten units ratio Skew: 0.0 s Ext adapter: None Ext coupler: None Ext gain: 1.00E+00 Ext offset: 0.0E+00
Channel 3	Scale: 2.00 V/div Offset: 5.76 V Coupling: DC Impedance: 1M Ohm Attenuation: 10.00 : 1 Atten units ratio Skew: 0.0 s Ext adapter: None Ext coupler: None Ext gain: 1.00E+00 Ext offset: 0.0E+00
Time base	Scale: 2.00 μ s/div Position: 3.454546 μ s Reference: center
Trigger	Mode: edge Sweep: auto Hysteresis: normal Holdoff time: 60 ns Coupling: DC Source: channel 1 Trigger level: 810 mV Slope: rising

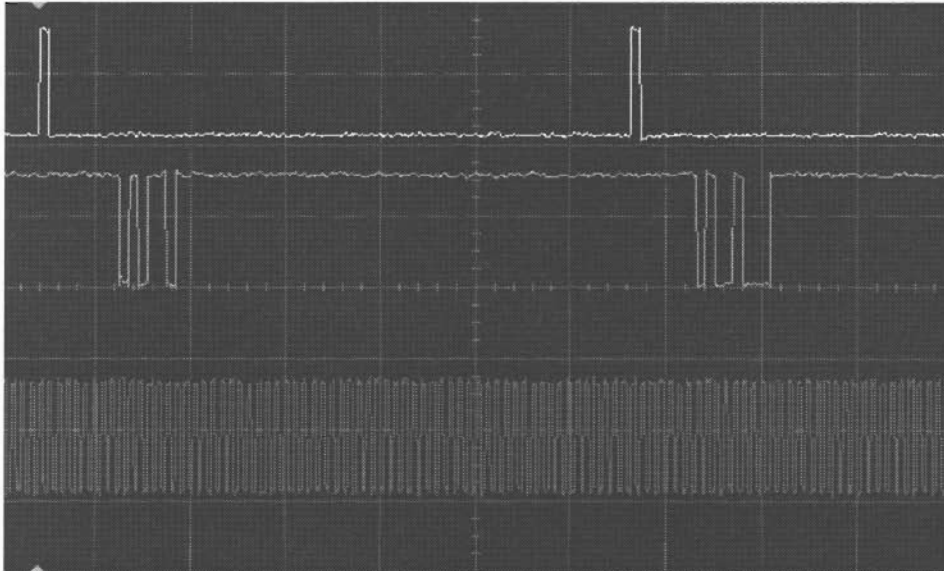
MAEPF-27493-0

Trace 1: GCAP II IC chip enable at R539 (Note active high).
Trace 2: SPI data clock at Test Point SCKB.
Trace 3: SPI data to GCAP II IC at Test Point MOSIB.

Figure 6-4. SPI B Data Waveforms

6.6 Receive Serial Audio Port (SAP)

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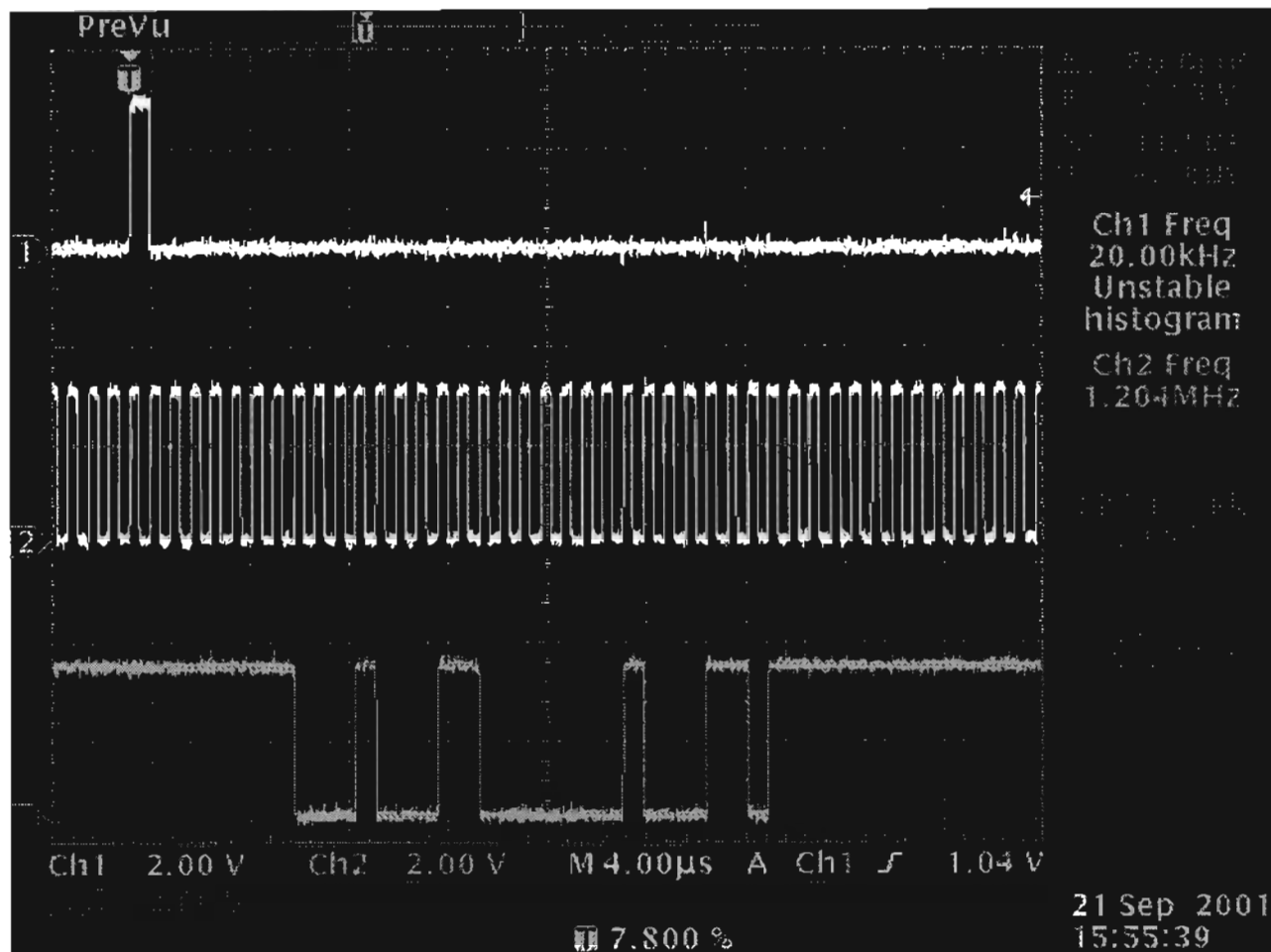
Acquisition	Sampling mode real time Configuration 4GSa/s Memory depth automatic Memory depth 3004pts Sampling rate automatic Sampling rate 5.00 MSa/s Averaging off 8-bit BW Filter off Interpolation on
Channel 1	Scale 1.99 V/div Offset -4.21 V Coupling DC Impedance 1M Ohm Attenuation 10.00 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00
Channel 2	Scale 2.00 V/div Offset -210 mV Coupling DC Impedance 1M Ohm Attenuation 10.00 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00
Channel 3	Scale 2.00 V/div Offset 5.55 V Coupling DC Impedance 1M Ohm Attenuation 10.00 : 1 Atten units ratio Skew 0.0 s Ext adapter None Ext coupler None Ext gain 1.00E+00 Ext offset 0.0E+00
Time base	Scale 20.0 μ s/div Position 92.181816 μ s Reference center
Trigger	Mode edge Sweep auto Hysteresis normal Holdoff time 60 ns Coupling DC Source channel 1 Trigger level 810 mV Slope rising

