MS2665C/MS2667C/MS2668C
Spectrum Analyzer
Service Manual

Third Edition

To ensure that this equipment is used safely, important safety items are explained in the MS2665C/MS2667C/MS2668C Spectrum Analyzer Operation Manual. This manual explains important service items related to service. Read both the operation manual and this manual, and keep both with the equipment.

Measuring Instruments Division
Measurement Group
ANRITSU CORPORATION

Document No.: M-W1335BE-3.0

For Safety

For safety, do not open the equipment covers.

If repair is required, contact the sales representative, branch office, or agent at the telephone number and address given in this document or in the equipment operation manual.

Although not recommended by Anritsu Corporation, if it is really imperative to open the covers for emergency repair, take great care not to touch any dangerous parts. Always request repair by a trained engineer who understands the hazards.

Anritsu Corporation will not accept liability for any injuries sustained as a result of opening the equipment covers.

MS2665C/MS2667C/MS2668C
Spectrum Analyzer
Service Manual

15 April 1998 (First Edition)
2 March 1999 (Third Edition)

Part Names & Part Numbers

Please specify the part numbers shown in the parts list when making inquiries or when ordering parts. There may be a difference between the names of parts used in this manual and the parts actually used in the equipment or supplied for repair. This is because equivalent parts with the same functions, performance and reliability as the parts specified in the circuit diagrams and parts list have been used or supplied. Since the parts are equivalent, they have absolutely no adverse effect on the equipment specified functions, performance or reliability.

Table of Contents

II.

Section 1 General

This manual is for smooth maintenance and service work of the MS2665C/MS2667C/MS2668C Spectrum analyzer.

Refer to the separate operation manual for handling the instruments.

Our basic policy to the repair to the factory system, i.e. the defective instruments should be returned to Anritsu for repair.

However, it may be time consuming and some kinds of repairs can be easily done in the field.

Therefore, Anritsu allows only those who Anritsu has authorized to open the instrument and repair it.

As clearly stated in the WARRANTY statement, any unauthorized modification, repair, or attempt to repair will render the warranty void.

This service manual is composed of the following sections:
SECTION 2 MS2665C
This section contains the following items of MS2665C.
(1) Overall circuit description, (2) Troubleshooting procedure, (3) Mechanical configuration.

SECTION 3 MS2667C
This section contains the following items of MS2667C.
(1) Overall circuit description, (2) Troubleshooting procedure, (3) Mechanical configuration.

SECTION 4 MS2668C
This section contains the following items of MS2668C.
(1) Overall circuit description, (2) Troubleshooting procedure, (3) Mechanical configuration.

SECTION 5 Firmware installation
This section describes Firmware installation procedure.

SECTION 6 Performance test system
This section describes performance test procedure after repairing modules.

SECTION 7 Options
This section describes option installation procedures and performance test.

Section 2 MS2665C

2.1 Overall Circuit description

MS2665C is a superheterodyne system scanning-type spectrum analyzer.
This section describes overall circuit of the MS2665C spectrum analyzer with its block diagram.

An RF input signal after passing through an RF switch and variable RF ATTN in 21 GHz S-ATT is switched by PIN diode switch in 21 GHz YTF/SW to two different signal routes depending on input RF frequency.

For an RF input frequency of 9 kHz to 3.1 GHz (termed as band 0), the signal passes through 3.2 GHz LPF and then to 1st mixer (1st MIX), where it is mixed with 1st local signal (4.1 GHz to 7.2 GHz) to generate 4110.69 MHz 1st IF signal.
The 1st IF signal is then passed through an amplifier and image rejection filters, and fed to 2nd mixer (2nd MIX), where it is mixed with 4 GHz 2nd local signal to generate 110.69 MHz 2nd IF signal.

For an RF input frequency of 3.1 GHz to 21.2 GHz (band 1 to 3), the signal goes to YTF (YIG tuned filter) in 21 GHz YTF/SW, and then to H. MIXER. In H. MIXER, the RF signal gets mixed with the 1st local signal (3.6 GHz to 7.5 GHz) to generate 689.31 MHz 1st IF signal.
This 1st IF signal is passed through a series of amplifiers and image rejection filters before further mixing with 800 MHz 2nd local signal to convert the signal to 110.69 MHz 2nd IF signal.

Depending on the active band of RF input, one of the two above 2nd IF signal is sent to IF section for further processing.

The 1st local signal generated at YTO (YIG tuned oscillator) is frequency-swept by scan signal from SCAN/AD section after phase-lock to reference signal (its frequency is 11 MHz to 14 MHz with the resolution of 1 Hz steps) generated on LOCAL-A section at the center frequency of its sweeping range, in normal sweep condition.

The YTO output is passed through an amplifier, and then divided into three paths with directional couplers. One of divided signal is fed to sampler circuit and the other are fed to the above mixers to frequency-convert.
In the sampler circuit, sampling signal (its frequency is 94 MHz to 106 MHz with the resolution of 1 MHz steps) generated on LOCAL-A section is frequency-multiplied, and then mixed with the YTO output to generate sampler IF signal with a frequency of 11 MHz to 14 MHz.
The sampler IF signal is compared with the reference signal of 11 MHz to 14 MHz at PFD.

The reference signal frequency (fREF) and the sampling signal frequency (fs) are controlled by CPU section according to the measuring frequency of the instrument, and set so that the center frequency of 1st local signal is fs * N ± fREF (, where N is an integer).
Meanwhile, the scan signal strength that is equivalent to frequency sweep width is controlled from LOCAL-A section.

The 2nd local signals of 4 GHz and 800 MHz are also phase-locked to 100 MHz VCXO signal, of which the frequency is also phase-locked to 10 MHz crystal oscillator (option 01).

In the instrument, a high accuracy 625 kHz signal is present for level accuracy calibration. This signal is generated by frequency-dividing the 10 MHz reference signal, and its power level is varied with 1 dB steps by CAL ATT.
Internal calibration operation being carried out, this calibrating signal is fed to the RF signal-route through the switch in 21 GHz S-ATT.

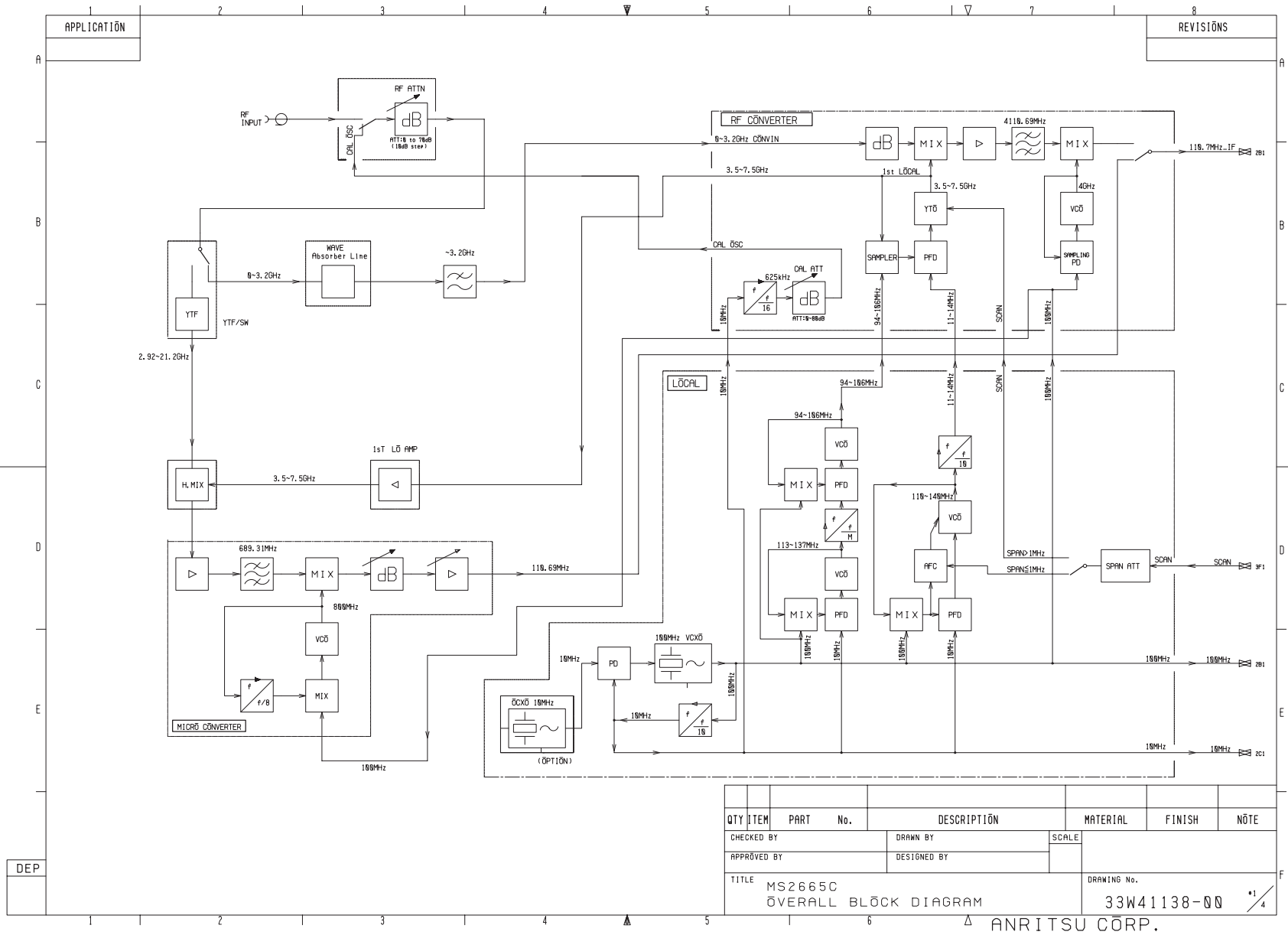
At the IF section the incoming signal is divided into two paths. The main route leads to image rejection filters while the second, a highly attenuated feeler path signal is used for generation of wide band trigger signal in TRIG/GATE section (option 06) situated on OPTION BASE board.
The main signal after passing through an image rejection filter is beat down to a 10.69 MHz signal using a 100 MHz reference signal. This signal is then sent to various Resolution Band Width (RBW) setting circuits.

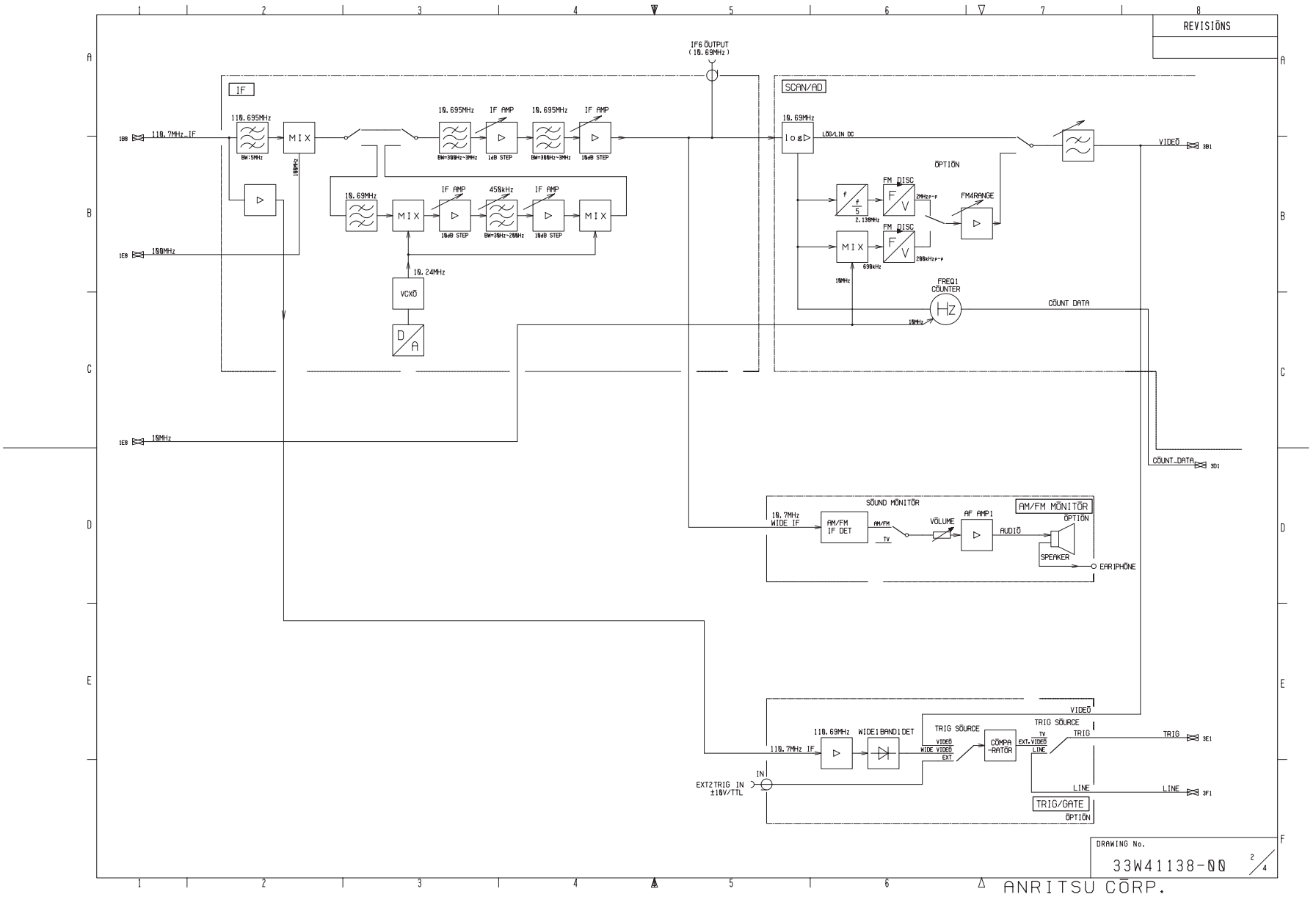
For RBW setting of 30 Hz to 200 Hz the signal is frequency converted to 450 kHz using 10.24 MHz signal. After passing through the RBW circuits (Crystal filter circuits) the signal is up converted back to 10.69 MHz signal and passed through wider RBW setting circuits.
For RBW setting of 300 Hz to 3 MHz the signal is sent directly to wide RBW setting circuits without any frequency modifications.

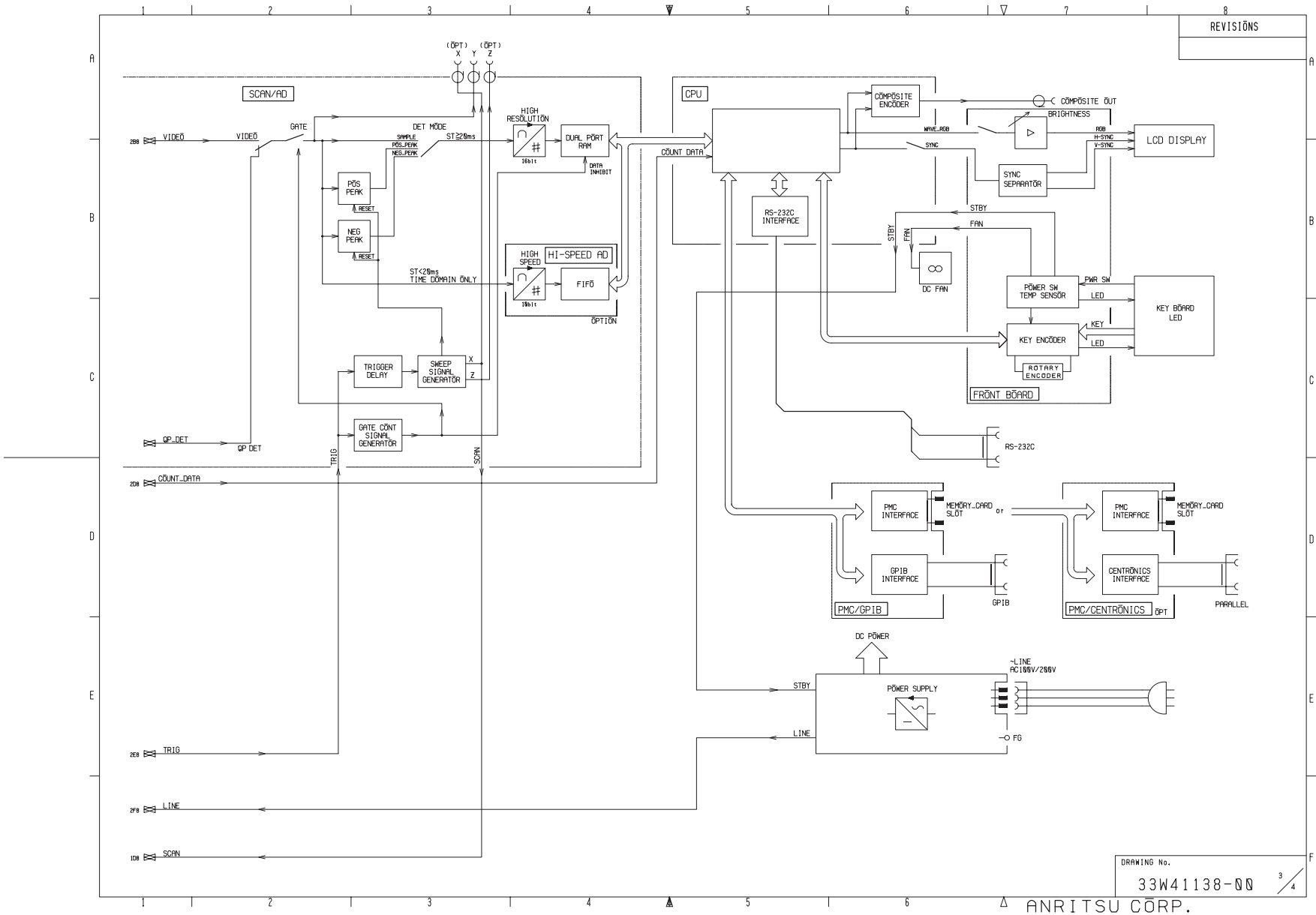
The RBW processed signal is passed onto SCAN/AD section, where it passes through logarithmic amplifiers and then to a linear detector. This linear detected signal is passed through smoothing filters called Video Band Width Filters (VBW). This smoothed signal is then passed through Positive or Negative peak detection circuits and the output is converted to digital signal by a Analog to Digital Convertor (ADC) circuit.
The results are then written (in digital word format) to a Dual Port RAM through one of the ports.

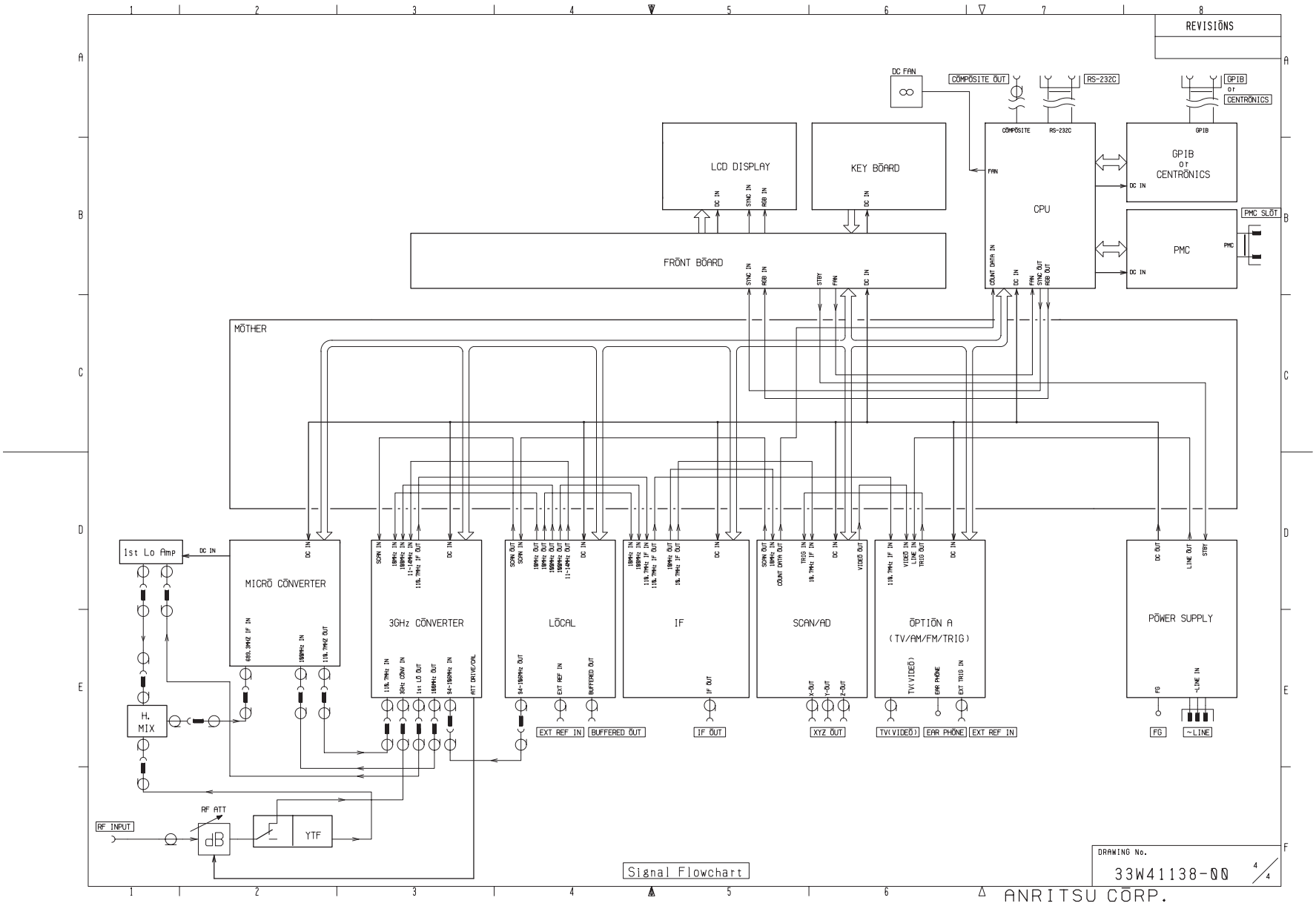
The CPU of the instrument on CPU section reads from the other port of Dual Port RAM and processes the data before displaying on the LCD screen. The CPU also controls various interface functions such as reading the Key Inputs or remote control commands received, and various outputs such as prints or plots of various data. The CPU also generates various commands required for controlling or setting of all hardware units inside the instrument.

FRONT BOARD section generates the KEY and rotary-knob encoder data, drives the LEDs, detects the power switch (PWR SW) setting, controls the power-supply On/Stby setting, and supplies power for the LCD backlight, etc.


APPLICATIŌN
REVISIŌNS
RF INPUT
RF ATTN
ATT:0 to 70dB (10dB step)
CAL ŌSC
RF CŌNVERTER
0~3.2GHz CŌNVIN
3.5~7.5GHz
1st LŌCAL
4110.69MHz
MIX
110.7MHz_IF
2B1
YTŌ
VCŌ
4GHz
SAMPLER
PFD
SAMPLING PD
CAL ATT
625kHz
ATT:0~80dB
10MHz
94~106MHz
11~14MHz
SCAN
100MHz
0~3.2GHz
WAVE Absorber Line
~3.2GHz
YTF
YTF/SW
2.92~21.2GHz
H.MIX
1st LŌ AMP
LŌCAL
689.31MHz
110.69MHz
800MHz
f/8
MICRŌ CŌNVERTER
160MHz
113~137MHz
118~148MHz
AFC
SPAN≧1MHz
SPAN≦1MHz
SPAN ATT
3F1
PD
160MHz VCXŌ
ŌCXŌ 10MHz
(ŌPTIŌN)
2C1
DEP
QTY ITEM PART No.
DESCRIPTIŌN
MATERIAL
FINISH
NŌTE
CHECKED BY
APPRŌVED BY
DRAWN BY
DESIGNED BY
SCALE
TITLE
MS2665C
ŌVERALL BLŌCK DIAGRAM
DRAWING No.
33W41138-00
*1
4
ANRITSU CŌRP.


REVISIONS
IF6 OUTPUT
(10.69MHz)
IF
SCAN/AD
10.695MHz
IF AMP
MIX
10.7MHz_IF
BW=15kHz
BW=30kHz~3MHz
1dB STEP
BW=30kHz~3MHz
10dB STEP
10.69MHz
IF AMP
450kHz
IF AMP
MIX
MIX
10dB STEP
BW=30kHz~26kHz
10dB STEP
10.24MHz
VCXO
D/A
10MHz
10MHz
10.69MHz
LOG/LIN DC
VIDEO
OPTION
FM DISC
FM4RANGE
2MHz/V
2.138MHz
FM DISC
MIX
200kHz/V
699kHz
10MHz
FREQ1
COUNTER
Hz
COUNT DATA
10MHz
COUNT_DATA
SOUND MONITOR
AM/FM MONITOR
10.7MHz
WIDE IF
AM/FM
IF DET
AM/FM
TV
VOLUME
AF AMP1
AUDIO
OPTION
SPEAKER
EARPHONE
VIDEO
10.69MHz
WIDE1BAND1DET
TRIG SOURCE
10.7MHz IF
VIDEO
WIDE VIDEO
EXT
COMPA
-RATOR
TRIG SOURCE
TV
EXT.VIDEO
LINE
TRIG
TRIG
IN
EXT2TRIG IN
±10V/TTL
LINE
LINE
TRIG/GATE
OPTION
DRAWING No.
33W41138-00
2/4
ANRITSU CORP.


REVISIONS
SCAN/AD
CPU
(OPT) X
(OPT) Y
(OPT) Z
VIDEO
VIDEO
GATE
DET MODE
SAMPLE
POS_PEAK
NEG_PEAK
ST≧20ms
HIGH RESOLUTION
16bit
DUAL PORT RAM
DATA INHIBIT
COUNT DATA
POS PEAK
RESET
NEG PEAK
RESET
ST<20ms TIME DOMAIN ONLY
HIGH SPEED
HI-SPEED AD
16bit
FIFO
OPTION
TRIGGER DELAY
SWEEP SIGNAL GENERATOR
X
Z
GATE COUNT SIGNAL GENERATOR
QP_DET
QP DET
TRIG
SCAN
COUNT_DATA
TRIG
LINE
SCAN
COMPOSITE ENCODER
COMPOSITE OUT
BRIGHTNESS
WAVE_RGB
SYNC
RGB
H-SYNC
V-SYNC
LCD DISPLAY
SYNC SEPARATOR
RS-232C INTERFACE
STBY
FAN
DC FAN
POWER SW TEMP SENSOR
PWR SW
LED
KEY BOARD LED
KEY ENCODER
KEY
LED
ROTARY ENCODER
FRONT BOARD
RS-232C
PMC INTERFACE
MEMORY_CARD SLOT
or
GPIB INTERFACE
GPIB
PMC/GPIB
CENTRONICS INTERFACE
PARALLEL
PMC/CENTRONICS
OPT
DC POWER
~LINE AC100V/200V
POWER SUPPLY
STBY
LINE
FG
DRAWING No.
33W41138-00
3/4
ANRITSU CORP.


REVISIONS
DC FAN
COMPOSITE OUT
RS-232C
GPIB or CENTRONICS
COMPOSITE
GPIB
LCD DISPLAY
KEY BOARD
CPU
GPIB or CENTRONICS
PMC SLOT
PMC
FRONT BOARD
MOTHER
1st Lo Amp
MICRO CONVERTER
3GHz CONVERTER
LOCAL
IF
SCAN/AD
OPTION A (TV/AM/FM/TRIG)
POWER SUPPLY
H. MIX
RF INPUT
RF ATT
YTF
EXT REF IN
BUFFERED OUT
IF OUT
XYZ OUT
TV(VIDEO)
EAR PHONE
EXT TRIG IN
FG
~LINE
Signal Flowchart
DRAWING No.
33W41138-00
4/4
ANRITSU CORP.

2.2 Troubleshooting

2.2.1 Introduction

2.2.1.1 Service kit

The ordering number of service kit is 34Y117630.

Table 2-2-1 Service kit

Name	Quantity	Drawing number	Description
Adjustment driver	1	34Z99432	
Adjustment driver	1	34Z81433	
Torque wrench	1	34B35154	
HRM554S	2	NO. 1305	NP-SMAJ adapter
HRM501	2	NO. 1305	SMAJ-SMAJ adapter
HRM519	2	NO. 1305	SMAP-BNCJ adapter
Extender cable	3	34J92837F	BNC-PJ-1.5, 27DP-LP-1.5, 300 mm
Extender cable	3	34J94207	27DP-BJ, 27DP-LP-1.5, 300 mm
Extender cable	2	S4J10001F	BNC-P, 1000 mm
Extender cable	3	S4W10184C	SMA-P-3T-NI (8), 300 mm
Extender cable	1	349J109862	for A08 LOCAL-A
Extender cable	1	34Y109639	for 3 GHz CONVERTER
Extender cable	1	34Y109632	for A05 SCAN/AD
Extender cable	1	34Y109632B	for A09 OPTION BASE
Extender cable	2	34Y109632C	for A09 OPTION BASE
Extender cable	2	34Y109632D	for A05 SCAN/AD

2.2.1.2 Required equipment

Table 2-2-2 shows the equipment to prepare for overall adjustment of the spectrum analyzer.

Table 2-2-2 Required equipment

Nomenclature	Model number	Manufacture
Synthesized signal generator	MG3633A	Anritsu
Frequency counter	MF76A	Anritsu
Swept frequency synthesizer	6769B	Anritsu
two Power meters	ML4803A	Anritsu
Power sensor	MA4701A	Anritsu
Power sensor	MA4705A	Anritsu
Digital multimeter	HP3478A	Hewlett Packard
GPIB interface board	GPIB-PC2/2A	National Instruments Corp.
two 3 dB attenuators		
IBM-PC/AT compatible		
a printer		

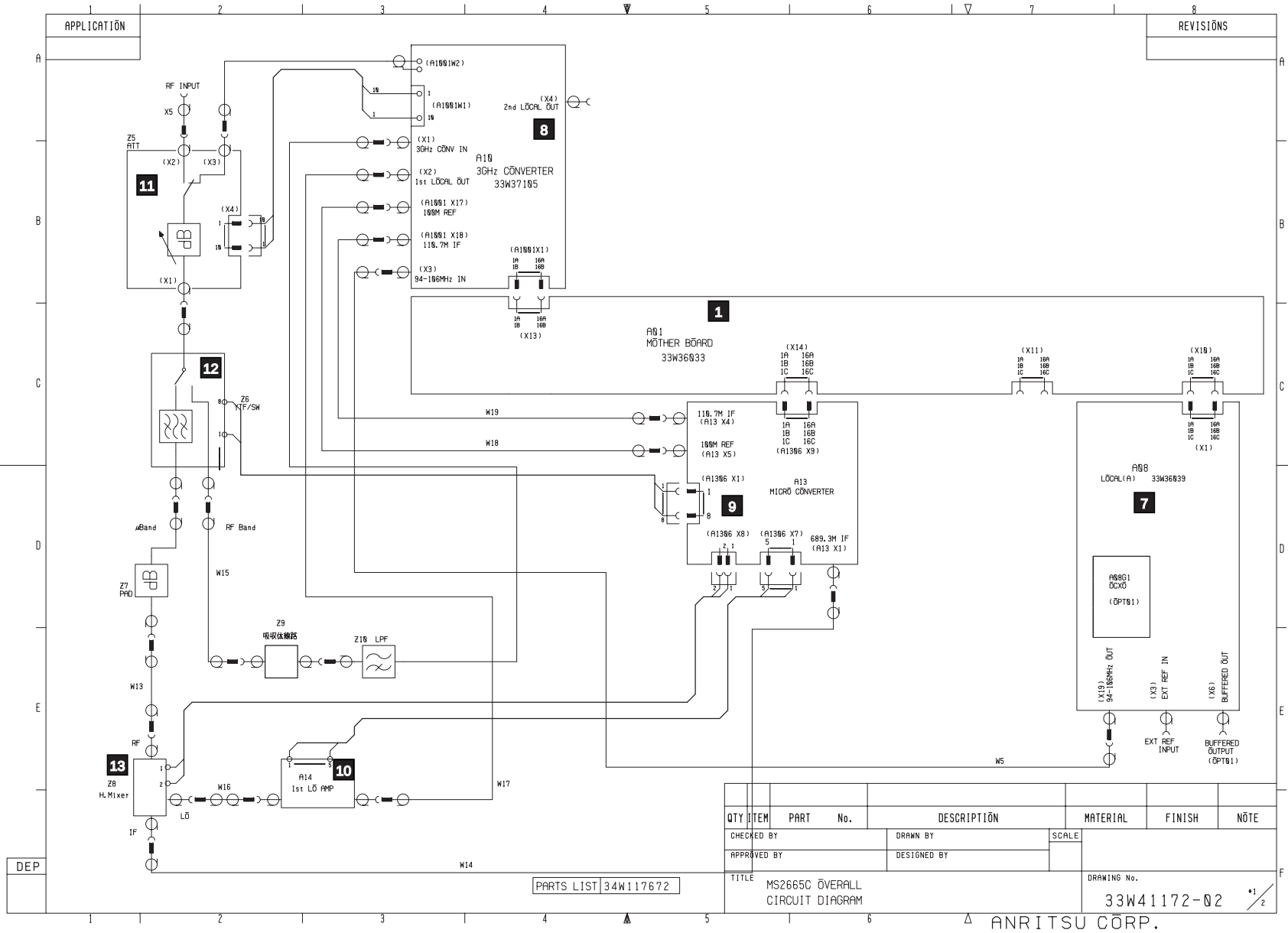
2.2.1.3 Circuit reference

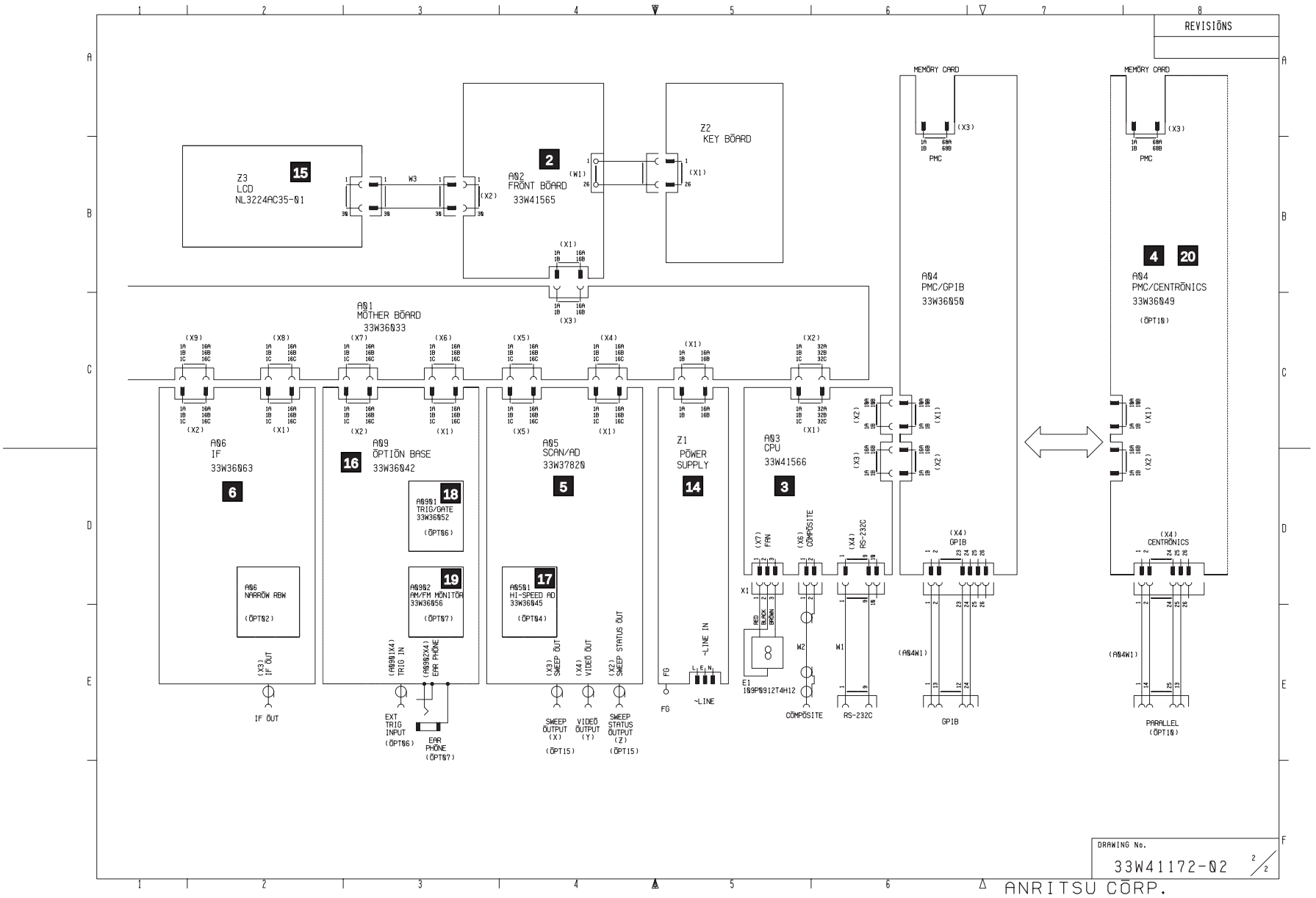
This paragraph supplies the exchangeable module list of the spectrum analyzer with its overall circuit diagram.

Table 2-2-3 Exchange modules of the MS2665C

Schematic number	Name	Model number	Ordering number	Note
1	A01 MOTHER BOARD	322U12876	34Y106673	
2	A02 FRONT BOARD	322U14223	34Y118357	
3	A03 CPU	322U14225	34Y118358	
4	A04 PMC/GPIB	322U12853	34Y106693	
5	A05 SCAN/AD	34Y112923C	34Y112923C	
6	A06 IF (B)	322U13830	34Y106718	
7	A08 LOCAL-A	322U12849	34Y106679	
8	3GHz CONVERTER	34Y108179B	34Y108179B	
9	A13 MICRO CONVERTER	34Z110446C	34Y110446C	
10	A14 1ST LO AMP	34Z110447	34Y110447	
11	21GHz S-ATT	339H37752	339H37752	
12	21GHz YTF/SW	329H13289	329H13289	
13	H.MIXER	329H13290	329H13290	
14	POWER SUPPLY UNIT	34Z112975	34Z112975	
15	TFT LCD MODULE	NL3224AC35-01	No1256	
16	A09 OPTION BASE	322U12930	34Y106684	
Options				
17	A0501 HI-SPEED AD	332U36333	34Y106688	Option 04
18	A0901 TRIG/GATE	322U12979	34Y106695	Option 06
19	A0902 AM/FM MONITOR	322U12981	34Y106699	Option 07
20	A04 PMC/CENTRONICS	34Y106692B	34Y106692B	Option 10

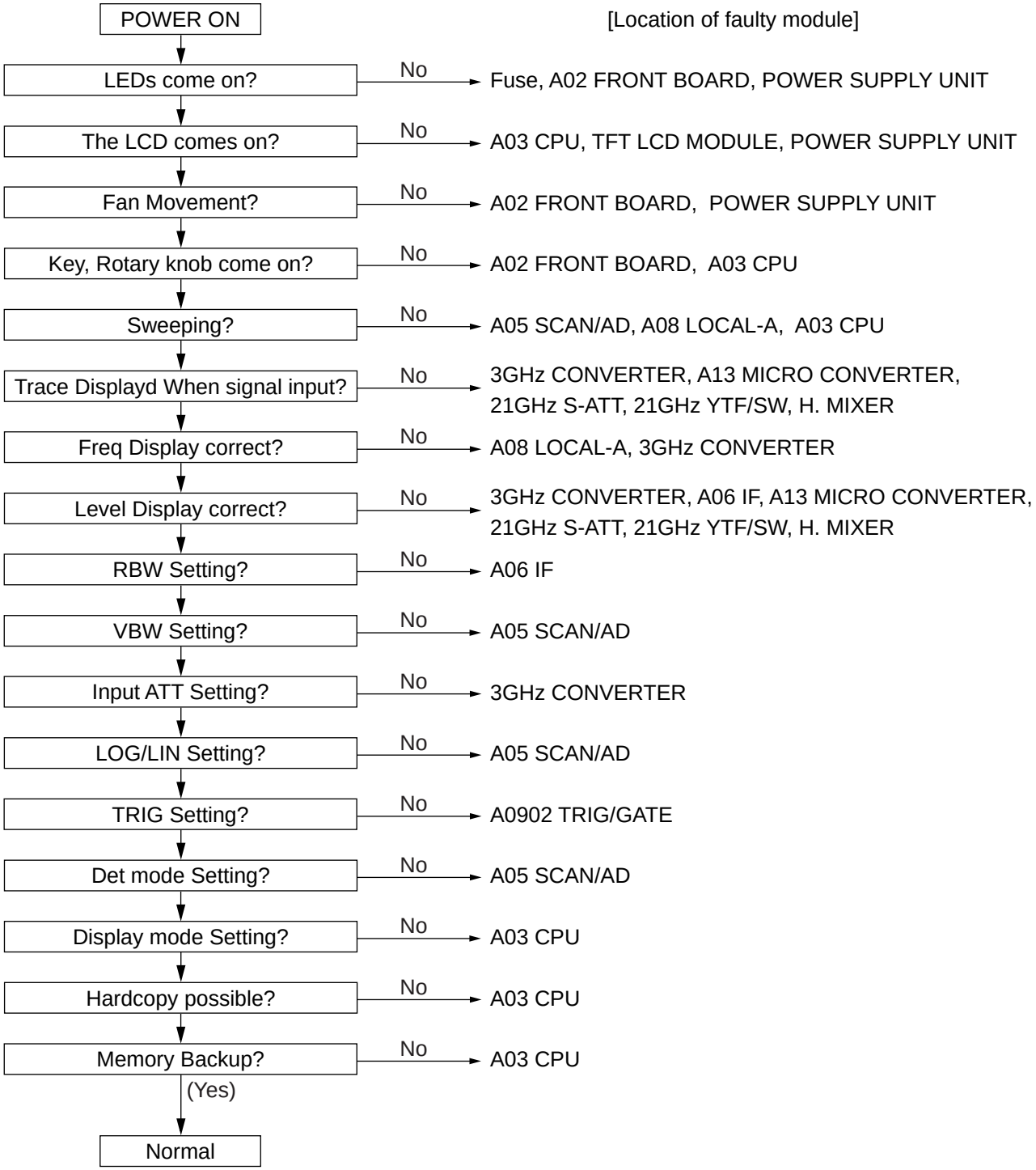
To identify a exchange module, a label printed “Model number” is pasted on module.


APPLICATIÕN
REVISIÕNS
RF INPUT
X5
Z5
ATT
(X2)
(X3)
11
dB
(X1)
12
Z6
RTF/SW
W19
W18
A1Ø
3GHz CÕNVERTER
33W37185
(X1) 3GHz CÕNV IN
(X2) 1st LÕCAL ÕUT
(A1ØØ1 X17) 1ØØM REF
(A1ØØ1 X18) 116.7M IF
(X3) 94-186MHz IN
(X4) 2nd LÕCAL ÕUT
8
(A1ØØ1W2)
(A1ØØ1W1)
(A1ØØ1X1)
(X13)
1
AØ1
MÕTHER BÕARD
33W36Ø33
(X14)
(X11)
(X10)
116.7M IF (A13 X4)
1ØØM REF (A13 X5)
(A13Ø6 X9)
(A13Ø6 X1)
A13
MICRÕ CÕNVERTER
9
(A13Ø6 X8)
(A13Ø6 X7)
689.3M IF (A13 X1)
AØ8
LÕCAL(A) 33W36Ø39
7
AØ8G1
ÕCXÕ
(ÕPTØ1)
(X19) 94-186MHz ÕUT
(X3) EXT REF IN
(X6) BUFFERED ÕUT
EXT REF INPUT
BUFFERED ÕUTPUT (ÕPTØ1)
W5
W15
W13
W16
W17
W14
RF Band
dB
Z7
PAD
Z9
吸収体線路
Z1Ø LPF
RF
13
Z8
H.Mixer
LÕ
IF
A14
1st LÕ AMP
10
DEP
PARTS LIST 34W117672
QTY ITEM PART No. DESCRIPTIÕN MATERIAL FINISH NÕTE
CHECKED BY
APPRÕVED BY
DRAWN BY
DESIGNED BY
SCALE
TITLE
MS2665C ÕVERALL
CIRCUIT DIAGRAM
DRAWING No.
33W41172-Ø2
*1/2
ANRITSU CÕRP.

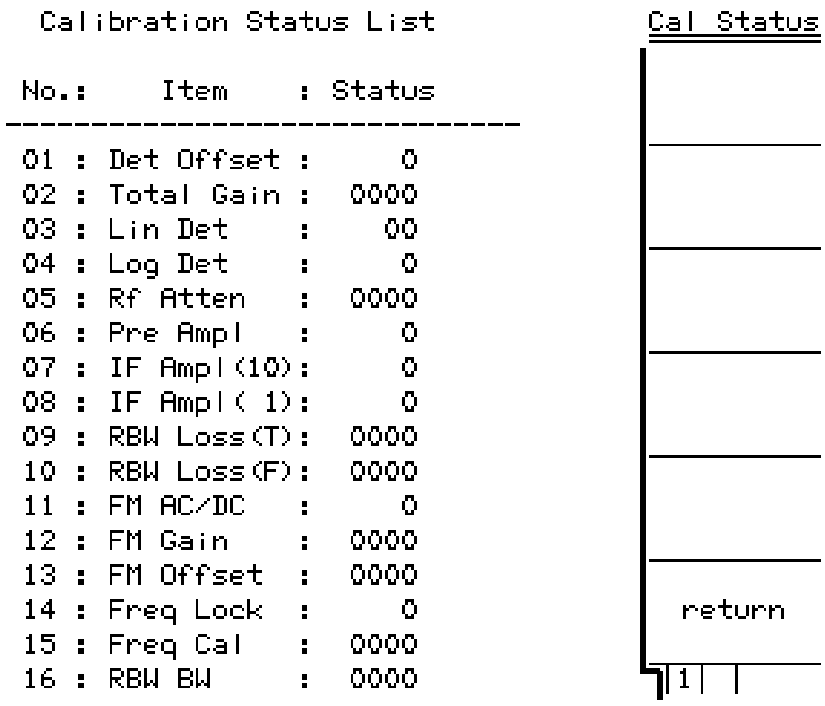

REVISIONS
Z3
LCD
NL3224AC35-01
15
W3
A02
FRONT BOARD
33W41565
2
(W1)
(X1)
(X2)
Z2
KEY BOARD
(X3)
A01
MOTHER BOARD
33W36033
A06
IF
33W36063
6
A09
OPTION BASE
33W36042
16
A0901
TRIG/GATE
33W36052
(OPT06)
18
A0902
AM/FM MONITOR
33W36056
(OPT07)
19
A06
NARROW RBW
(OPT02)
A05
SCAN/AD
33W37820
5
A0501
HI-SPEED AD
33W36045
(OPT04)
17
Z1
POWER
SUPPLY
14
A03
CPU
33W41566
3
A04
PMC/GPIB
33W36050
MEMORY CARD
PMC
4
20
A04
PMC/CENTRONICS
33W36049
(OPT10)
(X9)
(X8)
(X7)
(X6)
(X5)
(X4)
(X1)
(X2)
(X3)
(X7) FAN
(X6) COMPOSITE
(X4) RS-232C
(X4) GPIB
(X4) CENTRONICS
(A04W1)
(A0901X4) TRIG IN
(A0902X4) EAR PHONE
(X3) IF OUT
(X3) SWEEP OUT
(X4) VIDEO OUT
(X2) SWEEP STATUS OUT
FG
~LINE IN
~LINE
E1
109P0912T4H12
W1
W2
RED
BLACK
BROWN
IF OUT
EXT TRIG INPUT (OPT06)
EAR PHONE (OPT07)
SWEEP OUTPUT (X) (OPT15)
VIDEO OUTPUT (Y)
SWEEP STATUS OUTPUT (Z) (OPT15)
COMPOSITE
RS-232C
GPIB
PARALLEL (OPT10)
DRAWING No.
33W41172-02
2/2
ANRITSU CORP.

2.2.2 Detecting faulty module

The flowchart shows the way to locate the faulty module among them.



After executing internal calibration, you can locate the faulty module using “Cal Status” (as shown below). “Cal Status” can be displayed by the key operation : open the second page of Cal menu with “More” key, and press “F5” key.



If error occurred (Status value is not zero), the faulty module corresponding to each item is shown below :

NO.	Error item (at the status is not zero)	Faulty module
01	Det Offset	A05 SCAN/AD
02	Total Gain	A06 IF
03	Lin Det	A05 SCAN/AD
04	Log Det	A05 SCAN/AD
05	RF Atten	HR S-ATT
06	Pre Ampl	3 GHz PRE AMP
07	IF Ampl (10)	A06 IF
08	IF Ampl (1)	A06 IF
09	RBW Loss (T)	A06 IF
10	RBW Loss (F)	A06 IF
11	FM DC/AC	A0902 AM/FM MONITOR
12	FM Gain	A0902 AM/FM MONITOR
13	FM Offset	A0902 AM/FM MONITOR
14	Freq Lock	A08 LOCAL-A
15	Freq Cal	A08 LOCAL-A
16	RBW BW	A06 IF

2.2.3 Disassembling cabinet

Refer to 2.3.1.

2.2.4 Replacement of faulty module

Refer to 2.3.2 to 2.3.5.

2.2.5 Adjustment after module replacement

This paragraph describes the overall adjustment required after replacement of any modules in following Table. Look for modules which you replaced in Table. Please carry out work corresponding to module which you replaced. This adjustment is not necessary, if the module you replaced does not belong to the following Table.

Replaced module	
A08 LOCAL-A	Carry out 2.2.5.1 and 2.2.5.2.
3GHz CONVERTER A13 MICRO CONVERTER 21GHz YTF/SW	Carry out 2.2.5.2 and 2.2.5.3.

2.2.5.1 Reference crystal oscillator (option 01) adjustment

Remark :

Before this adjustment, leave the spectrum analyzer power-on at least for 6 to 7 hours. This adjustment needs a very high accuracy frequency standard (10 MHz).

Required equipment :

(1) MG3633A Synthesized signal generator
(2) MF76A Frequency counter

Setup :

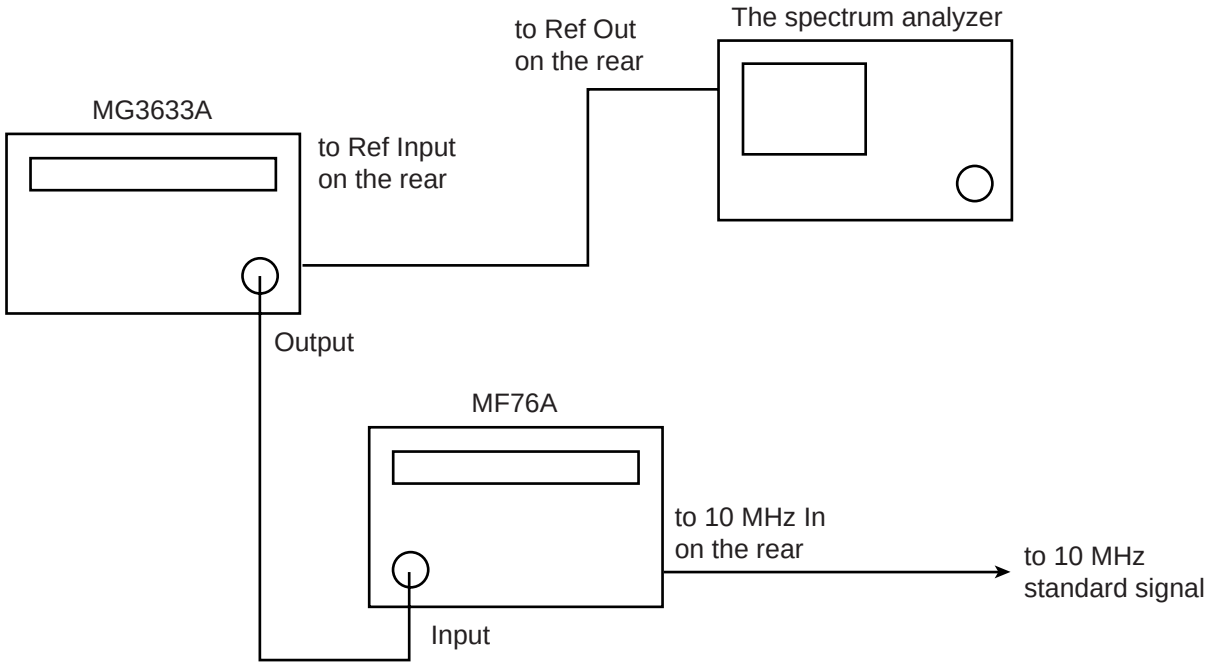


Fig. 2-2-1

(1) Connect the spectrum analyzer Buff Out (on its rear panel) to MG3633A REF INPUT (on its rear panel).
(2) Connect the MG3633A OUTPUT to MF76A Input.
(3) Connect the MF76A EREQ STD 10 MHz IN (on its rear panel) to 10 MHz standard signal. And set the EXT/INT selector switch to EXT.