MAEPF-27494-Q

Trace 1: 8 kHz frame sync at R406 (each word is 13 bits after falling edge of FSYNC).
Trace 2: SAP data at R403 (audio data from GCAP II IC CODEC to Patriot IC DSP).
Note: Transmit is identical, except data acquired at R402.
Trace 3: 520 kHz bit clock at R405 on the NTN9564, NNTN4563 & NNTN4819 VOCON boards.
 256 kHz bit clock at R405 on the NNTN4717 VOCON board.

Figure 6-5. Receive Serial Audio Port (SAP) Waveforms

6.7 Receive Baseband Interface Port (RX BBP)



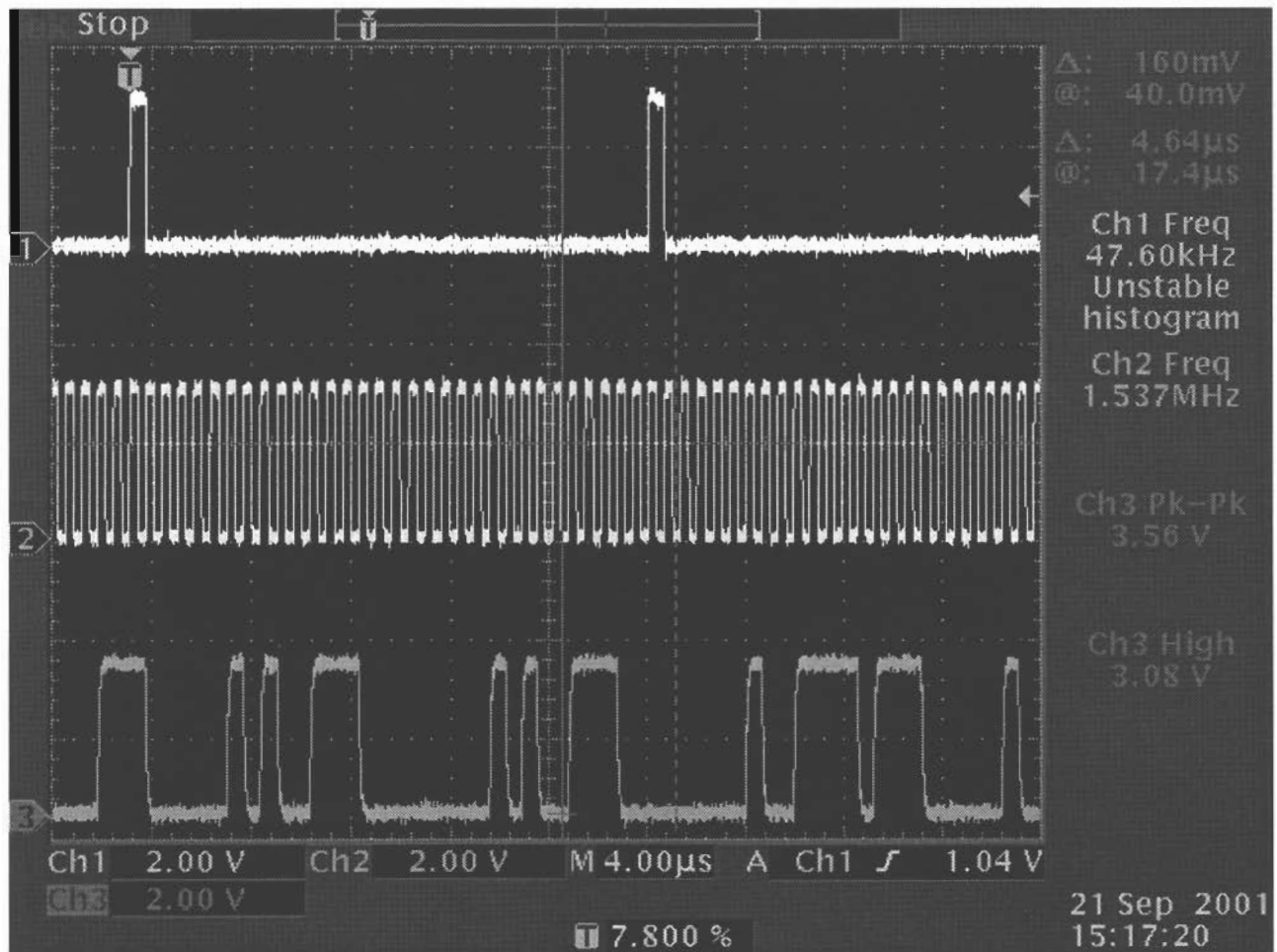
Trace 1: BBP RX frame sync signal at R123 (P1-6).

Trace 2: BBP RX clock signal at R124 (P1-5).

Trace 3: BBP RX data signal at R121 (P1-12).