Procedure :

(1) Set the MG3633A output to :
Center frequency, 1 GHz (CW)
Output level, 0 dBm
(2) Set the MF76A to resolution 1 Hz.
(3) Adjust the "Reference Adjust Screw (Multi-turn potentiometer)" visible through the hole provided on the rear panel (refer to Fig. 2-2-2) to make the MF76A reading 1,000,000,000 Hz ±5 Hz.

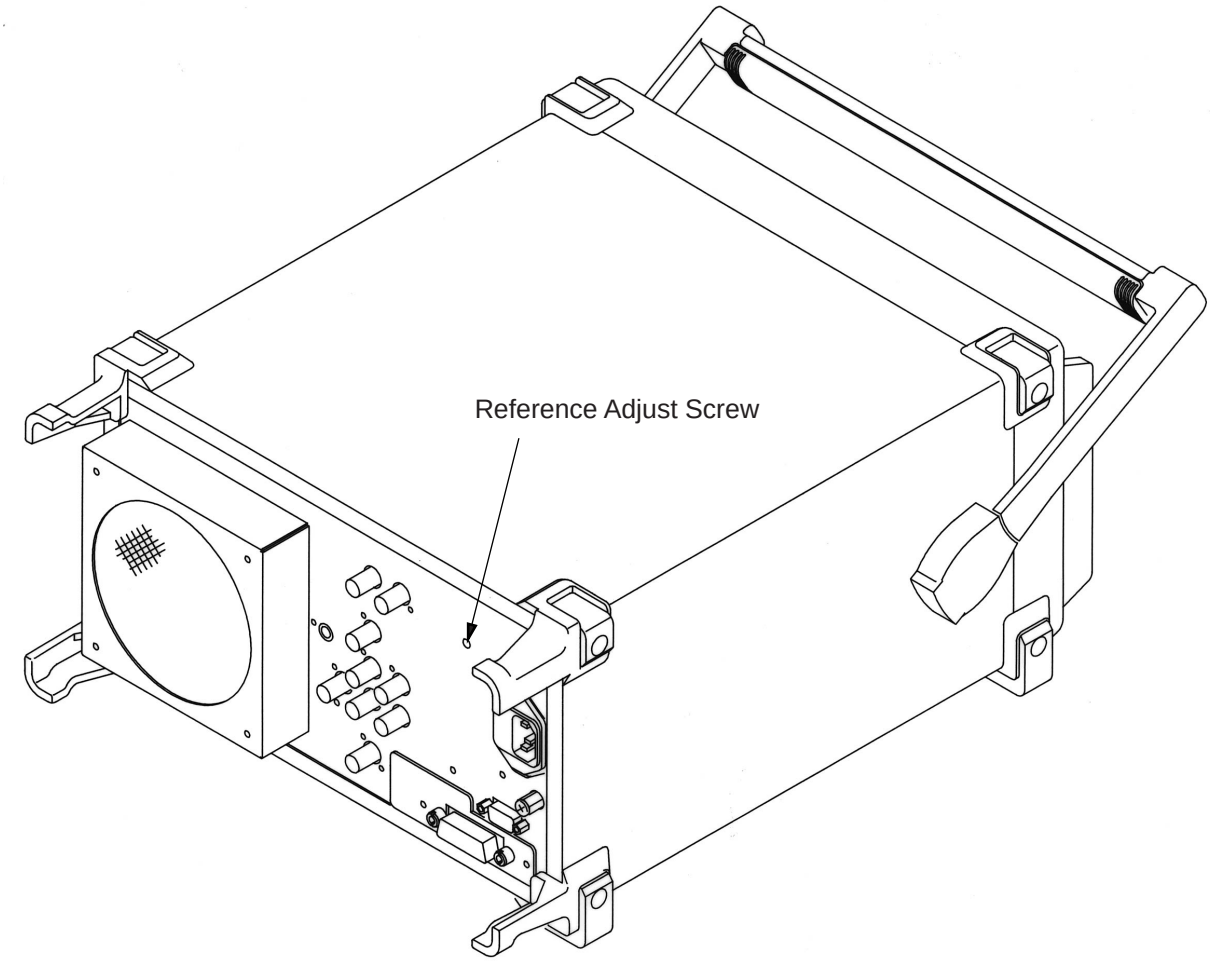


Fig. 2-2-2 The location of an adjuster of Reference crystal oscillator

2.2.5.2 Sweep adjustment

Required equipment :

(1) 6769B Swept frequency synthesizer,
(2) MG3633A Synthesized signal generator,
(3) HP3478A Digital multimeter.

Setup for the procedure (1), (2) :

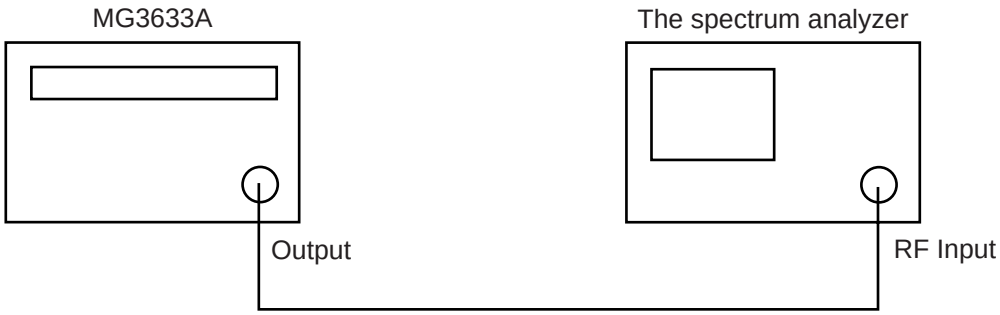


Fig. 2-2-3

Connect the spectrum analyzer RF Input to MG3633A OUTPUT.

Setup for the procedure (3) :

(1) Connect digital multimeter HI input to the TP4 terminal on A1306 MICRO DRIVER PC board attached to A13 MICRO CONVERTER.
(2) Connect digital multimeter LO input to the spectrum analyzer's common.

Setup for the procedure (4), (5), (6) :

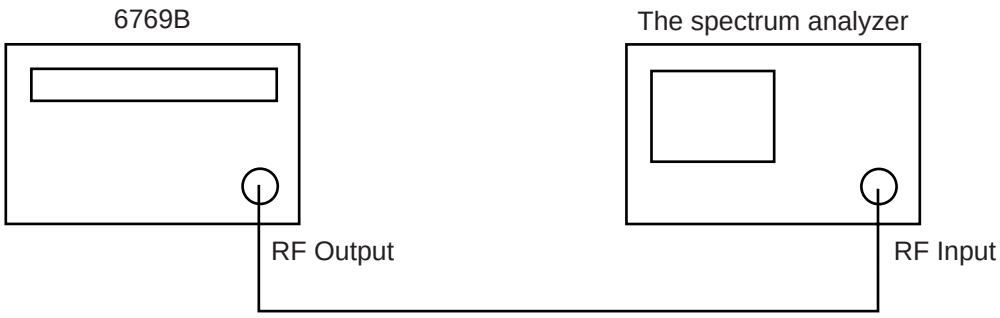


Fig. 2-2-4

(1) Connect the spectrum analyzer RF Input to 6769B RF OUTPUT.

Procedure :

(1) Local sweep adjustment

Initialize the spectrum analyzer and the MG3633A.

1) Set the spectrum analyzer to :
Center frequency, 100 MHz
Span, 100 kHz
Set the MG3633A output to :
LEVEL, -10 dBm
Frequency, 100 MHz (CW)
Press "→CF" key of the spectrum analyzer.

2) Set the MG3633A output frequency to 99.96 MHz (CW).
On the spectrum analyzer, press "Peak Search" key, and set the marker function to delta maker mode (Press "Marker" key and press "F2" key).

3) Set the MG3633A output frequency to 100.04 MHz (CW).
On the spectrum analyzer, press "Peak Search" key, and read the frequency difference between 99.96 MHz input and 100.04 MHz input.

4) Adjust the variable resistor R96 on A08 LOCAL-A (refer to Fig. 2-2-5) until the reading of frequency difference becomes 80 kHz ±200 Hz, to repeat the procedure 2), 3).

(2) YTO FM sweep adjustment

Initialize the spectrum analyzer.

1) Set the spectrum analyzer to :
Center frequency, 1000 MHz
Span, 10 MHz
Set the MG3633A output to :
Frequency, 1000 MHz (CW)
Press "→CF" key of the spectrum analyzer.

2) Set the MG3633A output frequency to 996 MHz (CW).
On the spectrum analyzer, press "Peak Search" key, and set the marker function to delta maker mode (Press "Marker" key and press "F2" key).

3) Set the MG3633A output frequency to 1004 MHz (CW).
On the spectrum analyzer, press "Peak Search" key, and read the frequency difference between 996 MHz input and 1004 MHz input.

4) Adjust the variable resistor R53 on 3GHz CONVERTER (refer to Fig. 2-2-5) until the reading of frequency difference becomes 8 MHz ±40 kHz, to repeat the procedure 2), 3).

(3) YTF tuning DAC adjustment

1) Turn the spectrum analyzer on, while pushing “0” key, and initialize the spectrum analyzer.

2) Set the spectrum analyzer to zero Span.

3) Enter Cal menu by pushing “Shift + 0” keys. Open the second page of the Cal menu, and enter Maintenance menu with “F6” key. Enter RF/Micro converter maintenance menu with “F2” key, and open the 6th page of the menu (Press “More” key 5 times).

4) Set YTF Pre-tuning value to 3600 by pushing “F2” key (assigned YTF Pre-tuning function) and data keys.

5) Adjust the variable resistor R60 on the A13 MICRO CONVERTER (refer to Fig. 2-2-6) to make multimeter reading -3.600 ±0.005 Volts.

6) Set YTF Pre-tuning value to 7600 by pushing “F2” key.

7) Adjust the variable resistor R57 on the A13 MICRO CONVERTER (refer to Fig. 2-2-6) to make multimeter reading -7.600 ±0.005 Volts.

8) Repeat the procedure 4), 5), 6), 7) until you get the required voltage corresponding to each YTF Pre-tuning value.

(4) YTF tuning adjustment

1) Initialize the spectrum analyzer (Press “Preset” key and press “F1” key).

2) After 5 seconds waiting, set the spectrum analyzer to :
Center frequency, 2.92 GHz
Zero Span
Set the 6769B output to :
Frequency, 2.92 GHz (CW)
RF LEVEL, -20 dBm

3) Enter Cal menu by pushing “Shift + 0” keys. Enter Pre-selector Tuning menu with “F6” key.

4) Press “F2” key and set Pre-selector bias value to 0, using the data keys or the knob on the front panel.

5) Adjust the variable resistor R22 on A13 MICRO CONVERTER (refer to Fig. 2-2-6) to make displayed signal level maximum.

6) Set the spectrum analyzer to :
Center frequency, 6.4 GHz
Zero Span
Set the 6769B output to :
Frequency, 6.4 GHz (CW)
RF LEVEL, -20 dBm

7) Enter Cal menu by pushing “Shift + 0” keys. Enter Pre-selector Tuning menu with “F6” key.

8) Press “F2” key and set Pre-selector bias value to 0, using the data keys or the knob on the front panel.

9) Adjust the variable resistor R31 on A13 MICRO CONVERTER (refer to Fig. 2-2-6) to make displayed signal level maximum.

10) Put the screw of the variable resistor R68 on A13 MICRO CONVERTER (refer to Fig. 2-2-6) center in its rotation range.

(5) YTO main sweep adjustment

Initialize the spectrum analyzer and the 6769B.

1) Set the spectrum analyzer to :
Center frequency, 1.5 GHz
Span, 3 GHz
Set the 6769B output to :
RF LEVEL, -10 dBm
Frequency, 1.5 GHz (CW)
Press “→CF” key of the spectrum analyzer.

2) Set the 6769B output frequency to 300 MHz.
On the spectrum analyzer, press “Peak Search” key, and set the marker function to delta marker mode (Press “Marker” key and press “F2” key).

3) Set the 6769B output frequency to 2.7 GHz.
On the spectrum analyzer, press “Peak Search” key, and read the frequency difference between 300 MHz input and 2.7 GHz input.

4) Adjust the variable resistor R57 on 3GHz CONVERTER (refer to Fig. 2-2-5) until the reading of frequency difference becomes 2.4 GHz ±6 MHz, to repeat the procedure 2), 3).

5) Initialize the spectrum analyzer (Press “Preset” key and press “F1” key).
Set the 6769B to :
Frequency, 14.2 GHz (CW)
RF LEVEL, -20 dBm

6) Set Pre-selector bias value to 0, according to above-mentioned procedure.

7) Press “Peak Search” key to place marker indicator on the top of 14.2 GHz signal.

8) Adjust the variable resistors R63 and R64 on A13 MICRO CONVERTER (refer to Fig. 2-2-6) to make the signal level maximum, i.e. increase the level roughly with R63, and then using R64, make it exactly maximum.

(6) Confirmation of YTF tuning

Initialize the spectrum analyzer and the 6769B.

1) Set the spectrum analyzer to :
   Start frequency, 3 GHz
   Stop frequency, 21 GHz
   Log Scale, 2 dB
   Storage Max Hold (Press “A, B” key, press “F5” key and “F2” key).

2) Set the 6769B to :
   F1 frequency, 3 GHz
   F2 frequency, 21 GHz
   RF LEVEL, -10 dBm
   Analog sweep ON
   Sweep time, 50 seconds

3) Confirm that the waveform on the analyzer’s display is flat, after the 6769B finishes its 50-second sweeping.

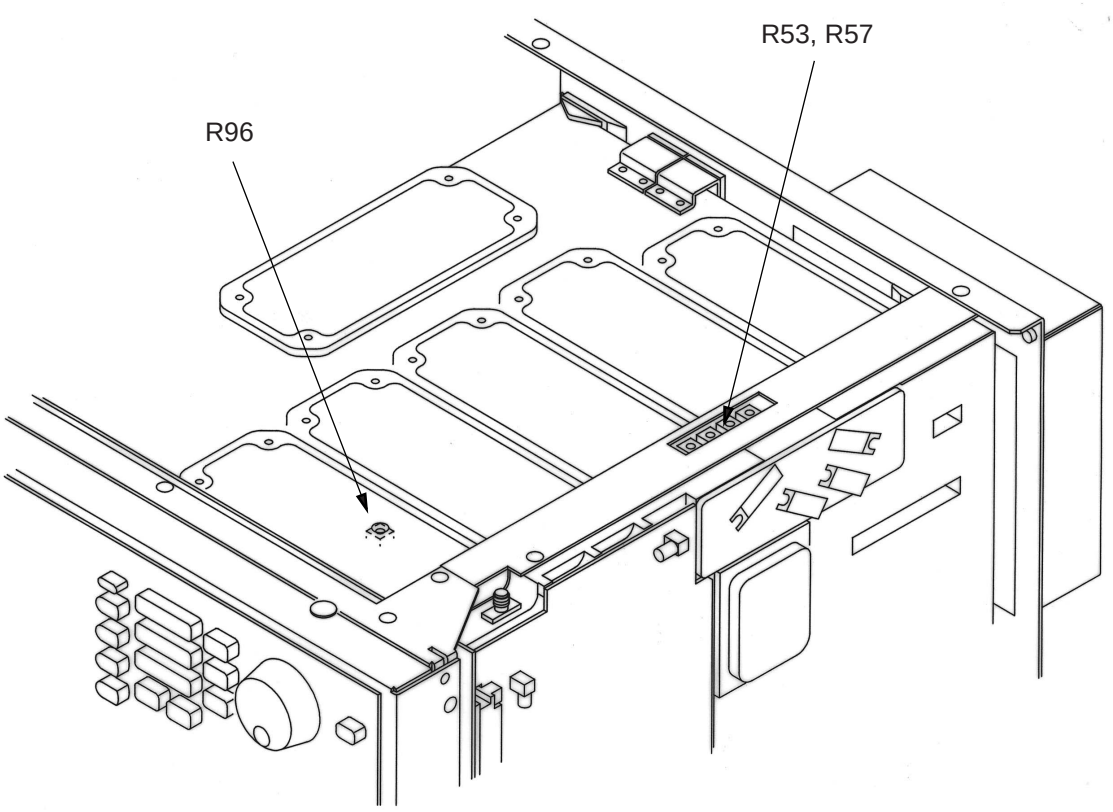


Fig. 2-2-5 The location of adjusters on A08 LOCAL-A and 3GHz CONVERTER

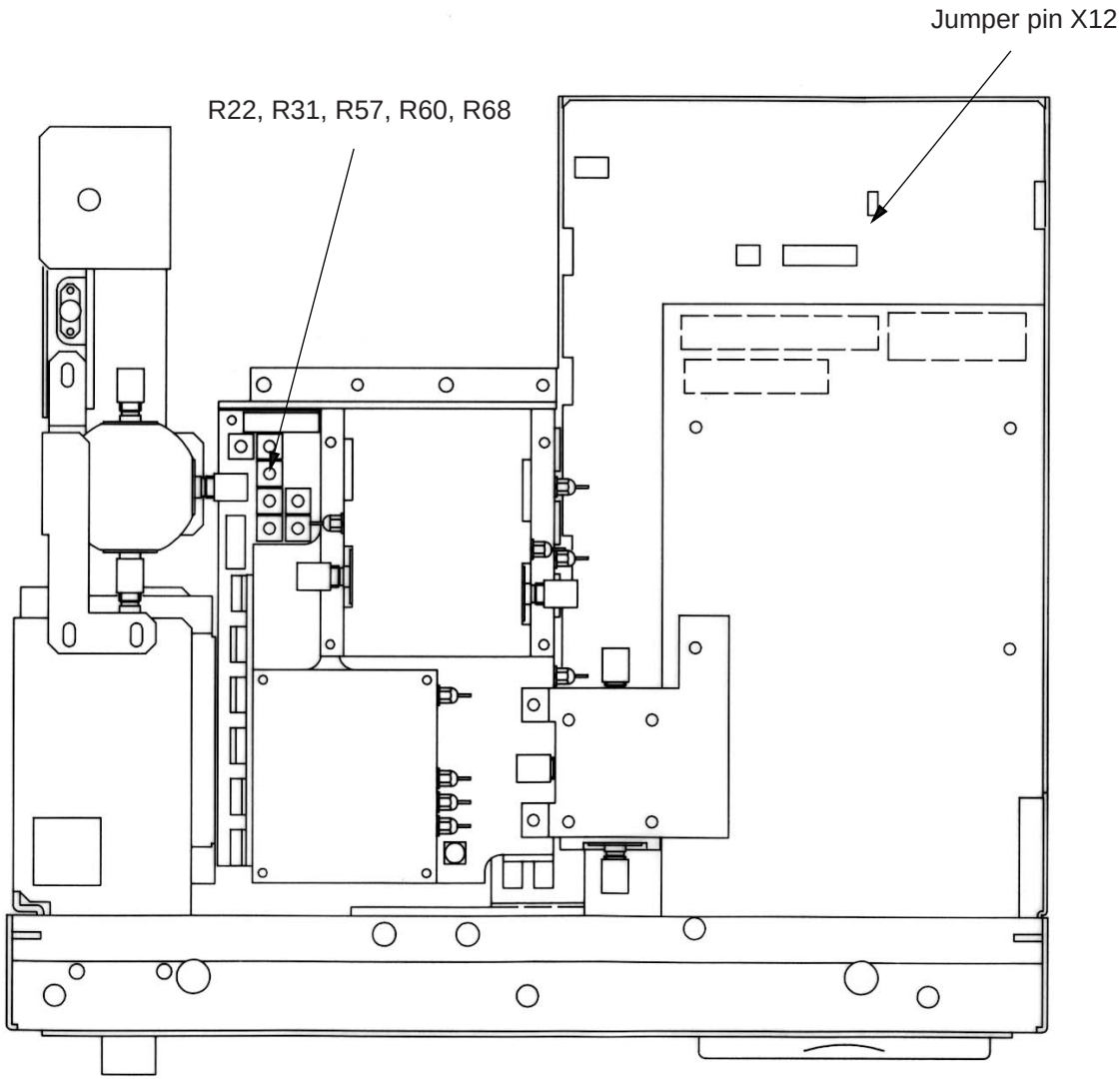


Fig. 2-2-6 The location of adjusters on A13 MICRO CONVERTER

2.2.5.3 IF1 (ATT), IF2 (AMP) adjustment

Required equipment :

(1) 6769B swept frequency synthesizer
(2) ML4803A Power meter
(3) MA4705A Power sensor
(4) IBM PC/AT compatible

Setup :

(1) Connect the spectrum analyzer RF Input to 6769B RF OUTPUT
(2) Connect the spectrum analyzer and the personal computer with RS-232C interface

Procedure :

(1) Turn the spectrum analyzer on, while pushing “0” key.

(2) Initialize the spectrum analyzer :
   1) Enter Preset menu with “Preset” key,
   2) Initialize the spectrum analyzer completely with “F1” key.

(3) Calibrate the spectrum analyzer using its internal calibration function :
   1) Enter Cal menu with “Shift” key and “0” key,
   2) Calibrate the spectrum analyzer by pushing “F1” key.

[Mixer harmonic order 1]

(4) Set mixing mode to Band 1- :
   1) Enter Frequency menu by pressing “Frequency” key, and open its second page with “More” key,
   2) Enter Band menu with “F1” key,
   3) Set mixing mode to Band 1- by pushing “F3” key.

(5) Set the spectrum analyzer to :
   Center frequency, 5.00 GHz
   Span, 1 MHz
   Set the 6769B output frequency to 5.00 GHz (CW).

(6) Adjust the 6769B output level to make power meter reading -10 dBm at the end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s RF Input.

(7) Tune the spectrum analyzer’s pre-selector, using its pre-selector auto tune function :
   1) Enter Cal menu with “Shift + 0” key,
   2) Enter Pre-selector Tuning menu with “F6” key,
   3) Tune the pre-selector by pushing “F1” key.

(8) Read marker level using peak search function (Press “Peak Search” key), and if maker reading is within -10 dBm ±0.2 dB, skip next procedure.

(9) Enter RF/MICRO CONVERTER maintenance menu, and open its 6th page :
   1) Enter Cal menu by pushing “Shift + 0” key. Open the second page of the Cal menu,
   2) Enter maintenance menu with “F6” key,
   3) Enter RF/Micro Converter maintenance menu with “F2” key. Open the 6th page of the RF/Micro Converter maintenance menu (Press “More” key 5 times).
      Adjust IF-Gain 1 and IF-Gain 2 so that the maker reading becomes -10 dBm ±0.2 dB.

[Mixer harmonic order 2]

(10) Set mixing mode to Band 2+ (refer to the procedure (4)).

(11) Set the spectrum analyzer to :
   Center frequency, 12.01 GHz
   Span, 1 MHz
   Set the 6769B output frequency to 12.01 GHz (CW).

(12) Adjust the 6769B output level to make power meter reading -10 dBm at the end of cable, and then connect the cable to the spectrum analyzer’s RF Input.

(13) Tune the spectrum analyzer’s pre-selector (refer to the procedure (7)).

(14) Read marker level with “Peak Search” key, and if marker reading is not within -10 dBm ±0.2 dB, adjust IF-Gain 1 and 2 to make the reading -10 dBm ±0.2 dB (refer to the procedure (9)).

[Mixer harmonic order 3]

(15) Set mixing mode to Band 3+ (refer to the procedure (4)).

(16) Set the spectrum analyzer to :
   Center frequency, 18.201 GHz
   Span, 1 MHz
   Set the 6769B output frequency to 18.201 GHz.

(17) Adjust the 6769B output level to make -10 dBm with power meter at the end of cable, and then connect the cable to the spectrum analyzer’s RF Input.

(18) Tune the spectrum analyzer’s pre-selector (refer to the procedure (7)).

(19) Read the marker level with “Peak Search” key, and if marker reading is not within -10 dBm ±0.2 dB, adjust IF-Gain 1 and 2 to make the reading -10 dBm ±0.2 dB (refer to the procedure (9)).

(20) Write the compensation value of adjusted IF-Gain 1 and IF-Gain 2 to the spectrum analyzer's Flash Memory with Flash Memory writing command "CDW" from personal computer. For example :

CMD > MENTE P2110 ON
CMD > CD40 1, 0
CMD > CD41 1, 3
CMD > CD40 2, 0
CMD > CD41 2, 17
CMD > CD40 3, 0
CMD > CD41 3, 30
CMD > CDW

, where

line 1 makes the spectrum analyzer maintenance mode ON.

<CD40 n, m> is IF-Gain 1 setting statement. "n" is a mixer harmonic order number. "m" is a compensation value in procedure (9), (14), (19) (0 to 255 integer).

Similarly, <CD41 n, l> is IF-Gain 2 setting statement. "l" is the compensation value (0 to 255 integer).

2.2.6 Assembling cabinet

Refer to 2.3.1.

2.2.7 Checking items after assembling cabinet

After switching the power on, check for the following faults.

(1) No burning smell and/or smoke.
(2) Fan rotates
(3) No strange sounds.

After checking the above items, make sure the original defect has been repaired.

2.2.8 Frequency response compensation

Perform Frequency response compensation, when one of the following modules is replaced. This Frequency response compensation is not necessary, if the module you replaced does not belong to the following modules.

- A03 CPU
- 3GHz CONVERTER
- A13 MICRO CONVERTER
- A14 1st LO AMP
- 21GHz S-ATT
- 21GHz YTF/SW
- H. MIXER

Frequency response caused by front-end components such as step attenuator, low pass filter and mixer is corrected by measuring the response and storing the data in instrument's memory.
Frequency response compensation process consists of four steps that are performed semi-automatically with "Frequency Response Compensation" software. The four steps are as follows :

1. DUT (Device Under Test) check,
2. Signal source power output calibration with power meter,
3. Frequency response measurement using the calibrated power output,
4. Compensation data updating.

Required instrument :

(1) 6769B Swept Frequency Synthesizer
(2) MG3633A Synthesized Signal Generator
(3) two ML4803A Power Meters
(4) MA4705A Power Sensor
(5) MA4601A Power Sensor
(6) two 3 dB attenuators
(7) IBM-PC/AT compatible for controller
(8) GPIB-PC2/2A
(9) ML2437A Power Meter (for MS2667C and MS2668C)
(10) MA2444A Power Meter (for MS2667C and MS2668C)

Required software :

(1) MS-DOS Ver. 5.0 or later and Windows 3.1, or Windows 95
(2) Frequency Response Compensation software.