Figure 6-6. Receive Baseband Interface Port (RX BBP) Waveforms

6.8 Transmit Baseband Interface Port (TX BBP)



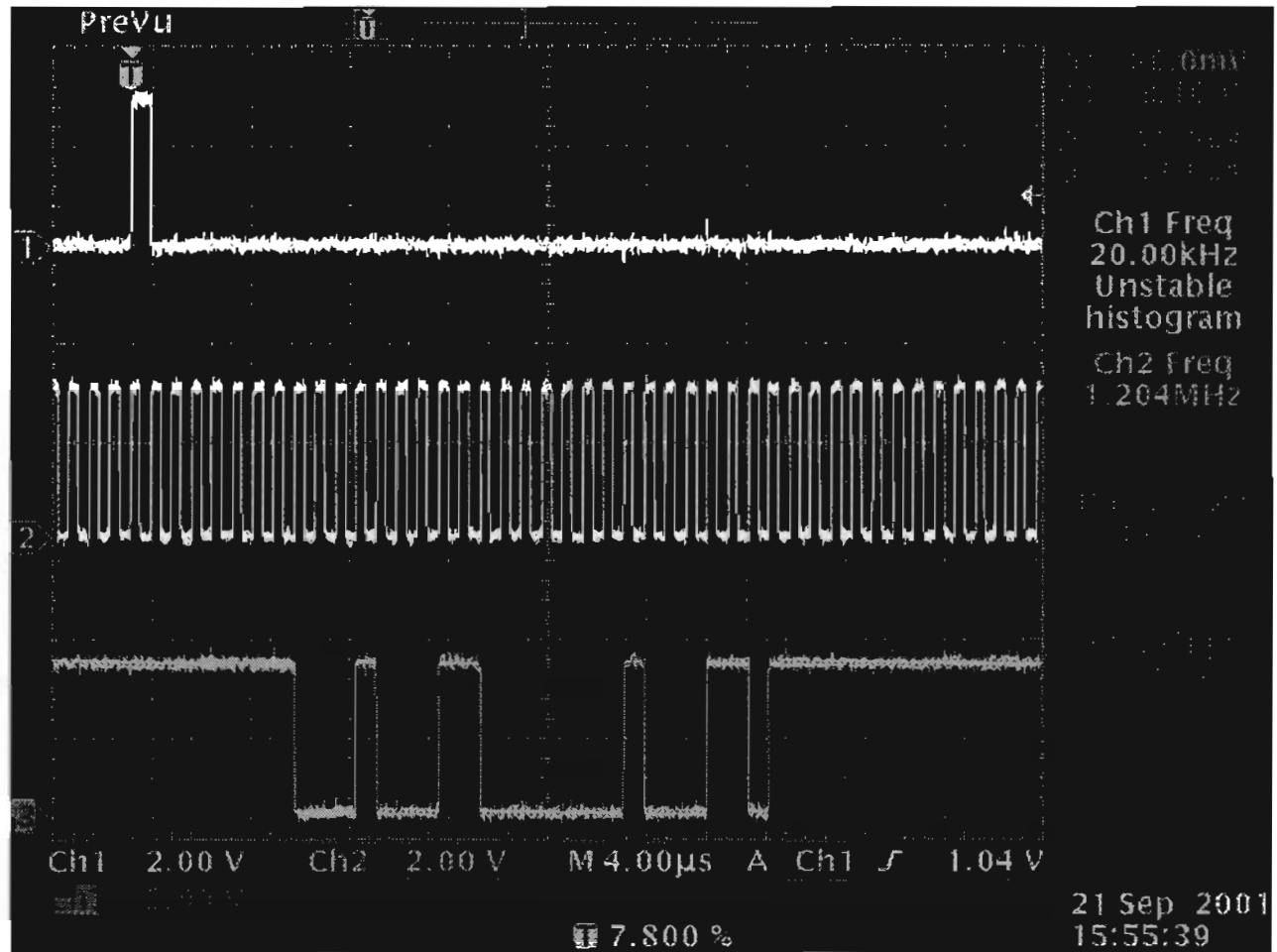
Trace 1: BBP TX frame sync signal at R119.

Trace 2: BBP TX clock signal at R125.

Trace 3: BBP TX data signal at R127.

Figure 6-7. Transmit Baseband Interface Port (TX BBP) Waveforms

6.7 Receive Baseband Interface Port (RX BBP)



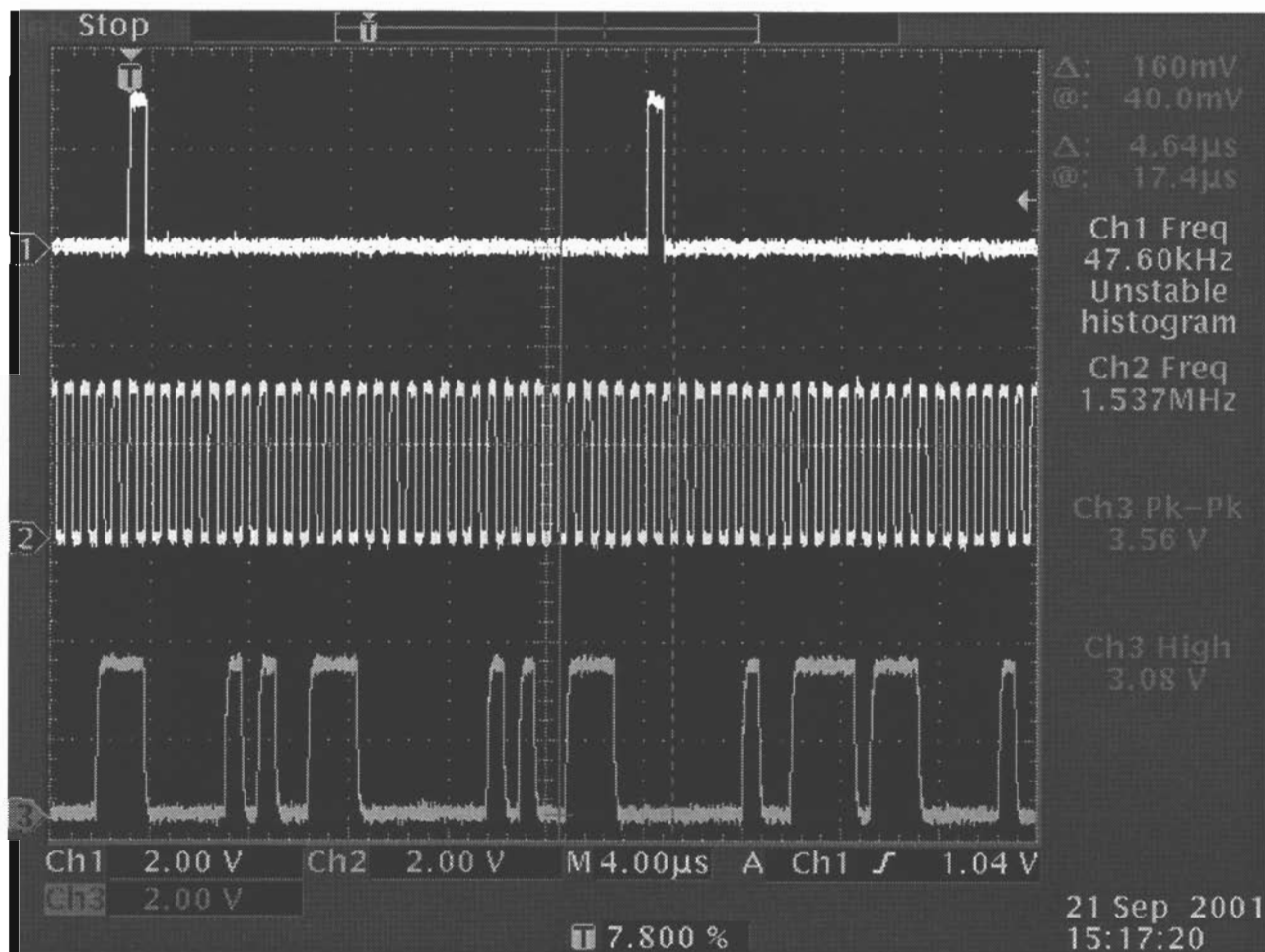
Trace 1: BBP RX frame sync signal at R123 (P1-6).