Setup :

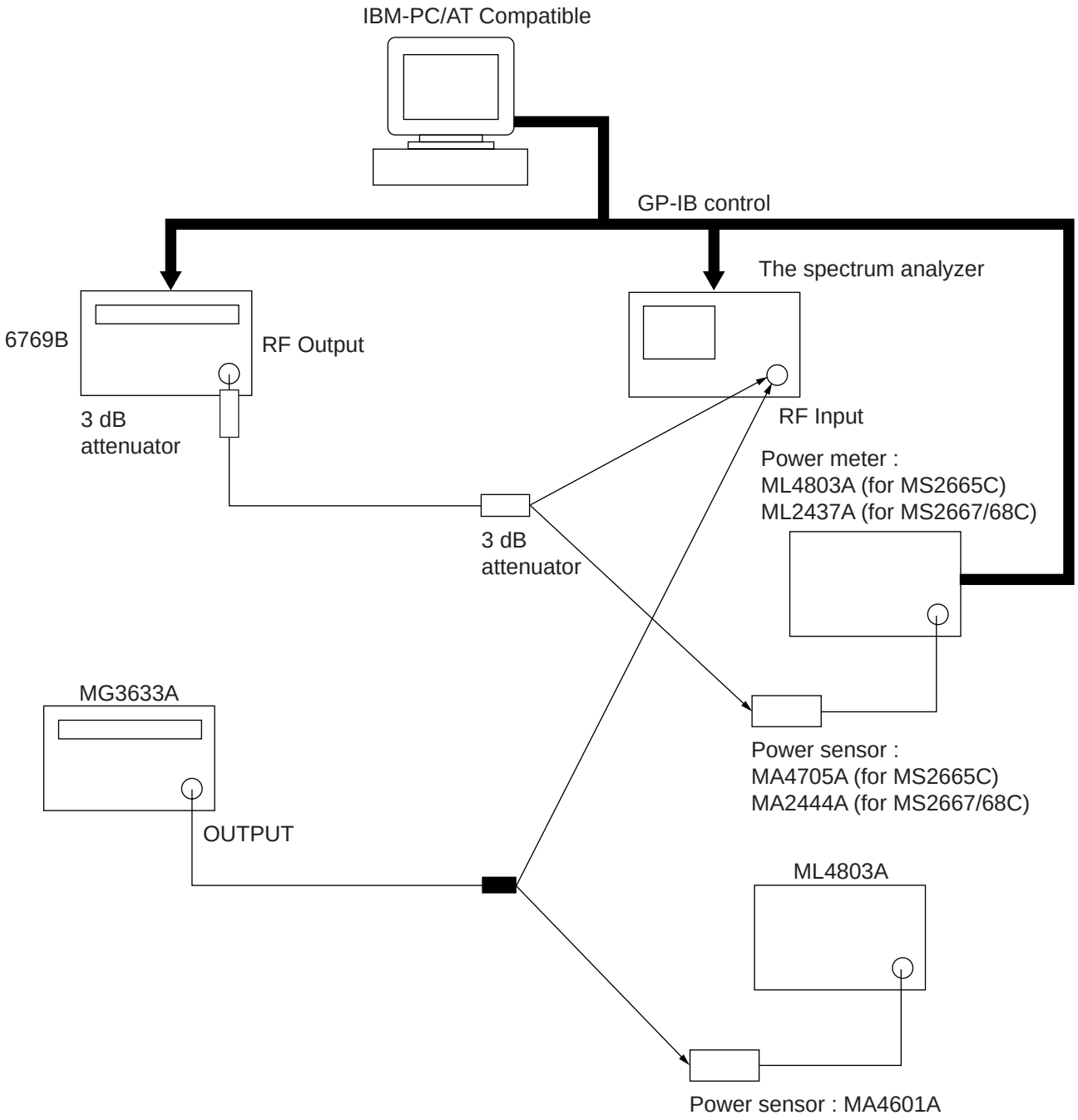


Fig. 2-2-7

(1) At the measurement of frequency response, connect the spectrum analyzer's RF Input to 6769B RF OUTPUT through a signal feeder. The signal feeder consists of a coaxial cable (e.g. SUCOFLEX) less than 1 m length and two 3 dB attenuators attached to each end of the cable.

(2) At the calibration of power output, connect the end of the feeder to power sensor.
Note that 1) the coaxial cable and 3 dB attenuators must be with a frequency range over the spectrum analyzer's range, 2) use a torque wrench for tightening each connection, 3) do not disconnect the connections of the 6769B and the signal feeder after the power calibration in order to keep the measured data valid.

Procedure :

Note that the spectrum analyzer (DUT) and the measuring instruments must be warmed up at least for an hour, before the compensation process.

(1) Run the Frequency Response Compensation program, and then confirm that 6769B output is set to 10 MHz (CW).

(2) After 5 minutes waiting or more, input the serial number of the spectrum analyzer to the personal computer.

(3) Execute "DUT Check" by pushing the button on the PC display.

(4) After internal calibration of the spectrum analyzer, confirm that the spectrum analyzer's "Cal Status" is all zero.

(5) Carry out zero adjustment and sensor sensitivity adjustment on the power meter, and then connect the MA4601A power sensor to the end of the cable from MG3633A OUTPUT.

(6) Set MG3633A output to 625 kHz (CW), and adjust the output level so that power meter reading becomes 0 dBm at the end of the cable, and then connect this end to the spectrum analyzer RF Input.

(7) After "Preset All", set the spectrum analyzer to :
Center frequency, 625 kHz
Span, 50 kHz
RBW, 10 kHz
VBW, 1 kHz
Atten, 10 dB
Reference Level, 0 dBm

(8) On the spectrum analyzer's display, read the marker level of 625 kHz signal, and input the reading to "625 kHz CAL OSC Level" space on the PC display. For example: when marker reading is 0.30 dBm, input "0.30" to the space.

(9) Measure the 6769B power output with “6769B output calibration” program.

1) Connect the 6769B RF OUTPUT to the MA4601A (for MS2665C) or MA2444A (for MS2667/68C) through a signal feeder. The signal feeder consists of a coaxial cable (e.g. SUCOFLEX) less than 1 m length and two 3 dB attenuators attached to each end of the cable. Note : Use a torque wrench for tightening each connection.
2) Run the “6769B output calibration” program by pushing the button on the PC display.
3) Change the power sensor for the MA4705A according to PC message. (for MS2665C only)
4) Before going to next step, leave the 6769B at least for 5 minutes after the program stopping.
Note that 1) The connections of the 6769B and the signal feeder must not be disconnected after the measurement in order to keep the measured data valid, 2) this measurement is needed once a day, as long as the 6769B is power on.

(10) Connect the end of the signal feeder to the spectrum analyzer RF Input.

(11) Run “Frequency Response Measurement” program with the button on the PC display.

(12) Write frequency response compensation data into the spectrum analyzer’s memory with the button on the PC display.

2.3 Mechanical configuration

2.3.1 Disassembling/Assembling cabinet

(1) Removing Feet (① to ⑧)
Remove the S1/S2/S3 screws and remove the S3 screw of the rear.

(2) Removing around cover ⑩
Remove the four S1 screws (① to ④) and remove the S3 screw of the rear.
Remove the around cover ⑩ to pull backward.

(3) Removing Front Frame ⑪
After (1) removing procedure, remove the ⑪ to pull forward.

To assemble, perform inversely.

Parts List

①	32E11805A	Front foot
②	32E11805B	Front foot
③	32E11806A	Front foot Receiver
④	32E11806B	Front foot Receiver
⑤	32E11807A	Rear foot
⑥	32E11807B	Rear foot
⑦	32E11808A	Rear foot Receiver
⑧	32E11808B	Rear foot Receiver
⑨	34Y107601	Tilt handle 3/4MW
⑩	333B35279	Around cover assembly
⑪	32E13058	Front frame

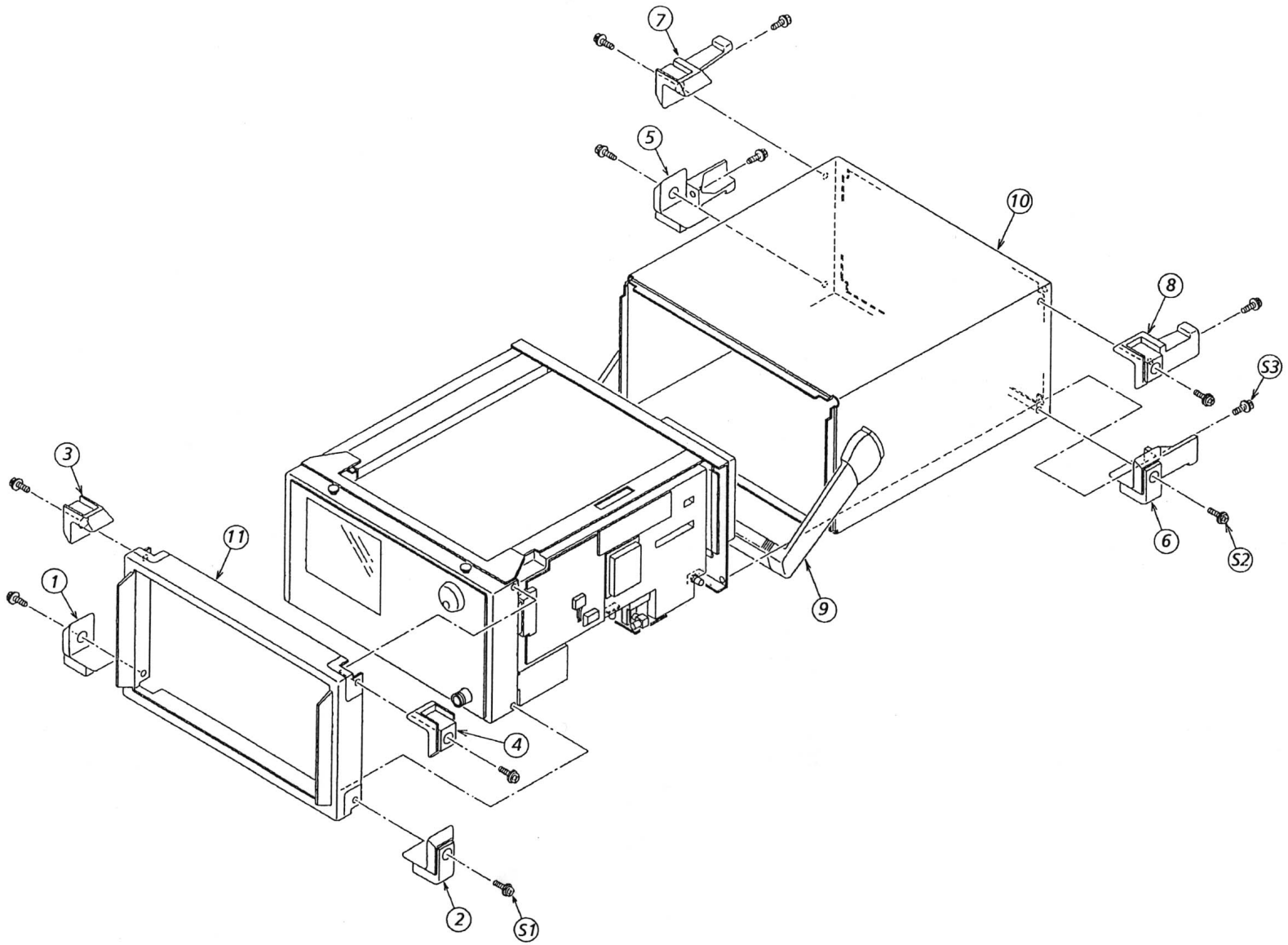


Fig. 2-3-1

2.3.2 Removing/Assembling units and PC boards

(1) Removing MICRO CONVERTER ④ and 1ST LO AMP ⑤
After removing the screws and each cables, remove the ④ ⑤ to pull backward.
(2) Removing Step Attenuator ③ Band ATT Angle ②
After removing the S1/S2 screws, remove the ② ③.
(3) Removing 21 GHz YTF/SW ⑦
After removing the Angle ⑧, remove the ⑦
(4) Removing PMC/GPIB ⑱ and CPU board ⑰
After removing the S3 screw, remove the ⑰ ⑱ to pull backward.
To assemble, perform inversely.

Parts List

① 34J107713	N-J SMA-P Adapter
② 332B36744B	ATT Angle
③ 339H37752	21GHz Step Attenuator
④ 34Y110446C	A13 MICRO CONVERTER
⑤ 34Y110447	A14 1ST LO AMP
⑥ 329H13290	H.MIXER
⑦ 329H13289	21GHz YTF/SW
⑧ 34B111361	Angle
⑨ 33B38019	Plate
⑩ 34J110924	Semi-rigid cable
⑪ 439H32078	SMA-Attenuator
⑫ 34J117955	Semi-rigid cable
⑬ 33J41281	Semi-rigid cable
⑭ 33J41282	Semi-rigid cable
⑮ 34J110713	Semi-rigid cable
⑯ 34J117700	Semi-rigid cable
⑰ 34Y106690	A03 CPU
⑱ 34Y106693	A04 PMC/GPIB
or 34Y106692B	or A04 PMC/CENTRONICS

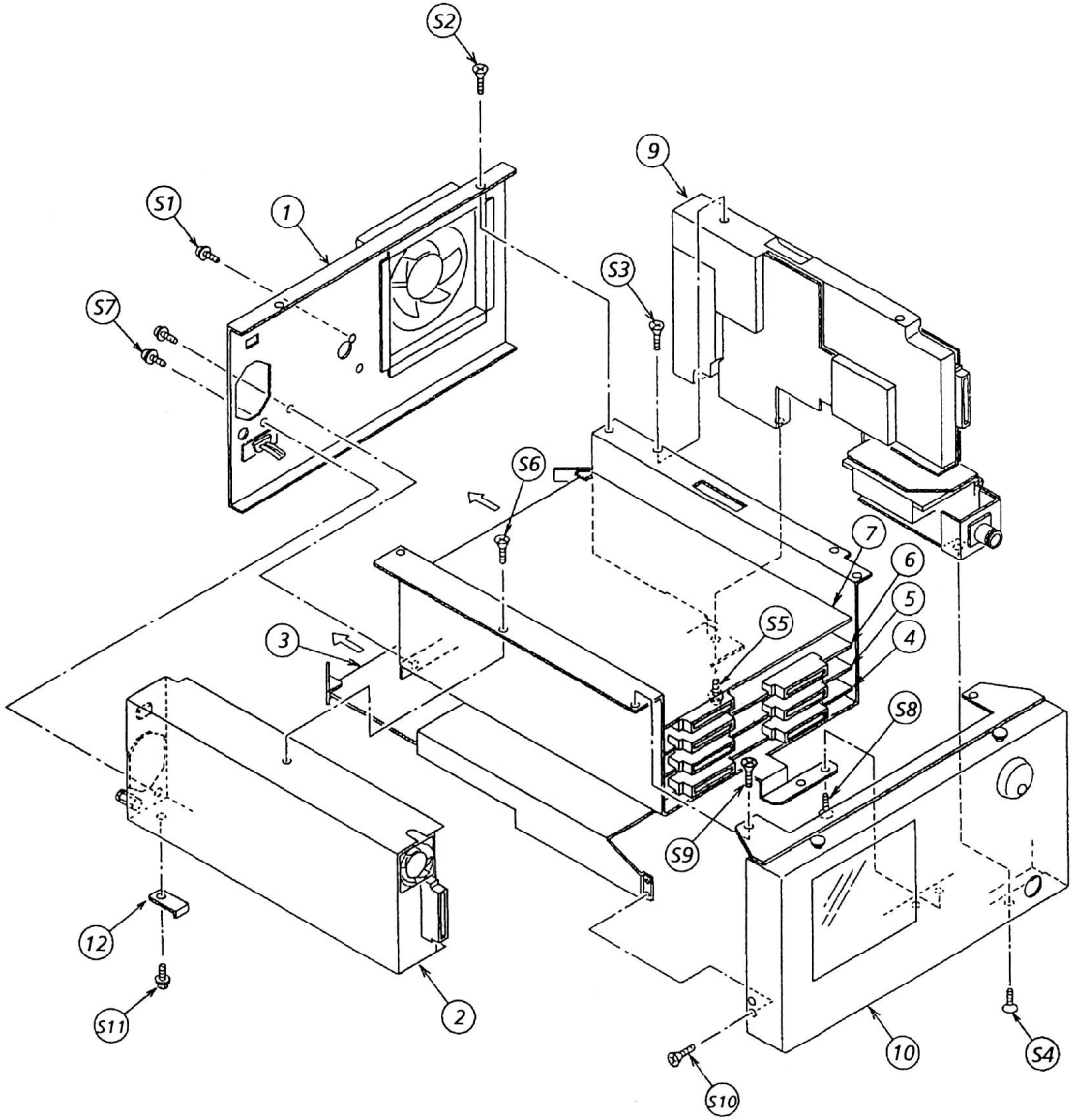


Fig. 2-3-2

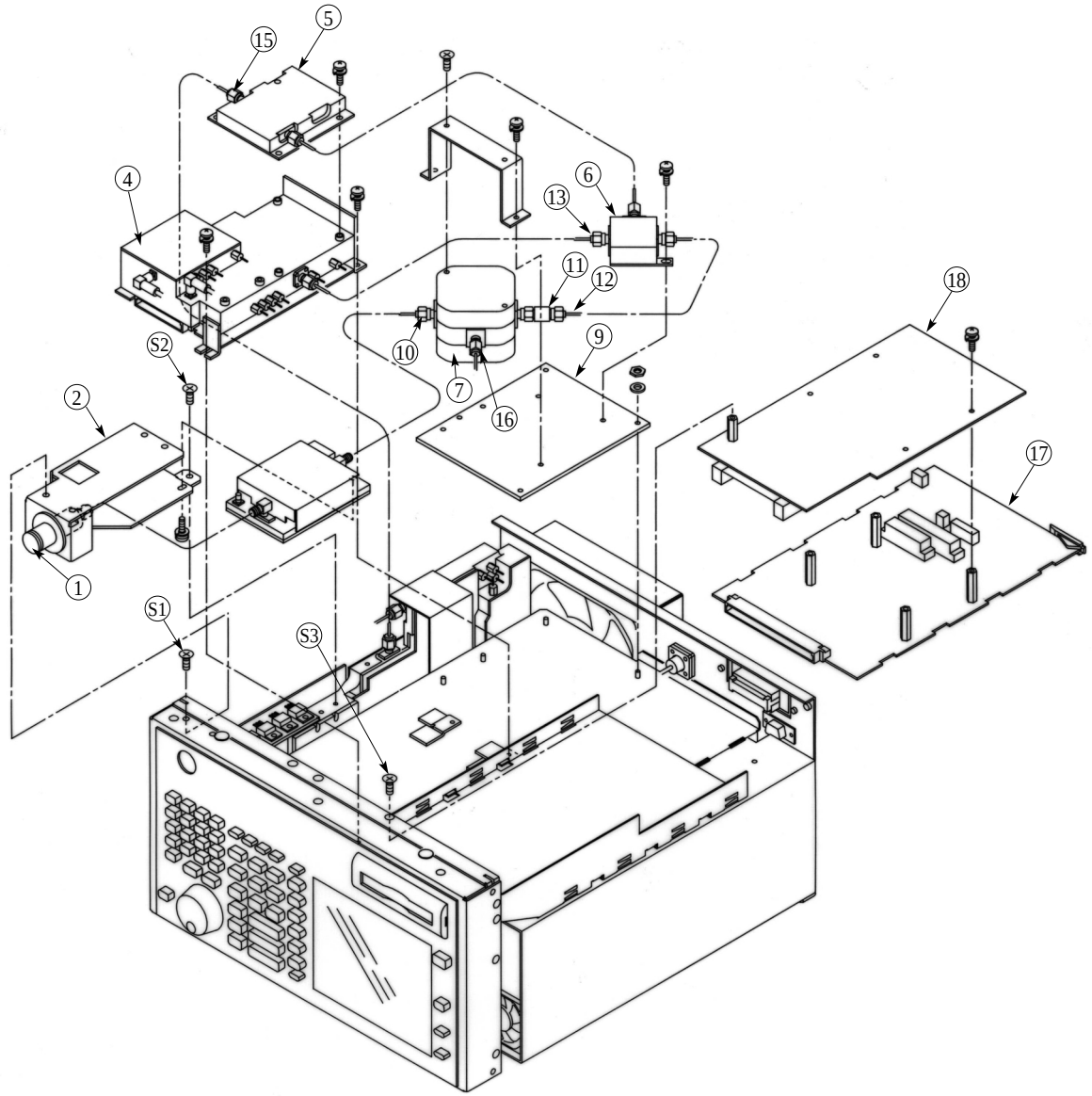


Fig. 2-3-3

2.3.3 Front unit disassembly/assembly

Removing TFT LCD MODULE

(1) After removing the S1, S2 screws and encoder knob ⑤, remove the front panel ①.

(2) After removing the S3 screw, remove the ②, ③ and ④ to pull forward.

(3) After removing the S4 screw and each cables, remove the LCD ②.

To assemble, perform inversely.

Parts List

① 322B13049	Front panel
② No1256	TFT LCD MODULE
③ 332B40222	LCD panel
④ 322B13048	Front cover
⑤ 33E32858	Encoder knob
⑥ 34Y106676	A02 FRONT BOARD
⑦ 34Y106673	A01 MOTHER BOARD

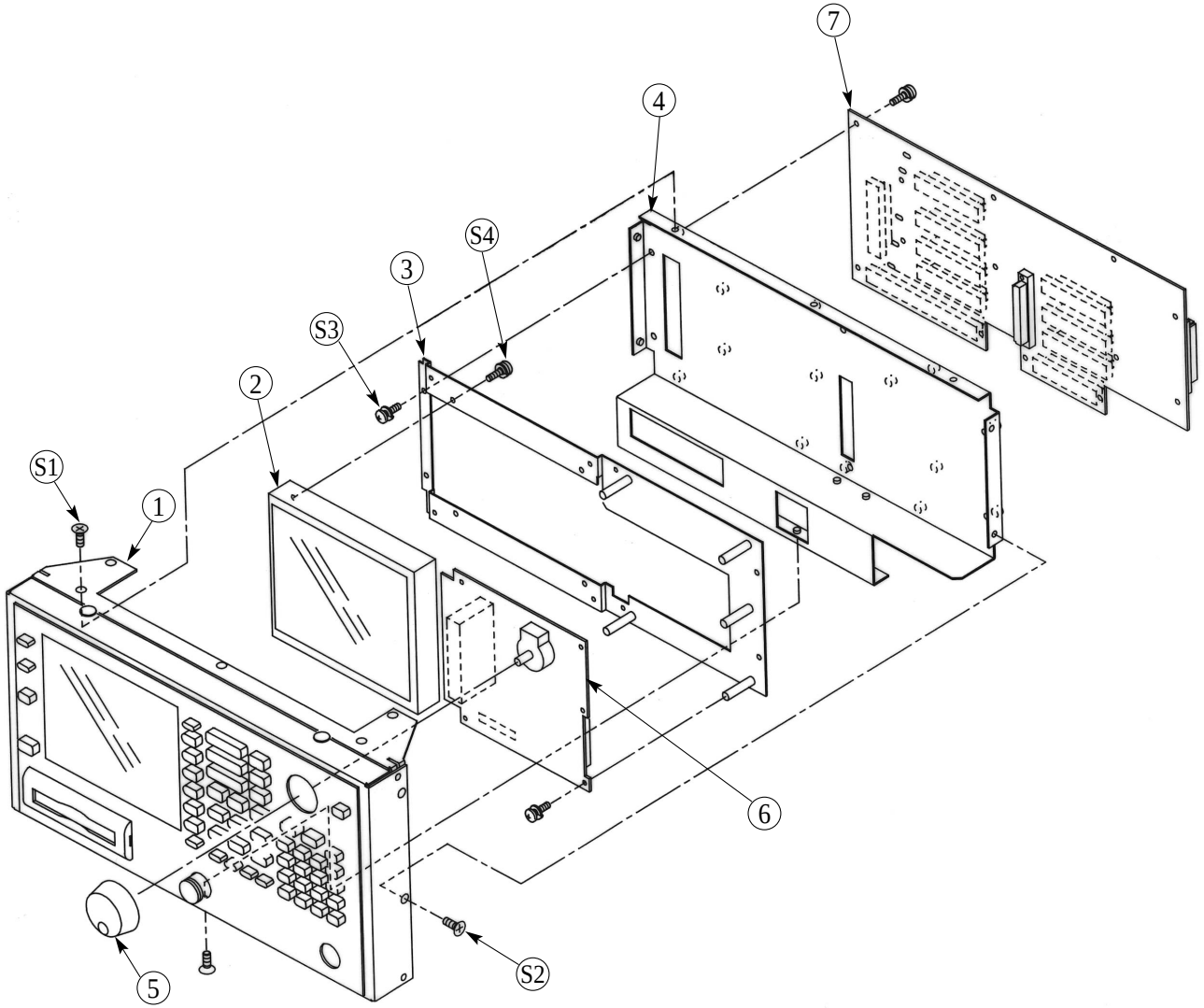


Fig. 2-3-4

2.3.4 A09 OPTION BASE disassembly/assembly

Parts List

① 34Y106684	A09 OPTION BASE
② 34Y106695	A0901 TRIG/GATE
③ 34Y106699	A0902 AM/FM MONITOR
④ 34Y106697	A0903 TV MONITOR
⑤ 34Y113473 or 34Y117105	A0904 QP DETECTOR

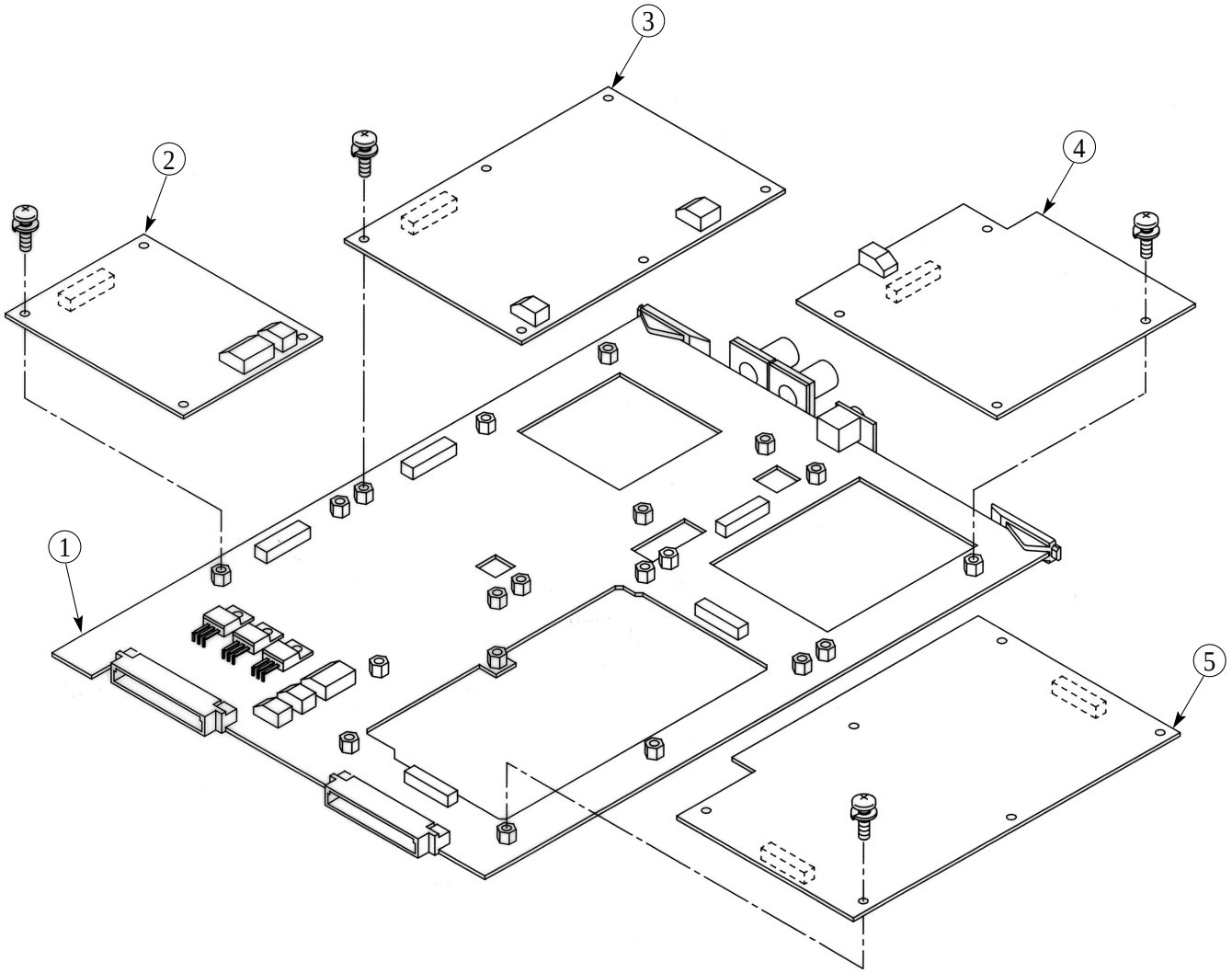


Fig. 2-3-5

2.3.5 Removing/Assembling A0501 HI-SPEED AD from A05 SCAN/AD

Parts List

①	34Y112923A or 34Y112923C	A05 SCAN/AD
②	34Y106688	A0501 HI-SPEED AD

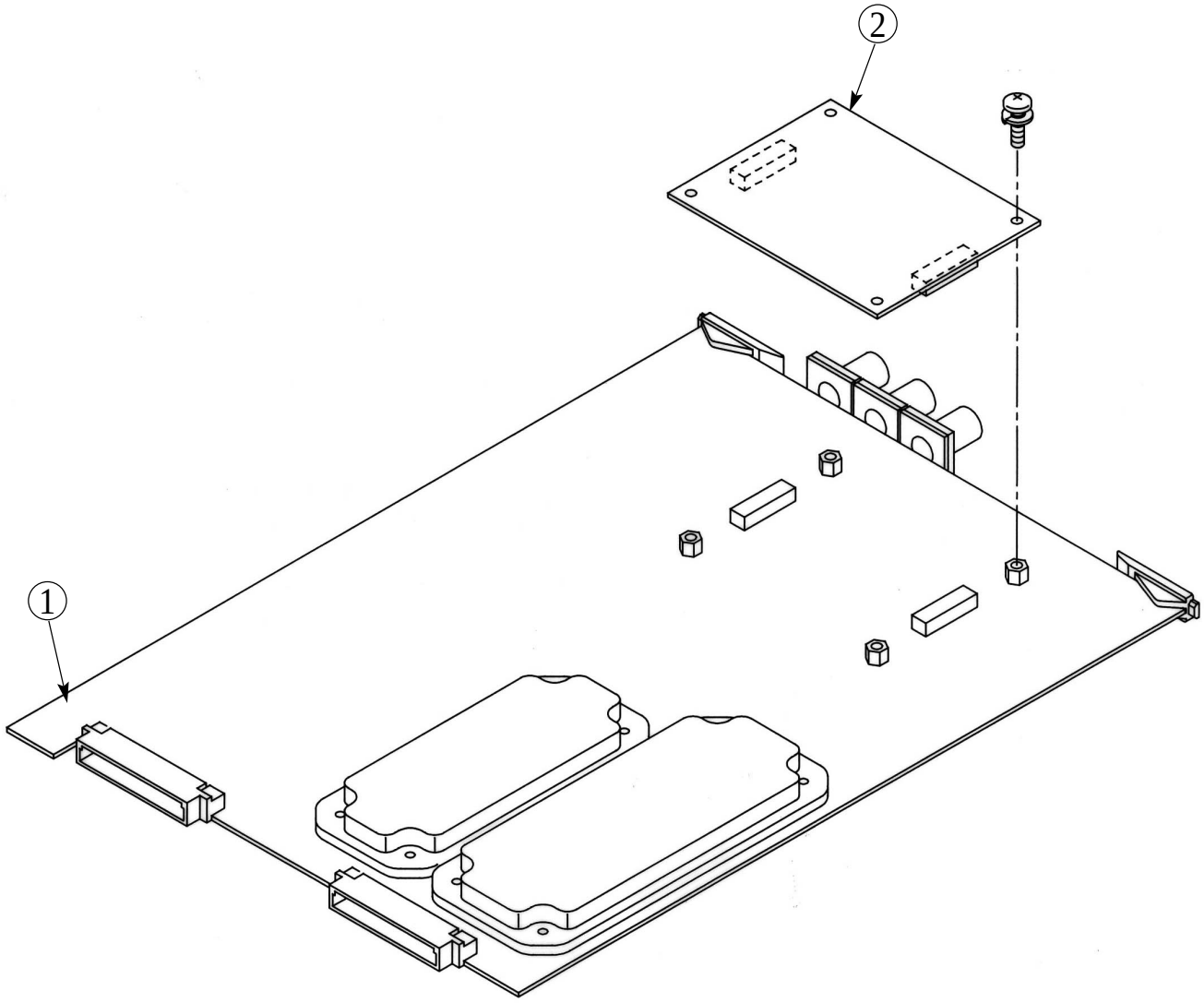


Fig. 2-3-6

Section 3 MS2667C

3.1 Overall Circuit description

MS2667C is a superheterodyne system scanning-type spectrum analyzer.
This section describes overall circuit of the MS2667C spectrum analyzer with its block diagram.

An RF input signal after passing through an RF switch and variable RF ATTN in Switched Attenuator is switched by Diplexing Bandswitch to two different signal routes depending on input RF frequency.

For an RF input frequency of 9 kHz to 3.1 GHz (termed as band 0), the signal passes through 3.2 GHz LPF and then to 1st mixer (1st MIX), where it is mixed with 1st local signal (4.1 GHz to 7.2 GHz) to generate 4110.69 MHz 1st IF signal.
The 1st IF signal is then passed through an amplifier and image rejection filters, and fed to 2nd mixer (2nd MIX), where it is mixed with 4 GHz 2nd local signal to generate 110.690 MHz 2nd IF signal.

For an RF input frequency of 3.1 GHz to 30 GHz (band 1 to 5), the signal goes to YTF (YIG tuned filter), and then to 30 GHz H.MIXER. In 30 GHz H.MIXER, the RF signal gets mixed with the 1st local signal (3.6 GHz to 7.5 GHz) to generate 689.31 MHz 1st IF signal.
This 1st IF signal is passed through a series of amplifiers and image rejection filters before further mixing with 800 MHz 2nd local signal to convert the signal to the 110.690 MHz 2nd IF signal.

Depending on the active band of RF input, one of the two above 2nd IF signal is sent to IF section for further processing.

The 1st local signal generated at YTO (YIG tuned oscillator) is frequency-swept by scan signal from SCAN/AD section after phase-lock to reference signal (its frequency is 11 MHz to 14 MHz with the resolution of 1 Hz steps) generated on LOCAL-SP1, 2 section at the center frequency of its sweeping range, in normal sweep condition.

The YTO output is passed through an amplifier, and then divided into three paths with directional couplers. One of divided signal is fed to sampler circuit and the other are fed to the above mixers to frequency-convert.
In the sampler circuit, sampling signal (its frequency is 94 MHz to 106 MHz with the resolution of 1 MHz steps) generated on LOCAL-SP1, 2 section is frequency-multiplied, and then mixed with the YTO output to generate sampler IF signal with a frequency of 11 MHz to 14 MHz.
The sampler IF signal is compared with the reference signal of 11 MHz to 14 MHz at PFD.

The reference signal frequency (fREF) and the sampling signal frequency (fs) are controlled by CPU section according to the measuring frequency of the instrument, and set so that the center frequency of 1st local signal is fs * N ± fREF (, where N is an integer).
Meanwhile, the scan signal strength that is equivalent to frequency sweep width is controlled from LOCAL-SP1, 2 section.

The 2nd local signals of 4 GHz and 800 MHz are also phase-locked to 100 MHz VCXO signal, of which the frequency is also phase-locked to 10 MHz crystal oscillator.

In the instrument, a high accuracy 625 kHz signal is present for level accuracy calibration. This signal is generated by frequency-dividing the 10 MHz reference signal, and its power level is varied with 1 dB steps by CAL ATT.
Internal calibration operation being carried out, this calibrating signal is fed to the RF signal-route through the switch in Switched Attenuator.

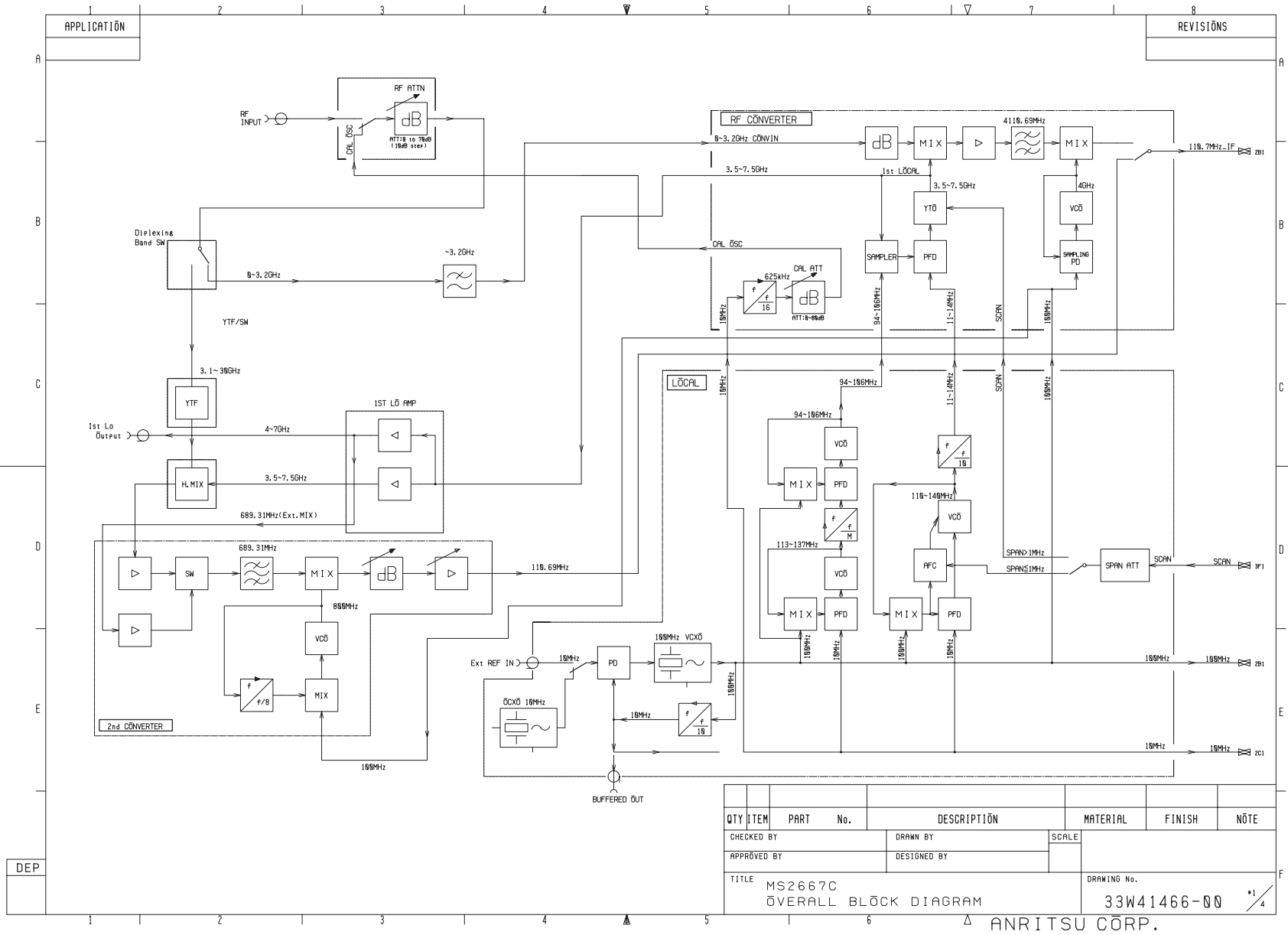
At the IF section the incoming signal is divided into two paths. The main route leads to image rejection filters while the second, a highly attenuated feeler path signal is used for generation of wide band trigger signal in TRIG/GATE section (option 06) situated on OPTION BASE board.
The main signal after passing through an image rejection filter is beat down to a 10.69 MHz signal using a 100 MHz reference signal. This signal is then sent to various Resolution Band Width (RBW) setting circuits.

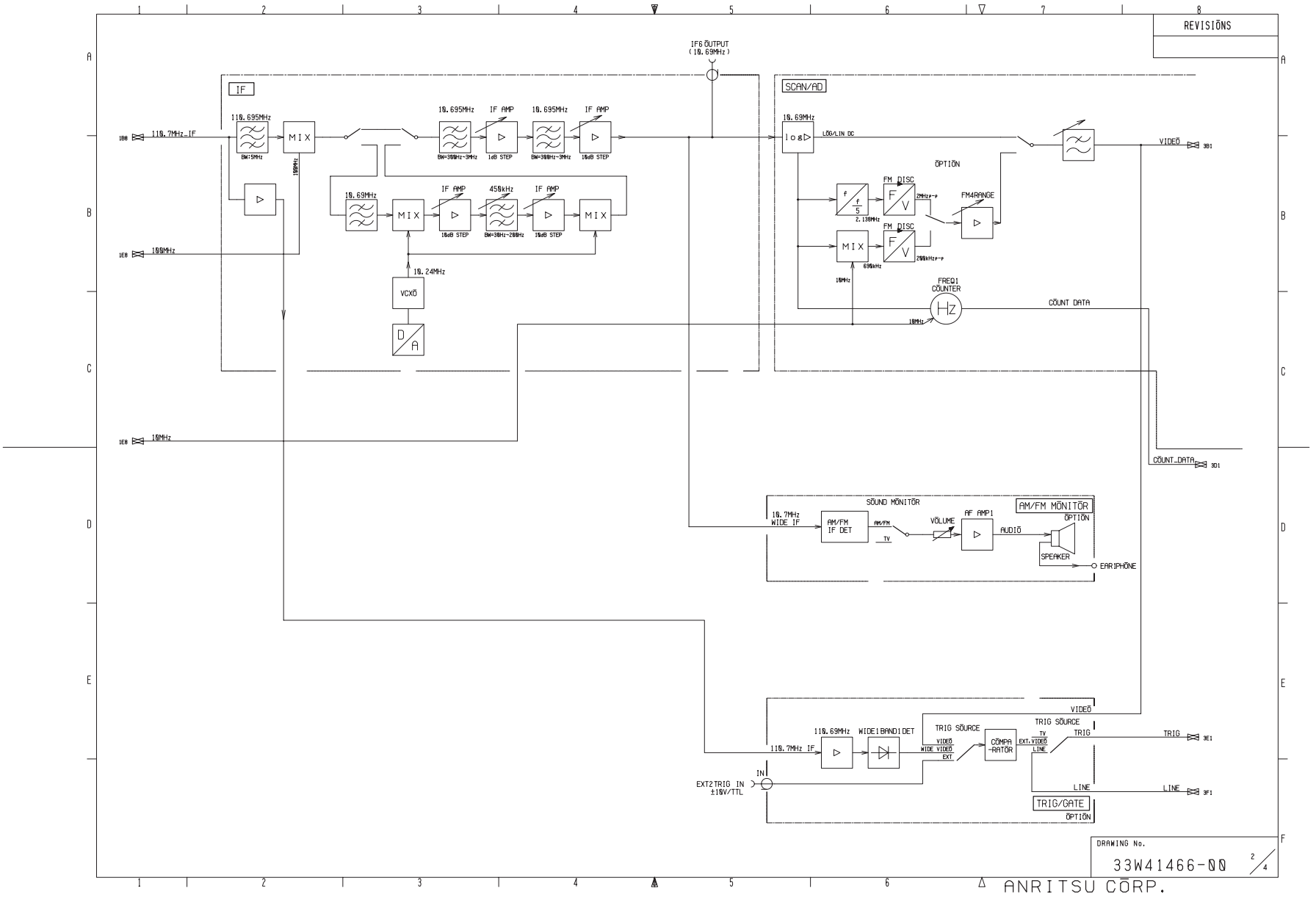
For RBW setting of 30 Hz to 200 Hz the signal is frequency converted to 450 kHz using 10.24 MHz signal. After passing through the RBW circuits (Crystal filter circuits) the signal is up converted back to 10.690 MHz signal and passed through wider RBW setting circuits. For RBW setting of 300 Hz to 3 MHz the signal is sent directly to wide RBW setting circuits without any frequency modifications.

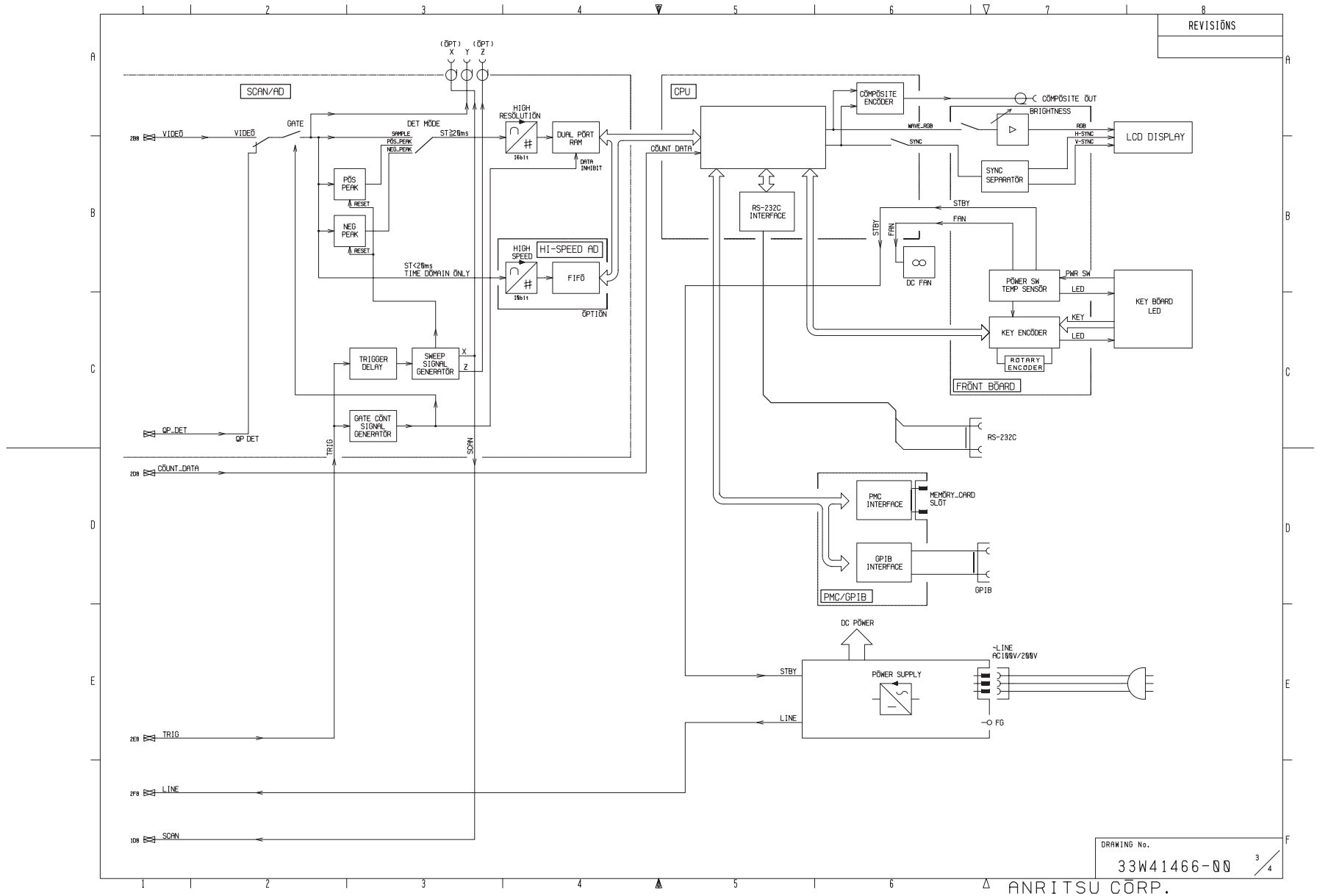
The RBW processed signal is passed onto SCAN/AD section, where it passes through logarithmic amplifiers and then to a linear detector. This linear detected signal is passed through smoothing filters called Video Band Width Filters (VBW). This smoothed signal is then passed through Positive or Negative peak detection circuits and the output is converted to digital signal by a Analog to Digital Converter (ADC) circuit.
The results are then written (in digital word format) to a Dual Port RAM through one of the ports.

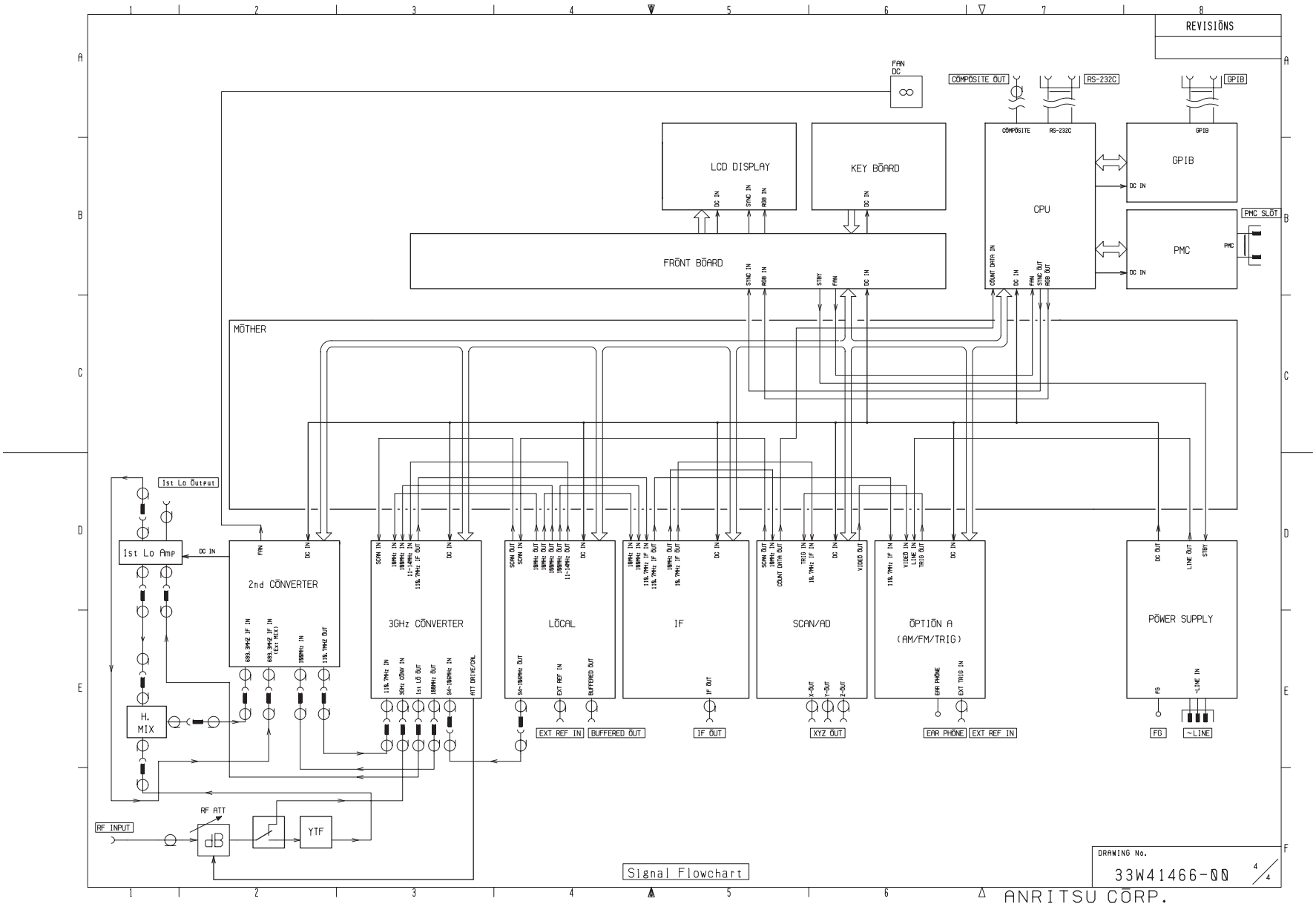
The CPU of the instrument on CPU section reads from the other port of Dual Port RAM and processes the data before displaying on the LCD screen. The CPU also controls various interface functions such as reading the Key Inputs or remote control commands received, and various outputs such as prints or plots of various data. The CPU also generates various commands required for controlling or setting of all hardware units inside the instrument.