Trace 2: BBP RX clock signal at R124 (P1-5).

Trace 3: BBP RX data signal at R121 (P1-12).

Figure 6-6. Receive Baseband Interface Port (RX BBP) Waveforms

6.8 Transmit Baseband Interface Port (TX BBP)



Trace 1: BBP TX frame sync signal at R119.

Trace 2: BBP TX clock signal at R125.

Trace 3: BBP TX data signal at R127.

Figure 6-7. Transmit Baseband Interface Port (TX BBP) Waveforms

Chapter 7 Troubleshooting Tables

7.1 List of Board and IC Signals

Due to the nature of the schematic-generating program, signal names might be different when they are not directly connected to the same point. The tables in this chapter provide a cross reference to the various pinouts for these signals. Table 7-1 lists and provides links to each of the tables in this chapter.

Table 7-1. List of Tables of Board and IC Signals

Table No.	Table Name	Page No.
7-2	J101 VOCON Board to Controls Flex Assembly	7-1
7-3	J107 VOCON Board to Keypad Module	7-3
7-4	J701 VOCON Board to Encryption Module	7-3
7-5	U402 FLASH Pinouts	7-5
7-6	U403 SRAM Pinouts	7-7
7-7	U401 Patriot MCU/DSP IC Pinouts	7-9
7-8	U301 Flipper IC Pinouts	7-18
7-9	U501 GCAP II IC Pinouts	7-20

Table 7-2. J101 VOCON Board to Controls Flex Assembly

J101 Pin No.	Description	To/From	Side Connector Number
1	UC_CTS	TP208	10
2	UC_LHDATA_KEYFAIL	TP206	13
3	DGND03	TP202	8
4	UC_RS232DIN_USB-	R253	12
5	UC_EXT_SPKR_NEG-	TP213	6
6	UC_RS232DOUT_USB+	R252	11
7	UC_OPT_SEL2	R218	5
8	UC_SB9600_BUSY	TP207	9
9	UC_EXT_SKPR	TP212	2
10	UC_RTS	TP209	7

Table 7-2. J101 VOCON Board to Controls Flex Assembly (Continued)

J101 Pin No.	Description	To/From	Side Connector Number
11	UC_OPT_SEL1	R217	1
12	UC_OPTB+_VPP	R255	4
13	UC_EXT_MIC	TP214	3
14	UC_EMERG	R233	
15	DGND15	TP202	
16	DGND16	TP202	
17	UC_MONITOR	R244	
18	DGND18	TP202	
19	DGND19	TP202	
20	UC_BL_FREQ	R206	
21	UC_RED_LED	R203	
22	UC_GREEN_LED	R204	
23	UC_TG2	R234	
24	UC_RTA1	R236	
25	UC_RTA3	R241	
26	UC_RTA2	R239	
27	UC_RTA0	R235	
28	DGND28	TP202	
29	DGND29	TP202	
30	DGND30	TP202	
31	UC_VOLUME	R232	
32	BSENS_1	L202	
33	UNSWB+1	L201	
34	UC_TG1	R231	
35	V2A	L203	
36	UC_INT_MICU	L208	
37	C_INT_SPKR_NEG	TP213	
38	UC_INT_PTT	R216	
39	AGND39	L204	
40	UC_INT_SPKR	L205	

Table 7-3. J107 VOCON Board to Keypad Module

J107 Pin No.	Description	To/From	Accessible on VOCON?
1	KP_COLUMN0	C134	Yes
2	KP_COLUMN1	C133	Yes
3	KP_COLUMN2	C132	Yes
4	KP_GND	GROUND	Yes
5	KP_GND	GROUND	Yes
6	KP_BL_EN	C124	Yes
7	KP_5V1	C104	Yes
8	KP_5V2	C104	Yes
9	KP_GND	GROUND	Yes
10	KP_GND	GROUND	Yes
11	KP_GND	GROUND	Yes
12	KP_GND	GROUND	Yes
13	KP_ROW0	C131	Yes
14	KP_ROW1	C130	Yes
15	KP_ROW2	C129	Yes
16	KP_ROW3	C128	Yes
17	KP_ROW4	C127	Yes
18	KP_ROW5	C126	Yes
19	KP_ROW6	C125	Yes
20	KP_GND	GROUND	Yes
21	KP_GND	GROUND	Yes
22	KP_GND	GROUND	Yes

Table 7-4. J701 VOCON Board to Encryption Module

J701 Pin No.	Description	To/From	Accessible on VOCON?
1	KEYFAIL_LH_BDMDATA	Q303 Pin 2	Yes
2	RS232_DIN_ENC	R308	Yes
3	RS232_DIN_UP	R308	Yes
4	RTSIN_ENC	U301 Pin H7	No

Table 7-4. J701 VOCON Board to Encryption Module (Continued)

J701 Pin No.	Description	To/From	Accessible on VOCON?
5	RS232_DOUT_UP	R317	Yes
6	RS232_DOUT_ENC	R317	Yes
7	SW_B+_ENC	C101	Yes
8	Regulated V_ENC	No Connect	N/A
9	RS232_DTR_IN_ENC	No Connect	N/A
10	RS232_RI_OUT_EN	No Connect	N/A
11	USB_MINUS Monitor	No Connect	N/A
12	CONT_3VDC_OUT_ENC	No Connect	N/A
13	RS232_DCD_ENC	No Connect	N/A
14	USB_PLUS Monitor	No Connect	N/A
15	BOOT_ENC	R417	Yes
16	TAMPER	GROUND	Yes
17	SSI_DO_CODEC_ENC	R403	Yes
18	SSI_DI_CODEC_ENC	R402	Yes
19	RTA0_ENC	R246	Yes
20	RTA1_ENC	R247	Yes
21	RTA3_ENC	R251	Yes
22	RTA2_ENC	R250	Yes
23	TG2_ENC	R234	Yes
24	LHDATA_BDMDATA_KEYFAIL	D308 Pin 3	Yes
25	GREEN_LED_ENC	R204	Yes
26	WAKEUP	U401 Pin E1	No
27	TX_INHIBIT	R109	Yes
28	UCM_SS	U301 Pin G4	No
29	RED_LED_ENC	R203	Yes
30	RESET_ENC	R418	Yes
31	MONITOR	R244	Yes
32	SPARE1_ENC	R415	Yes
33	GROUND_ENC	GROUND	Yes
34	SPARE2_ENC	R416	Yes
35	EMERG_ENC	R241	Yes

Table 7-4. J701 VOCON Board to Encryption Module (Continued)

J701 Pin No.	Description	To/From	Accessible on VOCON?
36	UNSW_B+_ENC	C102	Yes
37	ENC_SSI_CLK	R404	Yes
38	ENC_SSI_FS	R406	Yes
39	ENC_SSI_DI	R403	Yes
40	ENC_SSI_DOUT	R402	Yes