FRONT BOARD section generates the KEY and rotary-knob encoder data, drives the LEDs, detects the power switch (PWR SW) setting, controls the power-supply On/Stby setting, and supplies power for the LCD backlight, etc.


APPLICATIÕN
REVISIÕNS
RF INPUT
RF ATTN
CAL ÕSC
ATT:0 to 70dB (10dB step)
RF CÕNVERTER
0~3.2GHz CÕNVIN
411.69MHz
MIX
11.7MHz IF
2B1
3.5~7.5GHz
1st LÕCAL
4GHz
YTÕ
VCÕ
Diplexing Band SW
0~3.2GHz
~3.2GHz
CAL ÕSC
SAMPLER
PFD
SAMPLING PD
CAL ATT
625kHz
ATT:0~80dB
10MHz
94~106MHz
11~14MHz
SCAN
YTF/SW
3.1~30GHz
YTF
1ST LÕ AMP
1st Lo Õutput
4~7GHz
H.MIX
689.31MHz(Ext.MIX)
LÕCAL
SW
SPAN>1MHz
SPAN≤1MHz
SPAN ATT
AFC
113~137MHz
110~140MHz
800MHz
f/8
2nd CÕNVERTER
100MHz VCXÕ
Ext REF IN
PD
ÕCXÕ 10MHz
BUFFERED ÕUT
3F1
2C1
QTY ITEM PART No. DESCRIPTIÕN MATERIAL FINISH NÕTE
CHECKED BY
APPRÕVED BY
DRAWN BY
DESIGNED BY
SCALE
TITLE
MS2667C
ÕVERALL BLÕCK DIAGRAM
DRAWING No.
33W41466-00
*1
4
DEP
ANRITSU CÕRP.


REVISIÕNS
IF
SCAN/AD
IF6 ÕUTPUT
(10.69MHz)
10.7MHz IF
10.695MHz
BW=15kHz
MIX
10.695MHz
IF AMP
BW=30kHz~3MHz
1dB STEP
10.695MHz
IF AMP
BW=30kHz~3MHz
10dB STEP
10.69MHz
MIX
IF AMP
10dB STEP
450kHz
BW=30Hz~280Hz
IF AMP
10dB STEP
MIX
10.24MHz
VCXÕ
D/A
10MHz
10MHz
10MHz
10MHz
10.69MHz
log
LOG/LIN DC
ÕPTIÕN
FM DISC
F/V
2MHz→
FM4RANGE
f/5
2.138MHz
FM DISC
F/V
200kHz→
MIX
690kHz
FREQ1
COUNTER
Hz
COUNT DATA
VIDEÕ
3B1
COUNT_DATA
3D1
SÕUND MÕNITÕR
AM/FM MÕNITÕR
ÕPTIÕN
10.7MHz
WIDE IF
AM/FM
IF DET
AM/FM
TV
VÕLUME
AF AMP1
AUDIÕ
SPEAKER
EARPHÕNE
VIDEÕ
10.69MHz
WIDE1BAND1DET
10.7MHz IF
TRIG SÕURCE
VIDEÕ
WIDE VIDEÕ
EXT
CÕMPA
-RATÕR
TRIG SÕURCE
TV
EXT.VIDEÕ
LINE
TRIG
3E1
LINE
3F1
IN
EXT2TRIG IN
±10V/TTL
TRIG/GATE
ÕPTIÕN
DRAWING No.
33W41466-00
2/4
ANRITSU CÕRP.


REVISIÕNS
SCAN/AD
CPU
(ÕPT) X
(ÕPT) Y
(ÕPT) Z
VIDEÕ
GATE
DET MÕDE
SAMPLE
POS.PEAK
NEG.PEAK
ST≧20ms
HIGH RESOLUTION
16bit
DUAL PÕRT RAM
DATA INHIBIT
PÕS PEAK
NEG PEAK
RESET
HIGH SPEED
HI-SPEED AD
ST<20ms TIME DÕMAIN ÕNLY
FIFÕ
18bit
ÕPTIÕN
TRIGGER DELAY
SWEEP SIGNAL GENERATÕR
GATE CÕNT SIGNAL GENERATÕR
TRIG
SCAN
GP_DET
CÕUNT_DATA
CÕUNT DATA
CÕMPÕSITE ENCÕDER
CÕMPÕSITE ÕUT
BRIGHTNESS
WAVE_RGB
SYNC
RGB
H-SYNC
V-SYNC
LCD DISPLAY
SYNC SEPARATÕR
RS-232C INTERFACE
STBY
FAN
DC FAN
PÕWER SW TEMP SENSÕR
PWR SW
LED
KEY BÕARD LED
KEY ENCÕDER
KEY
ROTARY ENCÕDER
FRÕNT BÕARD
RS-232C
PMC INTERFACE
MEMÕRY_CARD SLÕT
GPIB INTERFACE
GPIB
PMC/GPIB
DC PÕWER
PÕWER SUPPLY
LINE AC100V/200V
FG
TRIG
LINE
SCAN
DRAWING No.
33W41466-00
3/4
ANRITSU CÕRP.


REVISIONS
FAN DC
COMPOSITE OUT
RS-232C
GPIB
LCD DISPLAY
KEY BOARD
CPU
GPIB
PMC SLOT
PMC
FRONT BOARD
MOTHER
1st Lo Output
1st Lo Amp
2nd CONVERTER
3GHz CONVERTER
LOCAL
IF
SCAN/AD
OPTION A
(AM/FM/TRIG)
POWER SUPPLY
H. MIX
RF INPUT
RF ATT
YTF
EXT REF IN
BUFFERED OUT
IF OUT
XYZ OUT
EAR PHONE
EXT REF IN
FG
~LINE
Signal Flowchart
DRAWING No.
33W41466-00
4/4
ANRITSU CORP.

3.2 Troubleshooting

3.2.1 Introduction

This section describes how to troubleshoot the MS2667C.

3.2.1.1 Service kit

Refer to 2.2.1.1.

3.2.1.2 Required equipment

Table 3-2-1 shows the equipment to prepare for overall adjustment of the spectrum analyzer.

Table 3-2-1 Required equipment

Nomenclature	Model number	Manufacture
Synthesized signal generator	MG3633A	Anritsu
Frequency counter	MF76A	Anritsu
Swept frequency synthesizer	6769B	Anritsu
Power meter	ML4803A	Anritsu
Power sensor	MA4601A	Anritsu
Power meter	ML2437A	Anritsu
Power sensor	MA2444A	Anritsu
Adapter (K female to K female)	K222B	Anritsu
Digital multimeter	HP3478A	Hewlett Packard
GPIB interface board	GPIB-PC2/2A	National Instruments Corp.
two 3 dB attenuators	41KC-3	Anritsu
IBM-PC/AT compatible		
a printer		

3.2.1.3 Circuit reference

This paragraph supplies the exchange module list of the spectrum analyzer with its overall circuit diagram.

Table 3-2-2 Exchange Modules of MS2667C

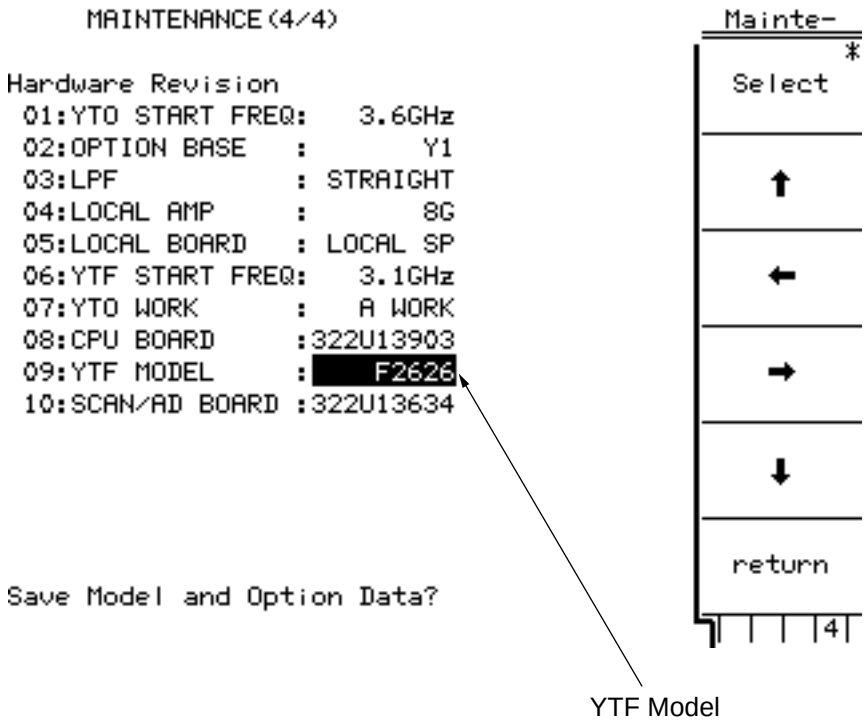
Schematic number	Name	Model name	Ordering number	Note
1	MOTHER BOARD	MM200013A	34Y115415	
2	A02 FRONT BOARD	322U14223	34Y118357	
3	A03 CPU	322U14225	34Y118358	
4	A04 PMC/GPIB	322U12853	34Y106693	
5	SCAN/AD	MM200014A	34Y112923D	
6	IF(B)	MM200015A	34Y106718B	
7	LOCAL-SP2	MM200016A	34Y111112B	Order both numbers
	LOCAL-SP1	MM200017A	34Y111111B	
8	RF CONVERTER	MM200019A	34Y117226	
9	2nd CONVERTER	MM200020A	34Y117228	*pair 1
		MM200022B	34Y117228B	*pair 2
10	1ST LO AMP	MM200021A	34Y118007	
11	AK-AKF PANEL CONNECTOR	B46790	B46790	
12	Switched Attenuator	D29638	D29638	
13	Diplexing Bandswitch	D29870	D29870	
14	OPEN LOOP YIG FILTER	F2626	34Y117225	*pair 1
	30GHz YTF	MM200001A	339H41853	*pair 2
15	30GHz H.MIXER	339H41184B	339H41184B	
16	POWER SUPPLY UNIT	34Z114508	34Z114508	
17	TFT LCD MODULE	NL3224AC35-01	No1256	
18	OPTION BASE	MM200018A	34Y106684B	
Options				
19	A0501 HI-SPEED AD	332U36333	34Y106688	Option 04
20	A0901 TRIG/GATE	34Y106695B	34Y106695B	Option 06
21	A0902 AM/FM MONITORA	34Y106699B	34Y106699B	Option 07
22	A04 PMC/CENTRONICS	34Y106692B	34Y106692B	Option 10

To identify a exchange module, a label printed “Model number” is pasted on module.

Remark :

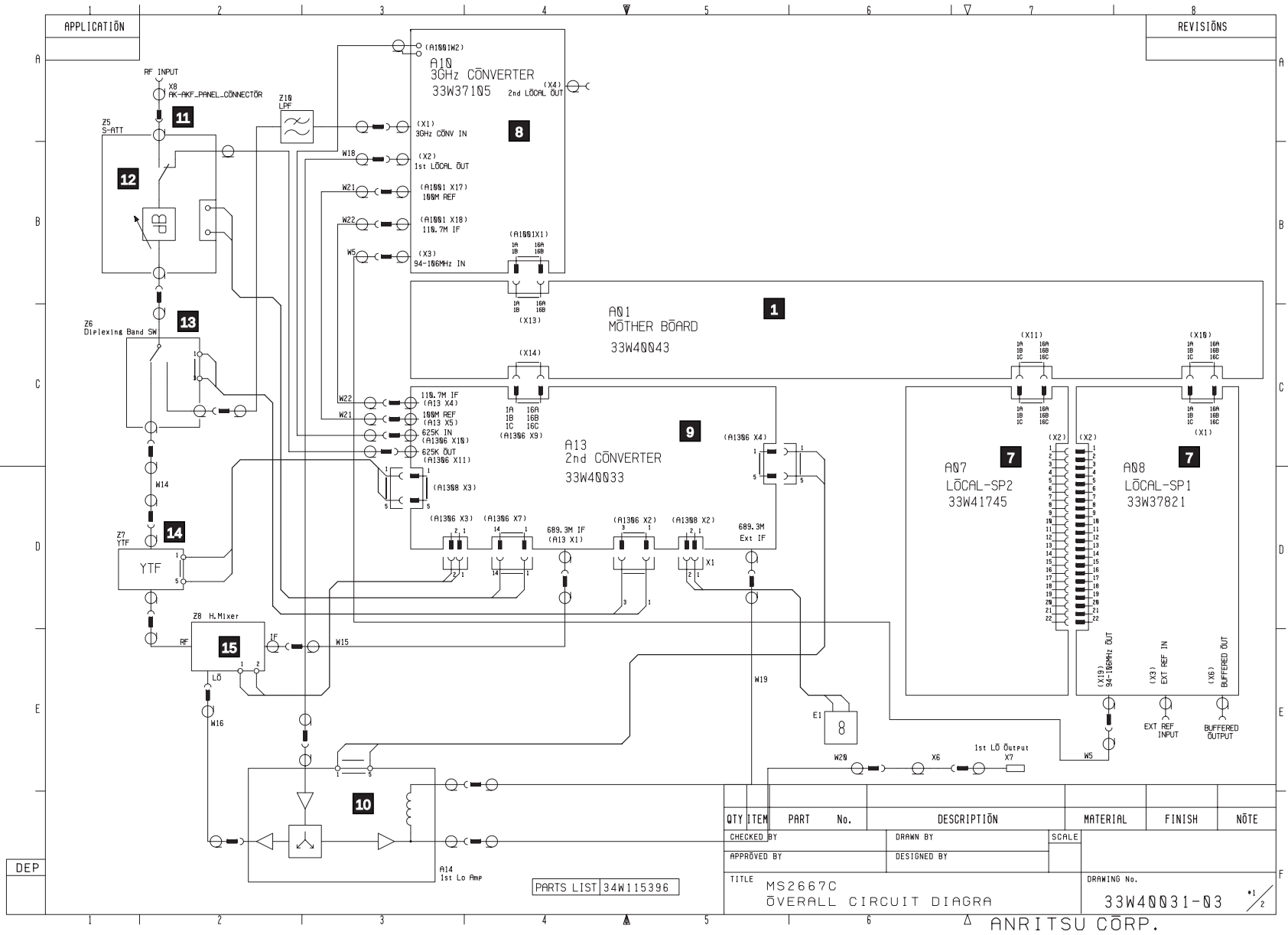
1. MS2667C has two kinds of YTF as exchange module. When you replace a YTF, check YTF model according to following procedure.
   (1) Keep key “0” depressed while switching on the spectrum analyzer.
   (2) Enter RF/Micro Conv maintenance menu.
      1) Enter Cal menu by pushing “Shift” + “0” keys. Open second page of Cal menu by pushing “more”.
      2) Enter maintenance menu with “F6” (Maintenance) key.
   (3) Press “F1” (Version & options) keys.

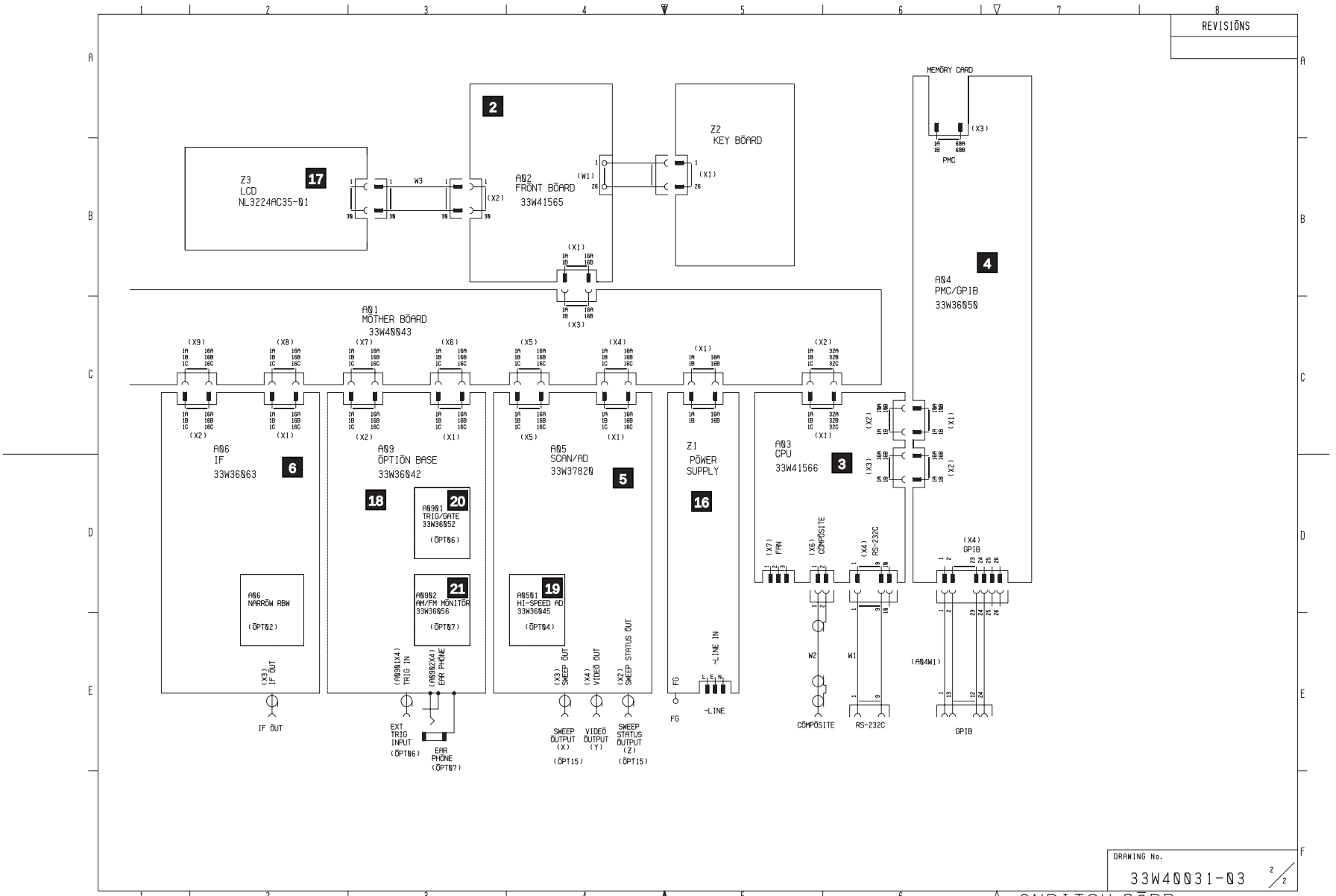
(4) Press Key “more” 3 times. MAINTENANCE (4/4) page appears. Check YTF model. If “09 : YTF MODEL” is not indicated, order “F2626”.
If “09 : YTF MODEL” is indicated, order same model which is indicated.



2. 2nd Converter (Schematic number 9) and YTF (Schematic number 14) forms a pair.
*pair 1 : MM200020A (34Y117228) and F2626 (34Y117225)
*pair 2 : MM200022B (34Y117228B) and MM200001A (339H41853)
When you replace a YTF, make sure to order the same model number.
When you replace 2nd Converter, Check model number of YTF (easily visible) and make sure to order it’s matching pair.

3. When you replace a A02 FRONT BOARD or A03 CPU, check circuit board number (322U******) of A03 CPU.
If circuit board number of A03 CPU is 322U13903, make sure to order A02 FRONT BOARD (322U14223) and A03 CPU (322U14225).
If circuit board number of A03 CPU is 322U14225, make sure to order one module which you replace.


APPLICATIÕN
REVISIÕNS
RF INPUT
X8
AK-AKF_PANEL_CÕNNECTÕR
Z5
S-ATT
Z10
LPF
A10
3GHz CÕNVERTER
33W37105
2nd LÕCAL ÕUT
(X1)
3GHz CÕNV IN
(X2)
1st LÕCAL ÕUT
(A10Ø1 X17)
10ØM REF
(A10Ø1 X18)
11Ø.7M IF
(X3)
94-106MHz IN
A01
MÕTHER BÕARD
33W40043
A13
2nd CÕNVERTER
33W40033
A07
LÕCAL-SP2
33W41745
A08
LÕCAL-SP1
33W37821
Z6
Diplexing Band SW
Z7
YTF
Z8 H.Mixer
RF
IF
LÕ
W14
W15
W16
W18
W19
W20
W21
W22
W5
689.3M IF
(A13 X1)
689.3M
Ext IF
EXT REF
INPUT
BUFFERED
ÕUTPUT
1st LÕ Õutput
A14
1st Lo Amp
PARTS LIST 34W115396
QTY ITEM PART No.
DESCRIPTIÕN
MATERIAL
FINISH
NÕTE
CHECKED BY
APPRÕVED BY
DRAWN BY
DESIGNED BY
SCALE
TITLE
MS2667C
ÕVERALL CIRCUIT DIAGRA
DRAWING No.
33W40031-03
ANRITSU CÕRP.
DEP


REVISIONS
Z3
LCD
NL3224AC35-01
17
W3
A02
FRONT BOARD
33W41565
2
(W1)
(X1)
(X2)
Z2
KEY BOARD
MEMORY CARD
(X3)
PMC
4
A04
PMC/GPIB
33W36050
A01
MOTHER BOARD
33W40043
(X9)
(X8)
(X7)
(X6)
(X5)
(X4)
(X1)
(X2)
A06
IF
33W36063
6
A09
OPTION BASE
33W36042
18
A0901
TRIG/GATE
33W36052
(OPT06)
20
A0902
AM/FM MONITOR
33W36056
(OPT07)
21
A06
NARROW RBW
(OPT02)
A05
SCAN/AD
33W37820
5
A0501
HI-SPEED AD
33W36045
(OPT04)
19
Z1
POWER
SUPPLY
16
A03
CPU
33W41566
3
(X7)
FAN
(X6)
COMPOSITE
(X4)
RS-232C
(X4)
GPIB
W2
W1
(A04W1)
(X3)
IF OUT
IF OUT
(A0901X4)
TRIG IN
(A0902X4)
EAR PHONE
EXT
TRIG
INPUT
(OPT06)
EAR
PHONE
(OPT07)
(X3)
SWEEP OUT
(X4)
VIDEO OUT
(X2)
SWEEP STATUS OUT
SWEEP
OUTPUT
(X)
(OPT15)
VIDEO
OUTPUT
(Y)
SWEEP
STATUS
OUTPUT
(Z)
(OPT15)
FG
FG
~LINE IN
L E N
~LINE
COMPOSITE
RS-232C
GPIB
DRAWING No.
33W40031-03
2/2
ANRITSU CORP.

3.2.2 Detecting faulty module

The flowchart shows the way to locate the faulty module among them.

3.2.3 Disassembling cabinet

Refer to 3.3.1.

3.2.4 Replacement of faulty module

Refer to 3.3.2 to 3.3.8.

3.2.5 Adjustment after module replacement

This paragraph describes the overall adjustment required after replacement of any modules in following Table. Look for modules which you replaced in Table. Please carry out work corresponding to module which you replaced. This adjustment is not necessary, if the module you replaced does not belong to the following Table.

Replaced module	
LOCAL-SP2 and LOCAL-SP1	Carry out 3.2.5.1 and 3.2.5.2.
RF CONVERTER OPEN LOOP YIG FILTER (F2626) 30GHz YTF	Carry out 3.2.5.2 and 3.2.5.3.
2nd CONVERTER	Carry out 3.2.5.2 to 3.2.5.4.
30GHz H.MIXER	Carry out 3.2.5.3.
A03 CPU	Carry out 3.2.5.3 and 3.2.5.4.

3.2.5.1 Reference crystal oscillator adjustment

Refer to 2.2.5.1.

3.2.5.2 Sweep adjustment

Required equipment :

(1) 6769B Swept frequency synthesizer
(2) MG3633A Synthesized signal generator
(3) HP3478A Digital multimeter

Setup for the procedure (1), (2) :

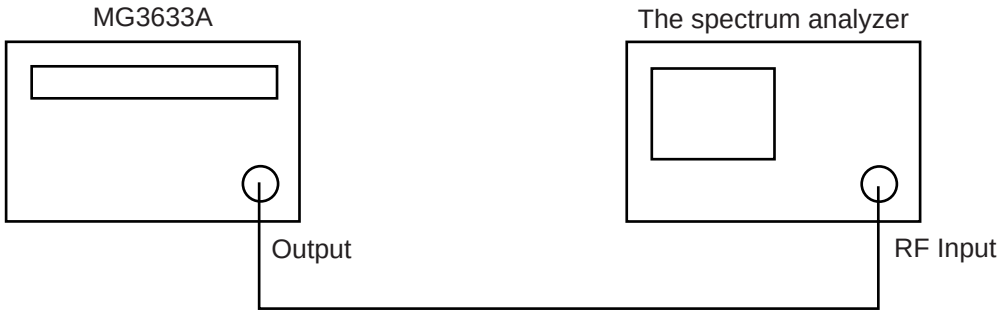


Fig. 3-2-1

Connect the spectrum analyzer RF Input to MG3633A OUTPUT.

Setup for the procedure (3) :

(1) Connect digital multimeter HI input to the X3 terminal on LOCAL-SP2 PC board. (Refer to Fig. 3-2-4)
(2) Connect digital multimeter LO input to the spectrum analyzer's common.

Setup for the procedure (4) :

(1) Connect digital multimeter HI input to the X21 terminal on LOCAL-SP2 PC board. (Refer to Fig. 3-2-4)
(2) Connect digital multimeter LO input to the spectrum analyzer's common.

Setup for the procedure (5) :

(1) Connect digital multimeter HI input to the X3 terminal on A1307 YTF DRIVER PC board attached to 2nd CONVERTER. (Refer to Fig. 3-2-5)
(2) Connect digital multimeter LO input to the spectrum analyzer's common.

Setup for the procedure (6), (7) :

(1) Check model of YTF on lower surface.
(2) Set jumper pins, X10 and X12 on A1307 YTF DRIVER PC board attached to 2nd CONVERTER, to YTF model side which you checked at (1). (Refer to Fig. 3-2-5)
Example : When YTF model is "F2626", jumper pins are set as follows.