* = Component located under a shield on NNTN4563, NNTN4819, & NNTN4717

Table 7-5. U402 FLASH Pinouts

U402 Pin No.	Description	To/From	Comment	Accessible on Vocon?
B4	B_CLK	B_CLK**		Yes
E7	CS0	CS0	Active Low	Yes
F8	EN_OE			No
C5	EN_WE			No
D6	WRITE PROTECT			No
C4	ADV	ADV**		Yes
B5	RESET	D401, pin 2	1.875 V	Yes
E8	ADDRESS 1			No
D8	ADDRESS 2			No
C8	ADDRESS 3			No
B8	ADDRESS 4			No
A8	ADDRESS 5			No
B7	ADDRESS 6			No
A7	ADDRESS 7			No
C7	ADDRESS 8			No
A2	ADDRESS 9			No
B2	ADDRESS 10			No
C2	ADDRESS 11			No
A1	ADDRESS 12			No
B1	ADDRESS 13			No
C1	ADDRESS 14			No

Table 7-5. U402 FLASH Pinouts (Continued)

U402 Pin No.	Description	To/From	Comment	Accessible on Vocon?
D2	ADDRESS 15			No
D1	ADDRESS 16			No
D4	ADDRESS 17			No
B6	ADDRESS 18			No
A6	ADDRESS 19			No
C6	ADDRESS 20			No
B3	ADDRESS 21			No
C3	ADDRESS 22			No
D7	ADDRESS 23	R427*		Yes
A3	GROUND			No
F1	GROUND			No
G2	GROUND			No
G8	GROUND			No
E2	DATA 15			No
F2	DATA 14			No
F3	DATA 13			No
D5	DATA 12			No
F4	DATA 11			No
F5	DATA 10			No
F6	DATA 9			No
G7	DATA 8			No
G1	DATA 7	R435**		Yes
E3	DATA 6	R434**		Yes
G3	DATA 5	R433**		Yes
E4	DATA 4	R432**		Yes
G5	DATA 3	R431**		Yes
E5	DATA 2	R430**		Yes
E6	DATA 1	R429**		Yes
F7	DATA 0	R428**		Yes
A5	VPP	D402, pin 3	1.875 V	Yes
G6	VSW2	C409*	1.875 V	Yes

Table 7-5. U402 FLASH Pinouts (Continued)

U402 Pin No.	Description	To/From	Comment	Accessible on Vocon?
E1	VSW2	C409*	1.875 V	Yes
G4	VSW2	C409*	1.875 V	Yes
A4	VSW2	C409*	1.875 V	Yes

* = Component located under a shield on NNTN4563, NNTN4819, & NNTN4717

** = No test point/component on NNTN4563, NNTN4819, & NNTN4717 - signal not accessible

Table 7-6. U403 SRAM Pinouts

U403 Pin No.	Description	To/From	Comment	Accessible on Vocon?
A2	EN_OE			No
G5	R_W	R_W	W = 0 V	Yes
A1	LB			No
B2	UB			No
B5	CS1	CS2 (TP)	Active Low	Yes
A6	CS2	C411*	Active Low	Yes
A3	ADDRESS 1			Yes
A4	ADDRESS 2			Yes
A5	ADDRESS 3			Yes
B3	ADDRESS 4			Yes
B4	ADDRESS 5			Yes
C3	ADDRESS 6			Yes
C4	ADDRESS 7			Yes
D4	ADDRESS 8			No
H2	ADDRESS 9			No
H3	ADDRESS 10			No
H4	ADDRESS 11			No
H5	ADDRESS 12			No
G3	ADDRESS 13			No
G4	ADDRESS 14			No
F3	ADDRESS 15			No
F4	ADDRESS 16			No

Table 7-6. U403 SRAM Pinouts (Continued)

U403 Pin No.	Description	To/From	Comment	Accessible on Vocon?
E4	ADDRESS 17			No
D3	ADDRESS 18			No
H1	ADDRESS 19			No
D1	GROUND			No
E6	GROUND			No
E3	GROUND			No
H6	NOT USED			No
G2	NOT USED			No
G1	DATA 15			No
F1	DATA 14			No
F2	DATA 13			No
E2	DATA 12			No
D2	DATA 11			No
C2	DATA 10			No
C1	DATA 9			No
B1	DATA 8			No
G6	DATA 7	R435**		No
F6	DATA 6	R434**		No
F5	DATA 5	R433**		No
E5	DATA 4	R432**		No
D5	DATA 3	R431**		No
C6	DATA 2	R430**		No
C5	DATA 1	R429**		No
B6	DATA 0	R428**		No
D6	VSW2	C411*	1.875 V	Yes
E1	VSW2	C411*	1.875 V	Yes

* = Component located under a shield on NNTN4563, NNTN4819, & NNTN4717

** = No test point/component on NNTN4563, NNTN4819, & NNTN4717 - signal not accessible

Table 7-7. U401 Patriot MCU/DSP IC Pinouts

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
H10	EEPOT_INC*	C537	Active Low	Yes
J14	EXT_SPKR_SEL	Q505, pin 5		Yes
C14	AUDIO_PA_EN	R575		Yes
B14	HOST_WAKE			No
F6	BATTERY_ID	C556		Yes
E5	MECH_SW_BAR	Q508, pin 3	Active Low	Yes
J6	INT_PTT	R216	Active Low	Yes
J5	GCAP_INT	R538		Yes
J4	OPT_SEL1_IN	U201 pin 1		Yes
J3	UART_INT*			No
C16	8KHZ_INT	R406	8 kHz Pulse	Yes
G11	OPT_SEL2_IN	U202 pin 1		Yes
F1	KP_ROW0	C131		Yes
H4	KP_ROW1	C130		Yes
H6	KP_ROW2	C129		Yes
G2	KP_ROW3	C128		Yes
G11	KP_ROW4	C127		Yes
G7	KP_ROW5	C126		Yes
H7	KP_ROW6	C125		Yes
H1	SPARE1_ENC	J701, pin 32		Yes
D1	KP_COL0	C134		Yes
G5	KP_COL1	C133		Yes
F3	KP_COL2	C132		Yes
G4	ENC_RESET	J701, pin 30		Yes
F2	BOOT*	J701, pin 15		Yes
E1	WAKEUP	J701, pin 26		Yes
H6	SPARE2_ENC	J701, pin 34		Yes
G3	NOT USED			No
E7	NOT USED			No
A8	NOT USED			No
F8	MISOA_SEL	U406, pin 2		Yes

Table 7-7. U401 Patriot MCU/DSP IC Pinouts (Continued)

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
E8	NOT USED			No
G8	NOT USED			No
C3	NOT USED			No
D4	LOCK_DET	C123	Active Low	Yes
A2	TG2	R234		Yes
B2	RTA3	R241		Yes
A3	RTA2	R239		Yes
B3	RTA1	R236		Yes
B4	RTA0	R235		Yes
A7	VSW2	E401*	1.875 V	Yes
P3	VSW2	E401*	1.875 V	Yes
P6	VSW2	E401*	1.875 V	Yes
T9	VSW2	E401*	1.875 V	Yes
N10	VSW2	E401*	1.875 V	Yes
R16	VSW2	E401*	1.875 V	Yes
H9	V2	E402*	3.0 V	Yes
G9	V2	E402*	3.0 V	Yes
E15	V2	E402*	3.0 V	Yes
A16	V2	E402*	3.0 V	Yes
K10	V2	E402*	3.0 V	Yes
C12	V2	E402*	3.0 V	Yes
D8	V2	E402*	3.0 V	Yes
B7	V2	E402*	3.0 V	Yes
A4	V2	E402*	3.0 V	Yes
A16	V2	E402*	3.0 V	Yes
H2	V2	E402*	3.0 V	Yes
K3	VSW2	E401*	1.875 V	Yes
R8	VSW2	E401*	1.875 V	Yes
G15	VSW2	E401*	1.875 V	Yes
C10	VSW2	E401*	1.875 V	Yes
K12	URXD1_USB_VMI			No

Table 7-7. U401 Patriot MCU/DSP IC Pinouts (Continued)

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
L16	URTS1_XRXD			No
F13	ADTRIG			No
B16	URXD2	U303, pin 4		Yes
D14	BSY_IN_RTS			No
B12	RX_SSI_DATA	R123	Data From Abacus to DSP	Yes
C11	TX_SSI_CLK	R125	1.536 MHz	Yes
B10	RED_LED	Q201, pin 3	Active High	Yes
D10	GREEN_LED	Q201, pin 5	Active High	Yes
B11	TX_SSI_FSYNC	R119	48 kHz	Yes
J10	CODEC_TX	R402	GCAP to DSP Tx Audio Data	Yes
J15	CODEC_DCLK	R405	520 kHz (NTN9564 NNTN4563 NNTN4819) 256 kHz (NNTN4717)	Yes
K16	CODEC_FSYNC	R406	8 kHz Pulse	Yes
D7	SPI_MISOA	MISOA	SPI A Data In	Yes
D3	SPI_MISOB	MISOB	SPI B Data In	Yes
E6	NOT USED			No
F7	NOT USED			No
D6	EEPROM_SEL*	R132	Active Low	Yes
C5	AD_CS*	R133	Active Low	Yes
A9	NOT USED			No
B8	NOT USED			No
B9	NOT USED			No
A10	NOT USED			No
G6	BT_DISABLE			No
D13	NOT USED			No
S15	BT_WAKE			No
F11	RX_SSI_CLK	R124		Yes

Table 7-7. U401 Patriot MCU/DSP IC Pinouts (Continued)

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
B15	OPT_SEL2_OUT	R256		Yes
J13	AUDIO_MODE_SEL	R257		Yes
J16	EEPOT_CS_EXT*	U509, pin 1		Yes
J12	EEPOT_U_D*	U509, pin 2		Yes
H11	EEPOT_CS*	U509, pin 10		Yes
A5	GROUND	GROUND		Yes
N6	GROUND	GROUND		Yes
P8	GROUND	GROUND		Yes
P11	GROUND	GROUND		Yes
M11	GROUND	GROUND		Yes
L15	GROUND	GROUND		Yes
H16	GROUND	GROUND		Yes
F14	GROUND	GROUND		Yes
G14	GROUND	GROUND		Yes
E13	GROUND	GROUND		Yes
B13	GROUND	GROUND		Yes
K15	GROUND	GROUND		Yes
D9	GROUND	GROUND		Yes
C8	GROUND	GROUND		Yes
B5	GROUND	GROUND		Yes
C2	GROUND	GROUND		Yes
C1	GROUND	GROUND		Yes
H3	GROUND	GROUND		Yes
K15	GROUND	GROUND		Yes
T8	GROUND	GROUND		Yes
H15	GROUND	GROUND		Yes
C9	GROUND	GROUND		Yes
B6	ABACUS_CS*	R126	Active Low	Yes
E2	UNI_SEL*	R131	Active Low	Yes
D2	FLPR_CS*		Active Low	No
E3	GCAP_CE	R539	Active High	Yes

Table 7-7. U401 Patriot MCU/DSP IC Pinouts (Continued)

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
E4	SCKB	SCKB	SPI B Clock	Yes
B1	NOT USED			No
F4	NOT USED			No
F5	SPI_MOSIB	MOSIB	SPI Data Out	Yes
C7	SCKA	SCKA	SPI A Clock	Yes
C6	MOSIA	MOSIA	SPI Data Out	Yes
G10	NOT USED			No
G16	OPT_SEL1_OUT	U201, pin 3		Yes
J11	CODEC_RX	R403	DSP to GCAP Rx Audio Data	Yes
A12	RX_SSI_FSYNC	R123	20 kHz pulse	Yes
A11	RX_SSI_CLK	R124	1.2 MHz	Yes
E9	TX_SSI_DATA	R127	Data From DSP to A/D	Yes
C15	BSY_OUT_CTS*			No
F12	UTXD2	U303, pin 1*		Yes
D15	USB_SUSP			No
E14	DISPLAY_R_W*	D403, pin 3	W = 0 V	Yes
D16	NOT USED			No
G12	UCTS1_USB_SPEED*			No
K11	UTXD1_USB_VPO			No
K14	USB_VMO			No
K13	USB_TX_EN			No
D5	8 KHZ_INT	R406	8 kHz Pulse	Yes
H14	BL_EN	C124		Yes
K4	LV_DETECT	POR	3.0 V	Yes
F9	NOT USED			No
J2	NOT USED			No
A6	16_8_MHZ	C452*	16.8 MHz	Yes

Table 7-7. U401 Patriot MCU/DSP IC Pinouts (Continued)

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
J7	FLIP_32K	32 kHz (NTN9564) U302, pin 2* (NNTN4563 NNTN4819 NNTN4717)	32.768 kHz	Yes
G13	NOT USED			No
J11	MOD	MOD	Bootstrap mode > 2.7 V	Yes
A13	NOT USED			No
M6	NOT USED			No
R1	NOT USED			No
N3	NOT USED			No
M5	NOT USED			No
P2	NOT USED			No
P1	NOT USED			No
N1	NOT USED			No
M4	NOT USED			No
M3	NOT USED			No
M2	NOT USED			No
M1	NOT USED			No
L4	NOT USED			No
L3	NOT USED			No
L1	NOT USED			No
L2	NOT USED			No
K2	NOT USED			No
T1	NOT USED			No
R2	NOT USED			No
T2	NOT USED			No
K7	NOT USED			No
N2	NOT USED			No
L5	NOT USED			No
L6	NOT USED			No
C4	NOT USED			No

Table 7-7. U401 Patriot MCU/DSP IC Pinouts (Continued)