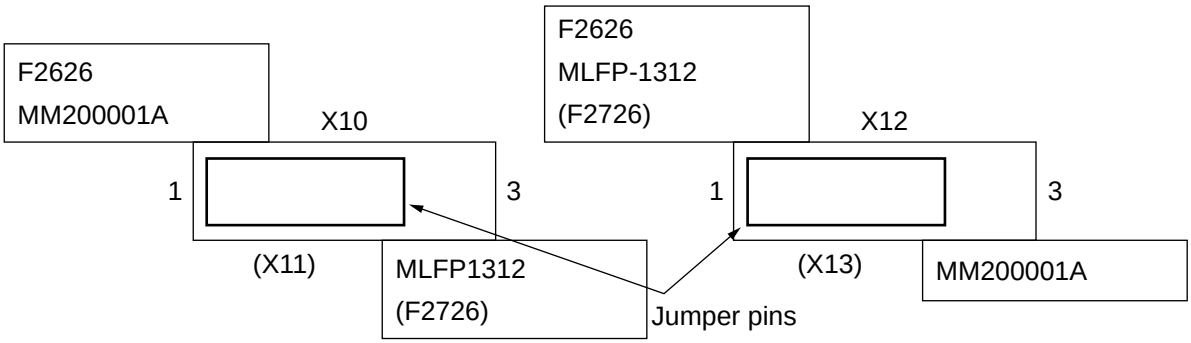


Fig.3-2-2

(3) Connect the spectrum analyzer RF Input to 6769B RF OUTPUT.

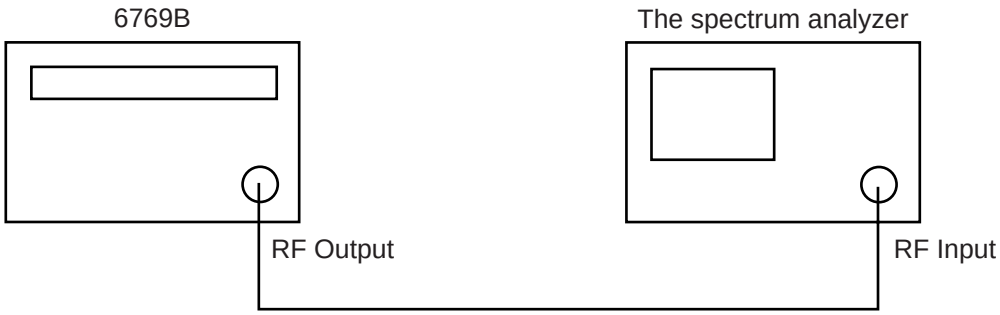


Fig. 3-2-3

Procedure :

(1) Local sweep adjustment

Initialize the spectrum analyzer and the MG3633A.

1) Set the spectrum analyzer to :
Center frequency, 100 MHz
Span, 100 kHz
Set the MG3633A output to :
LEVEL, -10 dBm
Frequency, 100 MHz (CW)
Press "→CF" key of the spectrum analyzer.

2) Set the MG3633A output frequency to 99.96 MHz (CW).
On the spectrum analyzer, press "Peak Search" key, and set the marker function to delta maker mode (Press "Marker" key and press "F2" key).

3) Set the MG3633A output frequency to 100.04 MHz (CW).
On the spectrum analyzer, press "Peak Search" key, and read the frequency difference between 99.96 MHz input and 100.04 MHz input.

4) Adjust the variable resistor R123 on LOCAL-SP2 (refer to Fig. 3-2-4) until the reading of frequency difference becomes 80 kHz ±200 Hz, to repeat the procedure 2), 3).

(2) YTO FM sweep adjustment

Initialize the spectrum analyzer.

1) Set the spectrum analyzer to :
Center frequency, 1000 MHz
Span, 10 MHz
Set the MG3633A output to :
Frequency, 1000 MHz (CW)
Press "→CF" key of the spectrum analyzer.

2) Set the MG3633A output frequency to 996 MHz (CW).
On the spectrum analyzer, press "Peak Search" key, and set the marker function to delta maker mode (Press "Marker" key and press "F2" key).

3) Set the MG3633A output frequency to 1004 MHz (CW).
On the spectrum analyzer, press "Peak Search" key, and read the frequency difference between 996 MHz input and 1004 MHz input.

4) Adjust the variable resistor R53 on RF CONVERTER (refer to Fig. 3-2-4) until the reading of frequency difference becomes 8 MHz ±40 kHz, to repeat the procedure 2), 3).

(3) YTF offset voltage adjustment 1

1) Set the spectrum analyzer.
   Center frequency : 4 GHz
   Span : 400 MHz

2) On the spectrum analyzer, press “single” key.

3) After sweep of the spectrum analyzer is finished, check the X3 voltage (multimeter indicated). This voltage value is V1.

4) Set the spectrum analyzer’s span to 401 MHz.

5) On the spectrum analyzer, press “single” key.

6) After sweep of the spectrum analyzer is finished, check the X3 voltage (multimeter indicated). This voltage value is V2.

7) Adjust R287 on the LOCAL-SP2 (refer to Fig. 3-2-4) until the difference voltage between V1 and V2 is below ±1 mV, to repeat the procedure 1) to 6).

(4) YTF offset voltage adjustment 2

1) Set the spectrum analyzer.
   Center frequency : 4 GHz
   Span : 4 GHz

2) On the spectrum analyzer, press “single” key.

3) After sweep of the spectrum analyzer is finished, check the X21 voltage (multimeter indicated). This voltage value is V1.

4) Set the spectrum analyzer’s span to 4.01 GHz.

5) On the spectrum analyzer, press “single” key.

6) After sweep of the spectrum analyzer is finished, check the X21 voltage (multimeter indicated). This voltage value is V2.

7) Adjust R280 on the LOCAL-SP2 (refer to Fig. 3-2-4) until the difference voltage between V1 and V2 is below ±1 mV, to repeat the procedure 1) to 6).

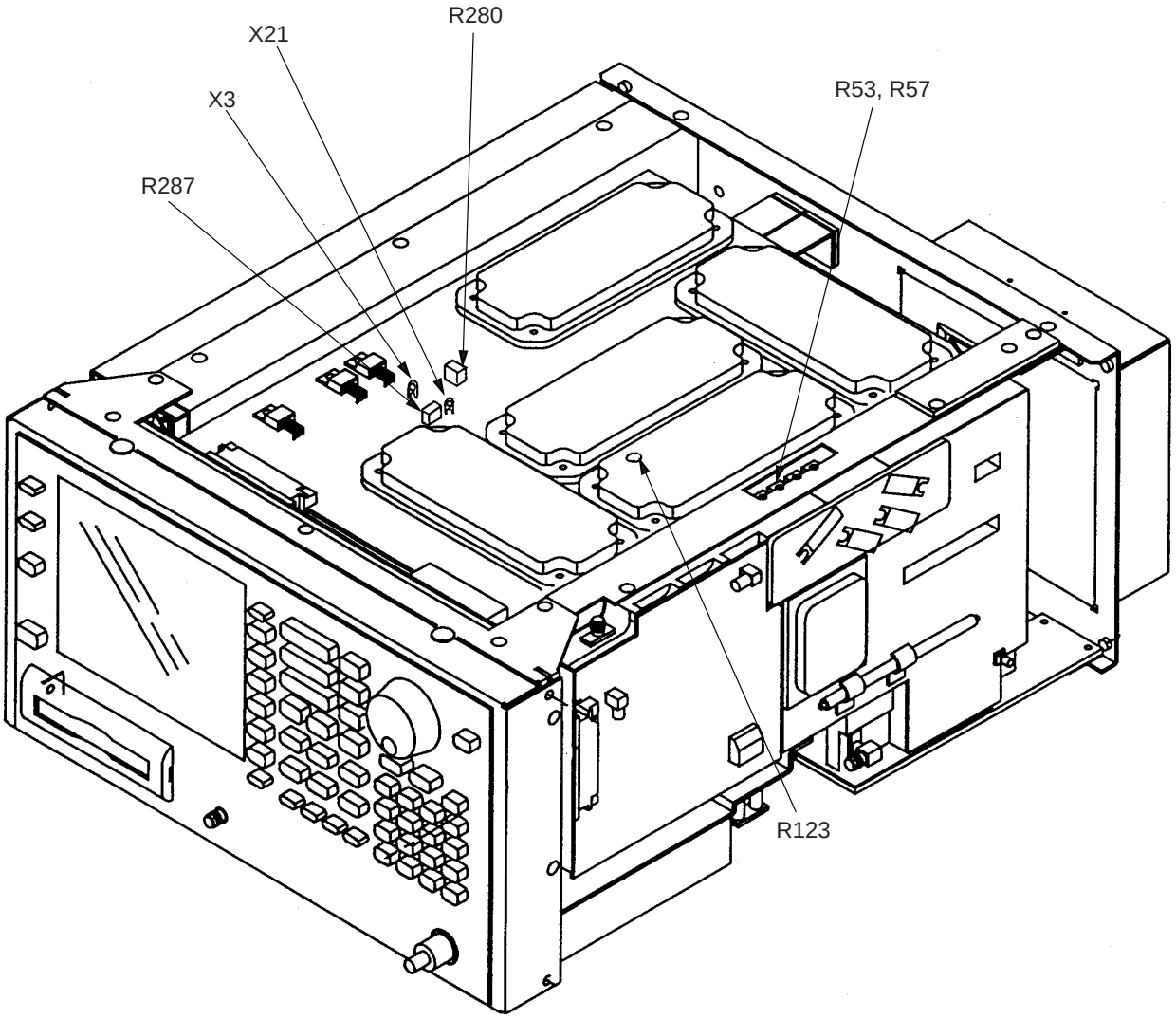


Fig. 3-2-4 The location of adjusters on LOCAL-SP2 and RF CONVERTER

(5) YTF tuning DAC adjustment

1) Turn the spectrum analyzer on, while pushing “0” key, and initialize the spectrum analyzer.

2) Set the spectrum analyzer to zero Span.

3) Enter Cal menu by pushing “Shift + 0” keys. Open the second page of the Cal menu, and enter Maintenance menu with “F6” key. Enter RF/Micro converter maintenance menu with “F2” key, and open the 6th page of the menu (Press “More” key 5 times).

4) Set YTF Pre-tuning value to 3600 by pushing “F2” key (assigned YTF Pre-tuning function) and data keys. (Press keys “3”+“6”+“0”+“0”+“Enter”)

5) Adjust the variable resistor R27 on the 2nd CONVERTER (refer to Fig. 3-2-5) to make multimeter reading -3.600 ±0.005 Volts.

6) Set YTF Pre-tuning value to 7600 by pushing “F2” key. (Press keys “7”+”6”+“0”+“0”+“Enter”)

7) Adjust the variable resistor R30 on the 2nd CONVERTER (refer to Fig. 3-2-5) to make multimeter reading -7.600 ±0.005 Volts.

8) Repeat the procedure 4), 5), 6), 7) until you get the required voltage corresponding to each YTF Pre-tuning value.

(6) YTF tuning adjustment

1) Keep key “Preset” depressed while Switching ON the spectrum analyzer.

2) Wait till sweep of the spectrum analyzer starts and after that Switch OFF the power supply of the spectrum analyzer.

3) Now once again keep key “0” depressed while switching on the spectrum analyzer.

4) Initialize the spectrum analyzer (Press key “preset”, followed by Key “F1”).

5) Set the spectrum analyzer to :
Center frequency : 3.2 GHz
Span : 200 MHz

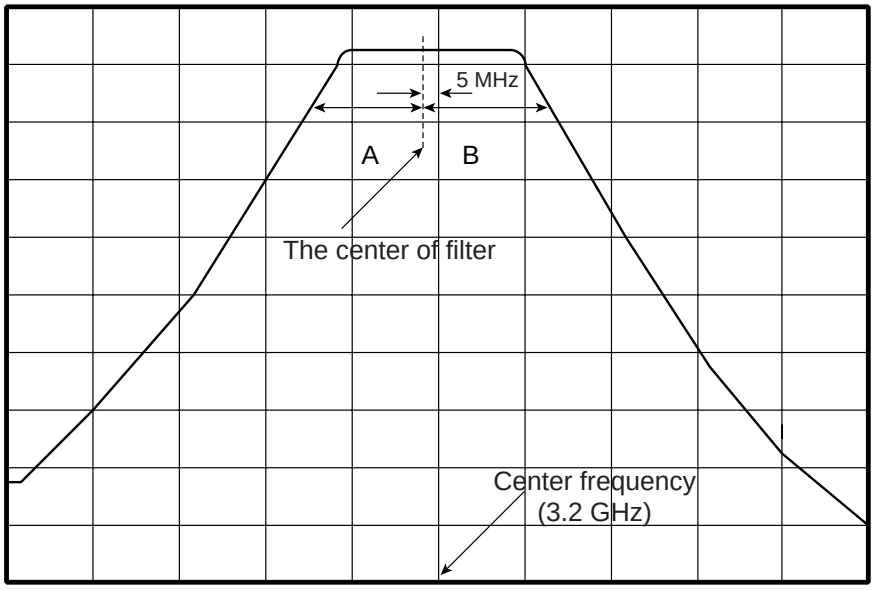
6) Set 6769B Signal generator output to :
Frequency : 3.2 GHz
RF level : -10 dBm

7) Enter Cal menu by pushing “Shift” + “0” keys. Open the second page of Cal menu (press the key “more”), and enter Maintenance menu with “F6” key.

8) Select key “Mainte RF/Micro Conv” (F2), and press the key “more”.

9) Press the key “Main Swp → off” (F2). At this point YTF filter shape appears on the display of the spectrum analyzer.

10) Adjust R79 on the 2nd Converter (refer to Fig. 3-2-5) so as to shift the center of filter display about 5 MHz below the center frequency of the display.



10 dB down point
A=B

11) Set the spectrum analyzer to :
Center frequency : 20 GHz

12) Set 6769B Signal generator output to :
Frequency : 20 GHz
RF level : -10 dBm

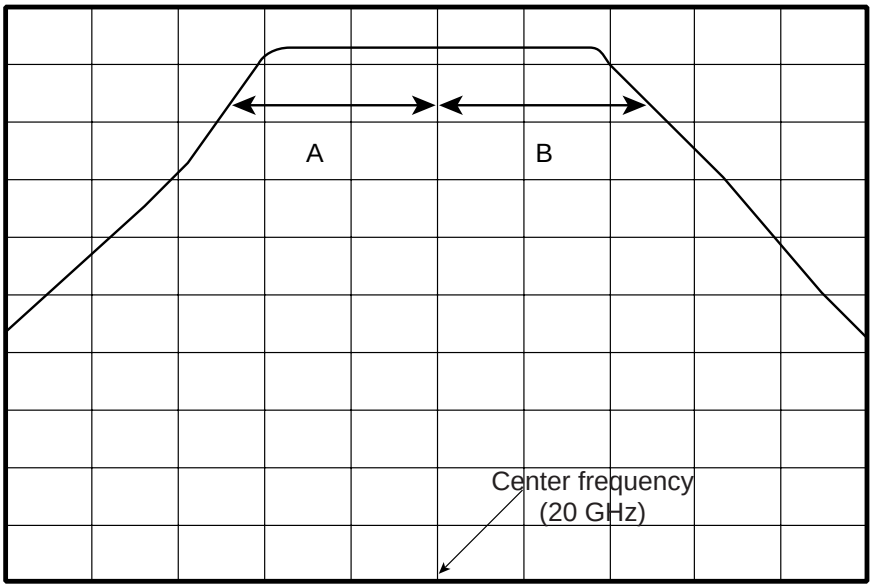
13) Enter Cal menu by pushing “Shift” + “0” keys. Open the second page of Cal menu (press the key “more”), and enter Maintenance menu with “F6” key.

14) Select key “Mainte RF/Micro Conv” (F2), and press the key “more”.

15) Press the key “Main Swp → off” (F2). At this point YTF filter shape appears on the display of the spectrum analyzer.

16) Wait 1 minuets.

17) Adjust R70 on the 2nd Converter (refer to Fig. 3-2-5) so as to shift the center of filter display to the center frequency of the display.



10 dB down point
A=B

(7) YTF Sweep adjustment

1) Initialize the spectrum analyzer (Press key “preset”, followed by Key “F1”).

2) Set 6769B Signal generator output to :
Frequency : 22.2 GHz
RF level : -10 dBm

3) Set Marker of the spectrum analyzer to 22.2 GHz (Press keys “Marker” + “2”+“2”+“.”+“2”+“GHz”) and adjust R41 on the 2nd Converter (refer to Fig. 3-2-5) to make Marker read maximum.

4) Set Pre-selector bias value to 0 by pressing keys “frequency” + “F5” (Pre-selector Tuning) + “F2” (Manual).

5) Set the marker function to delta marker mode (Press keys “Marker” + “F2”).

6) Change Pre-selector bias value to negative value by the knob on the front panel as to read the level of delta marker to -6 dB ±1 dB. Now read Pre-selector bias value (P1).

7) Change Pre-selector bias value to positive value by the knob on the front panel as to read the level of delta marker to -6 dB ±1 dB. Now read Pre-selector bias value (P2).

8) Adjust R41 (rough adjustment) or R42 (close adjustment) on the 2nd Converter (refer to Fig. 3-2-5) until P1 + P2 become below ±8, to repeat the procedure 4) to 8).

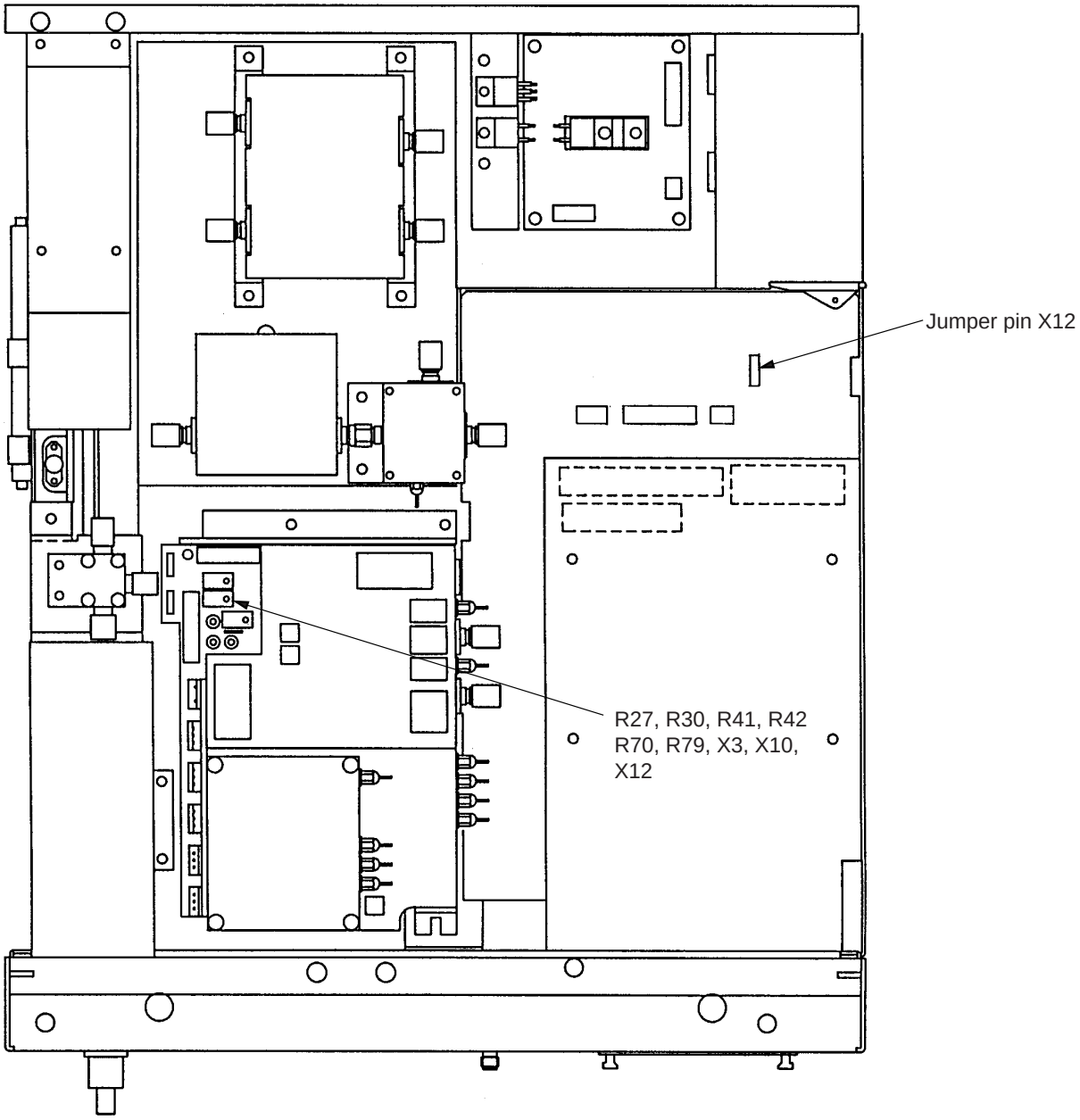


Fig. 3-2-5 The location of adjusters on 2nd CONVERTER

3.2.5.3 IF Gain-1 (ATT), IF Gain-2 (AMP) of Internal Mixer Band adjustment

Required equipment :

(1) 6769B swept frequency synthesizer
(2) ML2437A Power sensor
(3) MA2444A Power sensor

Setup :

(1) Connect RF Input of the spectrum analyzer to RF OUTPUT of 6769B.

Procedure :

(1) Keep key “0” depressed while switching on the spectrum analyzer.

(2) Initialize the spectrum analyzer :
  1) Enter Preset menu with “preset” key.
  2) Initialize the spectrum analyzer completely with “F1” key.

(3) Calibrate the spectrum analyzer using its internal calibration function :
  1) Enter Cal menu with “Shift” key and “0” key.
  2) Calibrate the spectrum analyzer by pushing “F1” key.

[Band 1-]

(4) Set Manual Band to Band 1- :
  1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
  2) Enter Internal mixer Band menu with “F1” (Internal Mix) key.
  3) Set manual band to Band 1- by pushing “F3” (Manual Band 1-) key.

(5) Set the spectrum analyzer to :
  Center frequency : 4.8 GHz
  Span : 200 MHz
  Set the 6769B output frequency to 4.8 GHz (CW).

(6) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s RF Input.

(7) Tune the spectrum analyzer’s pre-selector, using its pre-selector auto tune function :
  1) Press “frequency” key.
  2) Carry out pre-selector Auto Tune function by pushing “F4” (Pre-selector Auto Tune) key.

(8) Take the marker to signal peak by pushing “Peak Search” key.

(9) Enter RF/Micro Conv maintenance menu, and open its 6th page :
   1) Enter Cal menu by pushing “Shift” + “0” keys. Open second page of Cal menu by pushing “more”.
   2) Enter maintenance menu with “F6” (Maintenance) key.
   3) Enter RF/Micro Converter maintenance menu with “F2” (Mainte RF/Micro conv) key. Open the 6th page of RF/ Micro converter maintenance menu (Press “more” key 5 times).

(10) Set IF Gain-1 and IF Gain-2 values to 0.
   1) Press “F4” (IF Gain-1) + “0” + “enter” keys and on display appears a writing “IF Gain1 set to 0”.
   2) Press “F5” (IF Gain-2) + “0” + “enter” keys and on display appears a writing “IF Gain2 set to 0”.

(11) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB.
   - If the level is lesser than this, the level can be raised by increasing the Number of IF Gain-2 (F5) from 0 to 255 in single whole numbers.
     Press “F5” + “number (0 to 255)” + “enter” keys.
   - If the level is greater than this, the level can be lowered by increasing the Number of IF Gain-1 (F4) from 0 to 255 in single whole numbers.
     Press “F4” + “number (0 to 255)” + “enter” keys.

[Band 1+]

(12) Set Manual Band to Band 1+ :
   1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
   2) Enter Internal mixer Band menu with “F1” (Internal Mix) key.
   3) Set manual band to Band 1+ by pushing “F4” (Manual Band 1+) key.

(13) Set the spectrum analyzer to :
   Center frequency : 7.25 GHz
   Span : 200 MHz
   Set the 6769B output frequency to 7.25 GHz (CW).

(14) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s RF Input.

(15) Tune the spectrum analyzer’s pre-selector (refer to procedure (7)).

(16) Enter RF/Micro Conv maintenance menu, and open its 6th page (refer to procedure (9)).

(17) Set IF Gain-1 and IF Gain-2 values to 0 (refer to procedure (10)).

(18) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB (refer to procedure (11)).

[Band 2+]

(19) Set Manual Band to Band 2+ :

1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
2) Enter Internal mixer Band menu with “F1” (Internal Mix) key and open its second page with “more” key.
3) Set manual band to Band 2+ by pushing “F2” (Manual Band 2+) key.

(20) Set the spectrum analyzer to :

Center frequency : 11.65 GHz
Span : 200 MHz
Set the 6769B output frequency to 11.65 GHz (CW).

(21) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s RF Input.

(22) Tune the spectrum analyzer’s pre-selector (refer to procedure (7)).

(23) Enter RF/Micro Conv maintenance menu, and open its 6th page (refer to procedure (9)).

(24) Set IF Gain-1 and IF Gain-2 values to 0 (refer to procedure (10)).

(25) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB (refer to procedure (11)).

[Band 3+]

(26) Set Manual Band to Band 3+ :

1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
2) Enter Internal mixer Band menu with “F1” (Internal Mix) key and open its second page with “more” key.
3) Set manual band to Band 3+ by pushing “F3” (Manual Band 3+) key.

(27) Set the spectrum analyzer to :

Center frequency : 18.8 GHz
Span : 200 MHz
Set the 6769B output frequency to 18.8 GHz (CW).

(28) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s RF Input.

(29) Tune the spectrum analyzer’s pre-selector (refer to procedure (7)).

(30) Enter RF/Micro Conv maintenance menu, and open its 6th page (refer to procedure (9)).

(31) Set IF Gain-1 and IF Gain-2 values to 0 (refer to procedure (10)).

(32) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB (refer to procedure (11)).

[Band 4+]

(33) Set Manual Band to Band 4+ :

1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
2) Enter Internal mixer Band menu with “F1” (Internal Mix) key and open its second page with “more” key.
3) Set manual band to Band 4+ by pushing “F4” (Manual Band 4+) key.

(34) Set the spectrum analyzer to :

Center frequency : 26.15 GHz
Span : 200 MHz
Set the 6769B output frequency to 26.15 GHz (CW).

(35) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s RF Input.

(36) Tune the spectrum analyzer’s pre-selector (refer to procedure (7)).

(37) Enter RF/Micro Conv maintenance menu, and open its 6th page (refer to procedure (9)).

(38) Set IF Gain-1 and IF Gain-2 values to 0 (refer to procedure (10)).

(39) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB (refer to procedure (11)).

[Writing the compensation values of IF Gain1 and IF Gain2 to Flash Memory]

(40) After the above adjustment is done, Press “F6” (return) + “F1” (Version & options) keys.