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
L13	NOT USED			No
D11	ONE_WIRE_EN*		Active Low	No
E16	KVL_USB_DET*		Active Low	No
F15	NOT USED			No
K5	BAT_BUS_EN*	Q507, pin 2	Active Low	Yes
H8	NOT USED			No
F16	RESET	RESET_OUT (NTN9564) D401, Pin 3 (NNTN4563 NNTN4819, NNTN4717)	Reset = 0 V	Yes
K6	USB_VPI			No
H12	BL_FREQ	Q202, pin 5	Active High	Yes
H13	NOT USED			No
E10	DSP_DE	DSP_DE	ONCE/JTAG	Yes
F10	MCU_DE	MCU_DE	ONCE/JTAG	Yes
D12	TCK	TCK	ONCE/JTAG	Yes
C13	TMS	TMS	ONCE/JTAG	Yes
E11	TRST	TRST	ONCE/JTAG	Yes
A14	TDO	TDO	ONCE/JTAG	Yes
E12	TDI	TDI	ONCE/JTAG	Yes
M16	NOT USED			No
L14	NOT USED			No
P15	NOT USED			No
L11	NOT USED			No
M14	NOT USED			No
N16	NOT USED			No
L12	NOT USED			No
M12	CKO	CKO	Disabled	Yes
N15	NOT USED			No
M15	NOT USED			No

Table 7-7. U401 Patriot MCU/DSP IC Pinouts (Continued)

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
R12	ADDRESS 0	J101, pin 7	Not accessible on NNTN4563, NNTN4819, & NNTN4717	Yes
T13	ADDRESS 1			No
M10	ADDRESS 2			No
T12	ADDRESS 3			No
P13	ADDRESS 4			No
M9	ADDRESS 5			No
P10	ADDRESS 6			No
P12	ADDRESS 7			No
N9	ADDRESS 8			No
R10	ADDRESS 9			No
P9	ADDRESS 10			No
L10	ADDRESS 11			No
T10	ADDRESS 12			No
R9	ADDRESS 13			No
L9	ADDRESS 14			No
K9	ADDRESS 15			No
J9	ADDRESS 16			No
L8	ADDRESS 17			No
M8	ADDRESS 18			No
N8	ADDRESS 19			No
K8	ADDRESS 20			No
L7	ADDRESS 21			No
T7	ADDRESS 22			No
R7	ADDRESS 23	R427*		Yes
R3	DATA 15			No
T3	DATA 14			No
N4	DATA 13			No
P4	DATA 12			No
R4	DATA 11			No

Table 7-7. U401 Patriot MCU/DSP IC Pinouts (Continued)

U401 Pin No.	Description	To/From	Comment	Accessible on Vocon?
J8	DATA 10			No
T4	DATA 9			No
N5	DATA 8			No
P5	DATA 7	R435**		Yes
R5	DATA 6	R434**		Yes
T5	DATA 5	R433**		Yes
R6	DATA 4	R432**		Yes
T6	DATA 3	R431**		Yes
M7	DATA 2	R430**		Yes
N7	DATA 1	R429**		Yes
P7	DATA 0	R428**		Yes
N11	R_W	R_W		Yes
T11	NOT USED			No
R14	NOT USED			No
N12	CS3*	R106**	Active Low	Yes
T14	CS2	CS2	Active Low	Yes
R11	NOT USED			No
R15	CS0	CS0	Active Low	Yes
P16	OE_EN			No
M13	EB1_N			No
R13	EBO_N			No
N14	NOT USED			No
T16	WAIT	WAIT**		Yes
P14	NOT USED			No
N13	ADV	ADV**		Yes
T15	B_CLK	B_CLK**		Yes

* = Component located under a shield on NNTN4563, NNTN4819, & NNTN4717

** = No test point/component on NNTN4563, NNTN4819, & NNTN4717 - signal not accessible

Table 7-8. U301 Flipper IC Pinouts

U301 Pin No.	Description	To/From	Comment	Accessible on Vocon?
E7	RXDIN_ENC_3V	R308		Yes
D5	TXDO_BDI_5V	R329*	5 V RS232 Data Out	Yes
C7	RXDIN_5V	R328*	5 V RS232 Data In	Yes
A8	RTS	D303 pin 3	Request to Send (RS232)	Yes
D7	CTS	R303	Clear to Send (RS232)	Yes
H8	CTS_FILLREQ_3V	R306**		Yes
H3	16.8 MHz	C307*	16.8 MHz Clock	Yes
H6	13 MHz	R302 R331*	13 MHz Clock (OUT)	Yes
H5	PLL_LFT	C302*	PLL Loop Filter	Yes
F4	CODEC_DCLK	R405	520 kHz	Yes
E5	CODEC_FSYNC	R406	8 kHz Pulse	Yes
G4	UCM_SS	J701 pin 28		Yes
G2	V2	C304*	3.0 V	Yes
F1	V2	C317*	3.0 V	Yes
F3	VSS3_DC	GROUND		Yes
F2	VSS3_AC	GROUND		Yes
D8	VCC5	C305*	5.0 V	Yes
C8	VSS5	GROUND		Yes
A7	LI_CELL	C312*	3.0-3.3 V	Yes
C6	VSS3_XTL	GROUND		Yes
A4	UART_TX	NC		No
C4	UART_RX	NC		No
G3	ONE_WIRE_UP			No
G7	KVL_USB_DET			No
G1	ONE_WIRE_EN*			No
B5	BSY_IN_RTS			No
C5	BSY_OUT_CTS			No
E4	UCTS1_USB_SPEED*			No
C1	USB_TXENAB			No

Table 7-8. U301 Flipper IC Pinouts (Continued)

U301 Pin No.	Description	To/From	Comment	Accessible on Vocon?
D1	UTXD1_USP_VPO			No
B1	USB_VMO			No
C3	URTS1_XRXD			No
C2	USB_VPI			No
D2	URXD1_USB_VMI			No
E3	USB_SUSP			No
B2	SCKB	SCKB	SPI B Clock	Yes
B3	SPI_MOSIB	MOSIB	SPI Data Write to Flipper IC	Yes
A2	SPI_MISOB	MISOA	SPI Data Read from Flipper IC	Yes
A1	FLPR_CS*			No
A3	UART_INT*			No
F5	GCAP_RESET_X	C310*		Yes
H4	TEST_MODE1	GROUND		Yes
H1	TES_MODE2	GROUND		Yes
G6	OUT_DIS	GROUND		Yes
G5	SCAN_EN	GROUND		Yes
A6	XTAL32_IN			Yes
B6	XTAL32_OUT			Yes
A5	REF32_OUT	R316	32.768 kHz Square Wave	Yes
B7	BYPASS_32	GROUND		Yes
B4	BP_SEN_X	R510	0 V	Yes
D4	WD_OUT	R528	Watchdog Int to GCAP II	Yes
H2	ONE_WIRE_OPT	D308 pin 3		Yes
D6	S896D_BDO_KF_5V	NC		No
B8	LH_BUSY	D307 pin 3		Yes
D3	USB_DIS	R310*		Yes
E2	USB_DPLUS	Q301 pin 1*	USB Data Plus	Yes
E1	USB_DMINUS	Q301 pin 4*	USB Data Minus	Yes
E8	S896D_BDO_KF_3V	NC		No
F6	S896D_BDO_3V	D308 pin 3		Yes

Table 7-8. U301 Flipper IC Pinouts (Continued)

U301 Pin No.	Description	To/From	Comment	Accessible on Vocon?
H7	RTS_FILLSEN_3V	NC		No
G8	CTS_FILLREQ_3V	R309*		Yes
F8	TXDO_BDI_ENC_3V	R317		Yes
F7	TXDO_BDI_UP_3V	R317		Yes
E6	RXDIN_ENC_3V	R308		Yes

* = Component located under a shield on NNTN4563, NNTN4819, & NNTN4717

** = No test point/component on NNTN4563, NNTN4819, & NNTN4717 - signal not accessible

Table 7-9. U501 GCAP II IC Pinouts

U501 Pin No.	Description	To/From	Comment	Accessible on Vocon?
A2	AD4_BD_ID	R525		Yes
B2	AD3_BDTYPE	R524		Yes
B3	AD2_BAT_STAT	R568		Yes
A3	AD_TG1	R523		Yes
D4	AD0_EMERG	R522		Yes
C4	LV_DETECT	R511	Active Low	Yes
B4	AD_TRIG			No
A4	CONV_BYP	C516		Yes
B5	V3	C550	Unused Voltage Regulator	Yes
A5	VIN3	C515	3.77 V	Yes
D5	VSEN1	GROUND	0 V	Yes
C5	VSIN	C515	3.77 V	Yes
C6	VSIM1	C551	Unused Voltage Regulator	Yes
A6	V1	C552	Unused Voltage Regulator	Yes
B6	VIN1	B503	7.5V	Yes
D6	LI_CELL	C553	3.0-3.3V	Yes
D7	CHARGE	NC		No

Table 7-9. U501 GCAP II IC Pinouts (Continued)

U501 Pin No.	Description	To/From	Comment	Accessible on Vocon?
A7	XTAL1	G_32K	32.768 kHz Square Wave	Yes
B7	XTAL2			No
A8	PRSC2	C514	3.77V	Yes
B8	LX2	D502	262.144 kHz Square Wave	Yes
A9	PGND1	GROUND		Yes
B9	FB2	R501	1.85V	Yes
C8	ON	R579		Yes
A10	FB1	R502	3.77V	Yes
B10	LX1	D503	262.144 kHz Square Wave	Yes
C9	PWRON	C529	At Battery Voltage Level	Yes
D8	INT_EXT	GROUND		Yes
C10	PSRC1	C531	At Battery Voltage Level	Yes
E7	WDI	R576	3.0V	Yes
D10	MOSPORTB	C529	At Battery Voltage Level	Yes
D9	ISENSE	NC		No
E8	CHRG_C	NC		No
E9	SQ_OUT	NC		No
E10	BPOS	C529	At Battery Voltage Level	Yes
F7	BATTERY	NC		No
F8	AUX_BAT	NC		No
F9	AUX_FET	NC		No
F10	MAIN_FET	NC		No
E6	PGM2	C529	At Battery Voltage Level	Yes
G8	PGM1	C529	At Battery Voltage Level	Yes
G10	AGND1	GROUND		Yes
G9	REF	C528	3.0V	Yes

Table 7-9. U501 GCAP II IC Pinouts (Continued)

U501 Pin No.	Description	To/From	Comment	Accessible on Vocon?
H9	PA_DRV	NC		No
H10	PA_SENSE	NC		No
G7	PGM0	GROUND		Yes
H8	LS3_RX	NC		No
J10	DGND	GROUND		Yes
K10	LS3TX_PABPOS	GROUND		Yes
K1	MIC_OUT	U509 pin 6	AC Mic Signal	Yes
G4	STANDBY	R557	3.0V	Yes
K2	AUX_OUT	U509 pin 6	AC Mic Signal	Yes
H3	AUX_MIC_NEG	C538	Virtual Ground	Yes
J3	MB_CAP	C535		Yes
H4	EXT_MIC	NC		No
K3	MIC_BIAS	C535		Yes
J4	CD_CAP	C543		Yes
K4	VAG	C544		Yes
J5	V2	R560	3.0V	Yes
K5	VIN2	R502	3.77V	Yes
G5	ON2	NC		No
H5	EXTOUT	C533	AC RX Audio Signal	Yes
K6	SPKR_OUT	NC		No
J6	SPKR_IN	NC		No
H6	SPKR_NEG	NC		No
H7	SPKR_POS	NC		No
K7	LS1IN_TG1A	GROUND		Yes
J7	LS1OUT_TG1	NC		No
G6	LS2IN_TG2A	GROUND		Yes
F6	LS2OUT_TG2			No
K8	ALRT_GND			No
K9	ALRT_OUT	NC		No
J9	ALRT_VCC	NC		No

Table 7-9. U501 GCAP II IC Pinouts (Continued)

U501 Pin No.	Description	To/From	Comment	Accessible on Vocon?
J8	SIMI_O	NC		No
A1	AD5_VOLUME	R526	0-2.5V	Yes
B1	AGND3	GROUND		Yes
C3	DWN_OUT	NC		No
C2	DWN_IN	GROUND		Yes
C1	CMP_OUT	NC		No
D3	DSC_INN	GROUND		Yes
D2	DSC_INP	GROUND		Yes
D1	SPI_CLK	SCKB	SPI Data Clock	Yes
E4	SPI_DR	MISOB	SPI Data Read From GCAP	Yes
E3	SPI_DW	MOSIB	SPI Data Write To GCAP	Yes
E2	SR_VCCIN	NC		No
E1	SR_VCCOUT	NC		No
F3	SR_IN	NC		No
F2	SR_OUT	NC		No
F1	INTERRUPT	R538	GCAP Interrupt	Yes
F4	CE	R539	Active High GCAP Chip EN	Yes
F5	CLK_IN	R302 R331*	13 MHz	Yes
E5	CODEC_DCLK	R405	520 kHz (NTN9564 NNTN4563 NNTN4819) 256 kHz (NNTN4717)	Yes
G1	CODEC_TX	R402	TX Audio Data To DSP	Yes
G2	CODEC_RX	R403	RX Audio Data From DSP	Yes
G3	CODEC_FSYNC	R406	8 kHz Frame Sync	Yes

Table 7-9. U501 GCAP II IC Pinouts (Continued)

U501 Pin No.	Description	To/From	Comment	Accessible on Vocon?
H1	AGND4	GROUND		Yes
J1	AGND2	GROUND		Yes
H2	MICIN_POS	C534		Yes
J2	MICIN_NEG		Virtual Ground	No

* = Component located under a shield on NNTN4563, NNTN4819, & NNTN4717