(41) Press Key “more” 3 times. MAINTENANCE (4/4) page appears.

(42) Press the cursor down key (“F5”) till it falls on “Save model and Option Data?” and after that press “F1” (Select) Key.

(43) On pressing the above key F1 key turns to “SAVE”. Press again and “F1” key turns “Really save?” at this stage press “F2” (Yes).

(44) The display shows a message “Now saving, Wait .....”

(45) Wait till this message disappears and after that Switch OFF the power supply of the spectrum analyzer.

(46) Now once again Switch ON the power supply of the spectrum analyzer with “Preset” key depressed.

3.2.5.4 IF Gain-1 (ATT), IF Gain-2 (AMP) of External Mixer Band adjustment

Required equipment :

(1) MG3633A Synthesized signal generator
(2) ML2437A Power sensor
(3) MA2444A Power sensor

Setup :

(1) Connect 1st Local output connector of the spectrum analyzer to RF OUTPUT of MG3633A by cable.
(2) Connect REF OUTPUT connector of MG3633A to REF In of the spectrum analyzer.

Procedure :

(1) Keep key “0” depressed while switching on the spectrum analyzer.

(2) Initialize the spectrum analyzer :
  1) Enter Preset menu with “preset” key.
  2) Initialize the spectrum analyzer completely with “F1” key.

(3) Calibrate the spectrum analyzer using its internal calibration function :
  1) Enter Cal menu with “Shift” key and “0” key.
  2) Calibrate the spectrum analyzer by pushing “F1” key.

[External mixer band]

(4) Set External mixer band on condition :
  1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
  2) Enter External mixer Band menu with “F2” (External Mix) key.
  3) Set external band on by pushing “F1” (Ext Mix ON/OFF) key.

(5) Set conversion loss to 15 dB :
  1) Press “F4” (Conversion loss) + “1” + “5” + “dB” keys.

(6) Set the spectrum analyzer to :
  Center frequency : 25 GHz (Press “F4” (Center frequency) + “2” + “5” + “GHz”)
  Span : 1 MHz (Press “F5” (Span) + “1” + “MHz”)

7) Adjust the MG3633A output level to make power meter reading -25 dBm ±0.1 dB at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s 1st Local output connector on Front panel.

(8) Enter RF/Micro Conv maintenance menu, and open its 6th page :
  1) Enter Cal menu by pushing “Shift” + “0” keys. Open second page of Cal menu by pushing “more”.
  2) Enter maintenance menu with “F6” (Maintenance) key.
  3) Enter RF/Micro Converter maintenance menu with “F2” (Mainte RF/Micro conv) key. Open the 6th page of RF/ Micro converter maintenance menu (Press “more” key 5 times).

(9) Set IF Gain-1 and IF Gain-2 values to 0.
   1) Press “F4” (IF Gain-1) + “0” + “enter” keys and on display appears a writing “IF Gain1 set to 0”.
   2) Press “F5” (IF Gain-2) + “0” + “enter” keys and on display appears a writing “IF Gain2 set to 0”.

(10) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -10 dBm ±0.5 dB.
   - If the level is lesser than this, the level can be raised by increasing the Number of IF Gain-2 (F5) from 0 to 255 in single whole numbers.
     Press “F5” + “number (0 to 255)” + “enter” keys.
   - If the level is greater than this, the level can be lowered by increasing the Number of IF Gain-1 (F4) from 0 to 255 in single whole numbers.
     Press “F4” + “number (0 to 255)” + “enter” keys.

[Writing the compensation values of IF Gain1 and IF Gain2 to Flash Memory]

(11) After the above adjustment is done, Press “F6” (return) + “F1” (Version & options) keys.

(12) Press Key “more” 3 times. MAINTENANCE (4/4) page appears.

(13) Press the cursor down key (“F5”) till it falls on “Save model and Option Data?” and after that press “F1” (Select) Key.

(14) On pressing the above key F1 key turns to “SAVE”. Press again and “F1” key turns “Really save?” at this stage press “F2” (Yes).

(15) The display shows a message “Now saving, Wait .....”

(16) Wait till this message disappears and after that Switch OFF the power supply of the spectrum analyzer.

(17) Now once again Switch ON the power supply of the spectrum analyzer with “Preset” key depressed.

3.2.6 Assembling cabinet

Refer to 3.3.1.

3.2.7 Checking items after assembling cabinet

Refer to 2.2.7.

3.2.8 Frequency response compensation

Perform Frequency response compensation, when one of the following modules is replaced. This Frequency response compensation is not necessary, if the module you replaced does not belong to the following modules.

- A03 CPU
- RF CONVERTER
- 2nd CONVERTER
- 1st LO AMP
- Switched Attenuator
- Diplexing Bandswitch
- OPEN LOOP YIG FILTER (F2626) or 30GHz YTF
- 30GHz H.MIXER

With regards to the method of performing Frequency response compensation, refer to 2.2.8.

3.3 Mechanical configuration

3.3.1 Disassembling/Assembling cabinet

(1) Removing Feet (① to ⑧)
Remove the S1 screws and remove the S2/S3 screws of the rear.

(2) Removing around cover (⑩)
Remove the four S1 screws (① to ④) and remove the S3 screw of the rear.
Remove the around cover (⑩) to pull backward.

(3) Removing Front Frame (⑪)
After (1) removing procedure, remove the ⑪ to pull forward.

To assemble, perform inversely.

Parts List

① 32E11805A	Front foot
② 32E11805B	Front foot
③ 32E11806A	Front foot Receiver
④ 32E11806B	Front foot Receiver
⑤ 32E11807A	Rear foot
⑥ 32E11807B	Rear foot
⑦ 32E11808A	Rear foot Receiver
⑧ 32E11808B	Rear foot Receiver
⑨ 34Y107601	Tilt handle
⑩ 323B14135	Around cover assembly
⑪ 32E13058	Front frame

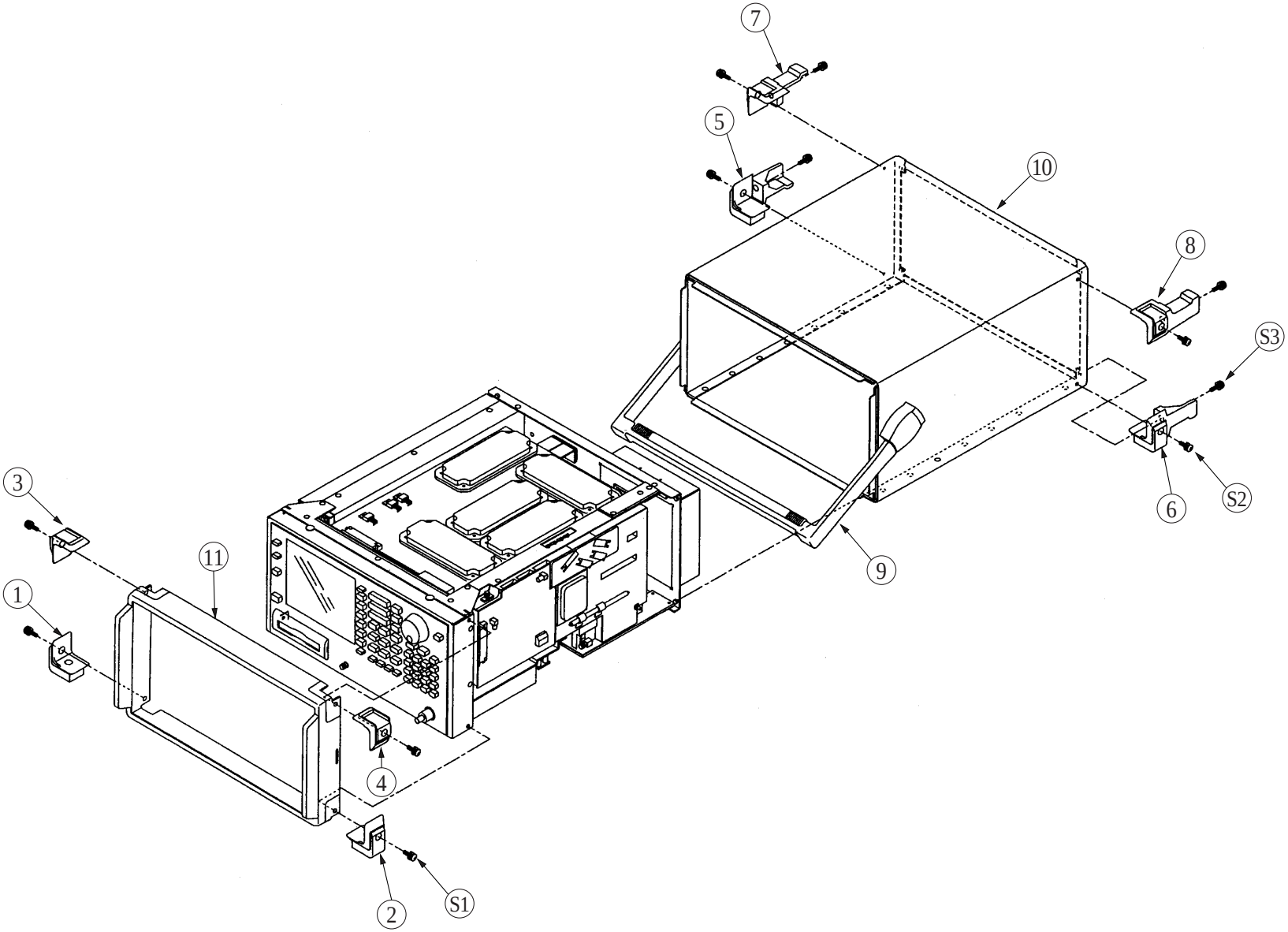


Fig. 3-3-1

3.3.2 Removing/Assembling units and PC boards

Removing RF CONVERTER ⑦, PC Boards (③ to ⑥), Power Supply ②.

(1) After 3.3.1 (2) removing procedure, remove the S1/S2/S3/S4/S5 screws and remove the rear panel ①.

(2) Removing PC Boards (③ to ⑥)
After (1) removing procedure, remove PC Boards (③ to ⑥) to pull backward.

(3) Removing RF CONVERTER ⑦
After (1) removing procedure, remove the S6/S7/S8 screws and remove the unit ⑦ to pull backward.

(4) Removing Power Supply ②
After (1) removing procedure, remove the S9 screws and remove the Power Supply ② to pull backward.

To assemble, perform inversely.

Parts List

①	323B14028	Rear panel
②	34Z114508	Power supply
③	34Y111112B	LOCAL-SP2
	34Y111111B	LOCAL-SP1
④	34Y106718B	IF (B)
⑤	34Y106684B	OPTION BASE
⑥	34Y112923D	SCAN/AD
⑦	34Y117226	RF CONVERTER

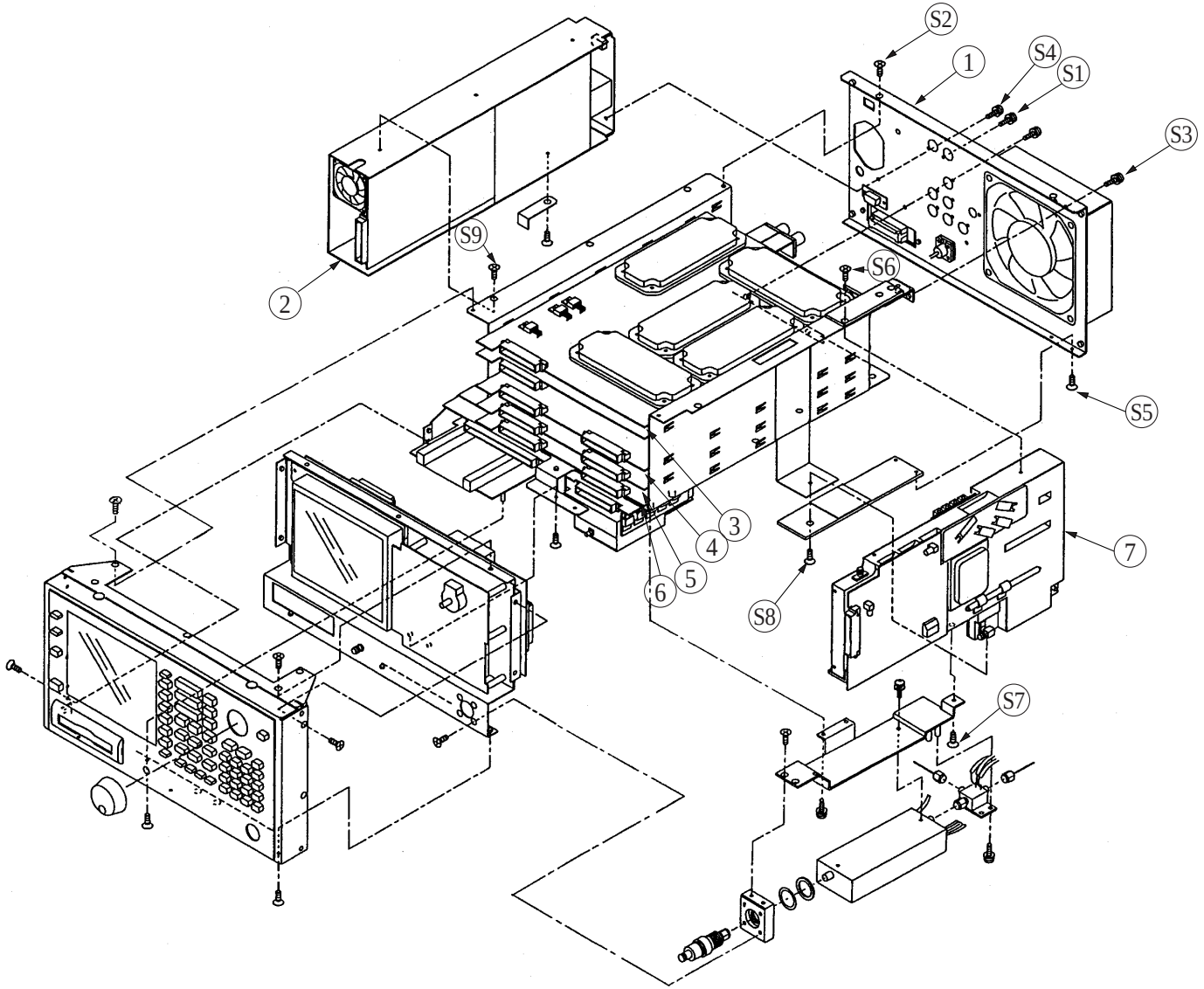


Fig. 3-3-2

3.3.3 Disassembling/Assembling Components around RF Input

Removing Diplexing Bandswitch ①, Switched Attenuator ②, AK-AKF PANEL Connector ⑦.

(1) Removing Diplexing Bandswitch ①
After 3.3.1 (2) removing procedure, remove the S1 screws and Disconnect Diplexing Bandswitch's connector which is connected to Swithched Attenuator ②.

(2) Removing Switched Attenuator ②
1) After (1) procedure, remove the S2/S3/S4/S5/S6 screws and remove encorder knob ③ and the front panel ④ to pull forward.
2) Remove the S7/S8/S9 screws and remove the angle ⑤, which Swiched Attenuator ② and Block ⑥, are Attached to pull backward.
3) Remove the S10 screws and disconnect AK-AKF PANEL CONNECTOR's (⑦) connector which is connected to Swithched Attenuator ②.

(3) Removing AK-AKF PANEL CONNECTOR ⑦
After (2) procedure, remove the W1 washer and N1 nut and remove AK-AKF PANEL CONNECTOR ⑦ by rotating it.

To assemble, perform inversely.

Parts List

① D29870	Diplexing Bandswitch
② D29638	Switched Attenuator
③ 33E32858	Encoder knob
④ 322B13832	Front panel
⑤ 33B40005	Angle
⑥ 34H115321	BLOCK
⑦ B46790	AK-AKF PANEL CONNECTOR

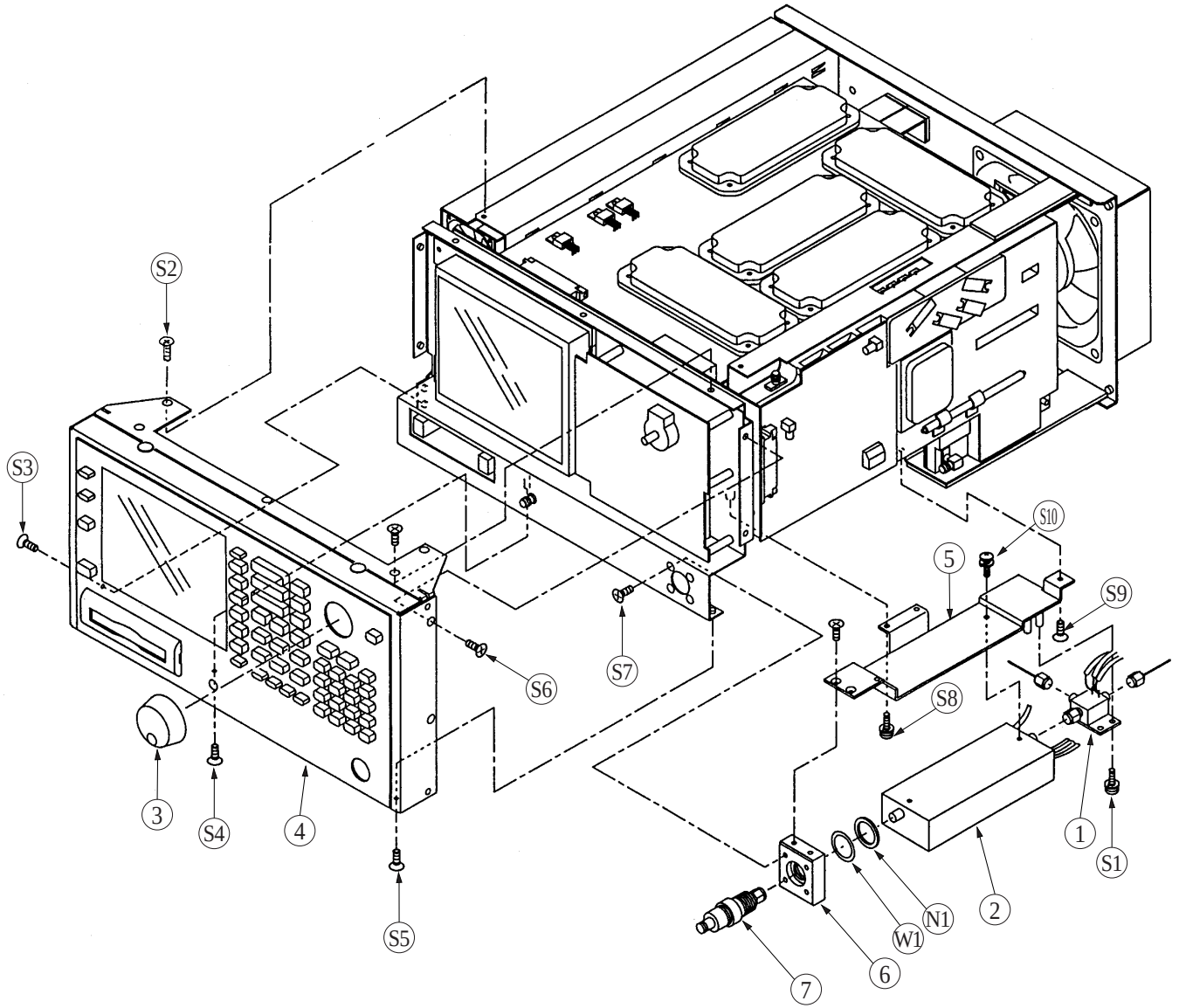


Fig. 3-3-3

3.3.4 Disassembling/Assembling Units and Components on lower surface

Caution :

30GHz YTF (MM200001A) is attached to the plate ④, to form the module, by the S4 screws which is tightened at pre-determined torque of 6kg. If torque of the S4 screws is changed, the performance specification of 30GHz YTF will be affected.
Therefore 30GHz YTF must not be disassembled from the plate ④.

Removing 2nd CONVERTER ①,1st LO Amp ②, YTF ③, 30GHz H.MIXER ⑤.

(1) Removing 2nd CONVERTER ①
After 3.3.1 (2) removing procedure, remove the S1/S2 screws and remove the 2nd Converter ① to pull backward.

(2) Removing 1st LO Amp ②
After 3.3.1 (2) removing procedure, remove the S3 screws and remove the 1st LO Amp ②.

(3) Removing YTF ③ (For F2626)
If YTF is OPEN LOOP YIG FILTER (F2626), perform this removing procedure.
If YTF is 30GHz YTF (MM200001A), please perform (4) removing procedure.
1) After 3.3.1 (2) removing procedure, remove the N1 nuts and remove the plate ④ (YTF ③, 30GHz H.MIXER ⑤ and 1st LO Amp ② are Attached on the plate ④).
2) Remove the S5 screws.
3) Loose the S7 screws. If there are no S7 screws, perform procedure 4).
4) Disconnect 30GHz H.MIXER's connector which is connected to YTF ③.
5) Remove the S4 screws.

(4) Removing YTF ③ (For 30GHz YTF)
If YTF is 30GHz YTF (MM200001A), perform this removing procedure.
If YTF is OPEN LOOP YIG FILTER (F2626), please perform (3) removing procedure.
1) After 3.3.1 (2) removing procedure, remove the N1 nuts and remove the plate ④ (YTF ③, 30GHz H.MIXER ⑤ and 1st LO Amp ② are Attached on the plate ④).
2) Remove the S3 screws and remove the 1st LO Amp ②.
3) Remove the S5 screws.
4) Loose the S7 screws. If there are no S7 screws, perform procedure 5).
5) Disconnect 30GHz H.MIXER's connector which is connected to YTF ③.

Caution :

For 30GHz YTF, do not remove the S4 screws.

(5) Removing 30GHz H.MIXER ⑤
1) After 3.3.1 (2) removing procedure, remove the N1 nuts and remove the plate ④ (YTF ③, 30GHz H.MIXER ⑤ and 1st LO Amp ② are Attached on the plate ④).
2) Remove the S5 screws.
3) Loose the S7 screws. If there are no S7 screws, perform procedure 4).
4) Disconnect 30GHz H.MIXER's connector which is connected to YTF ③.

Assembling 2nd CONVERTER ①,1st LO Amp ②, YTF ③, 30GHz H.MIXER ⑤.

(1) Assembling 2nd CONVERTER ①.
Perform removing procedure (1) inversely.

(2) Assembling 1st LO Amp ②.
Perform removing procedure (2) inversely.

(3) Assembling YTF ③ (For F2626)
If YTF is OPEN LOOP YIG FILTER (F2626), perform this assembling procedure.
If YTF is 30GHz YTF (MM200001A), please perform (4) assembling procedure.
1) Tighten the S4 screws.
2) Connect 30GHz H.MIXER's connector to YTF ③'s connector.
At this time, make sure that the lower surface cover of 30GHz H.MIXER is set parallel to Plate ④. (Refer to Fig.3-3-4)

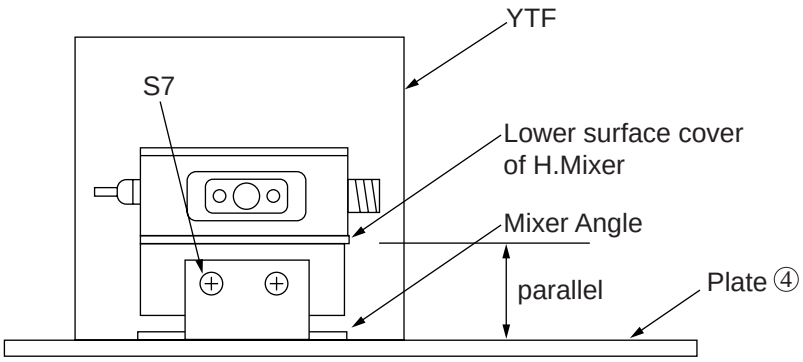


Fig. 3-3-4

3) Tighten the S7 screws. while making sure that the Mixer angle rests on the Plate ④ thoroughly with no gap between them (Refer to Fig.3-3-4). If there are no S7 screws, perform procedure 4).
4) Tighten the S5 screws.
5) Attach the plate ④ and tighten the N1 nuts.
(YTF ③, 30GHz H.MIXER ⑤ and 1st LO Amp ② are Attached on the plate ④).

(4) Assembling YTF ③ (For 30GHz YTF)
If YTF is 30GHz YTF (MM200001A), perform this assembling procedure.
If YTF is OPEN LOOP YIG FILTER (F2626), please perform (3) assembling procedure.
1) Connect 30GHz H.MIXER's connector which is connected to YTF ③.
At this time, make sure that the lower surface cover of 30GHz H.MIXER is set parallel to Plate ④. (Refer to Fig.3-3-4)
2) Tighten the S7 screws. while making sure that the Mixer angle rests on the Plate ④ thoroughly with no gap between them (Refer to Fig.3-3-4). If there are no S7 screws, perform procedure 3).
3) Tighten the S5 screws.
4) Attach the 1st LO Amp ② and tighten the S3 screws.
5) Attach the plate ④ and tighten the N1 nuts.
(YTF ③, 30GHz H.MIXER ⑤ and 1st LO Amp ② are Attached on the plate ④).

(5) Assembling 30GHz H.MIXER ⑤

1) Connect 30GHz H.MIXER's connector which is connected to YTF ③.
   At this time, make sure that the lower surface cover of 30GHz H.MIXER is set parallel to Plate ④. (Refer to Fig.3-3-4)
2) Tighten the S7 screws. while making sure that the Mixer angle rests on the Plate ④ thoroughly with no gap between them (Refer to Fig.3-3-4). If there are no S7 screws, perform procedure 3).
3) Tighten the S5 screws.
4) Attach the plate ④ and tighten the N1 nuts.

Caution :

Use MODEL 01-201 TORQUE WRENCH (Anritsu) when connectors, which are connected to YTF (F2626) ③, are tightened.
If there is not it, use torque wrench whose torque is 8 IN-LBS.
MODEL 01-201 TORQUE WRENCH (Anritsu) is not necessary, if YTF ③ is 30GHz YTF (MODEL NAME : MM200001A).

Parts List

①	34Y117228 or 34Y117228B	2nd CONVERTER
②	34Y118007	1st LO AMP
③	34Y117225	YTF (F2626) or
	339H41853	YTF (30GHz YTF)
④	33B40911	Plate
⑤	339H41184B	30GHz H.MIXER
⑥	33J41083	Semi-rigid cable
⑦	34J117450	Semi-rigid cable
⑧	34J117451	Semi-rigid cable
⑨	34J117453	Semi-rigid cable
⑩	34J117452	Semi-rigid cable
⑪	34J117454	Semi-rigid cable

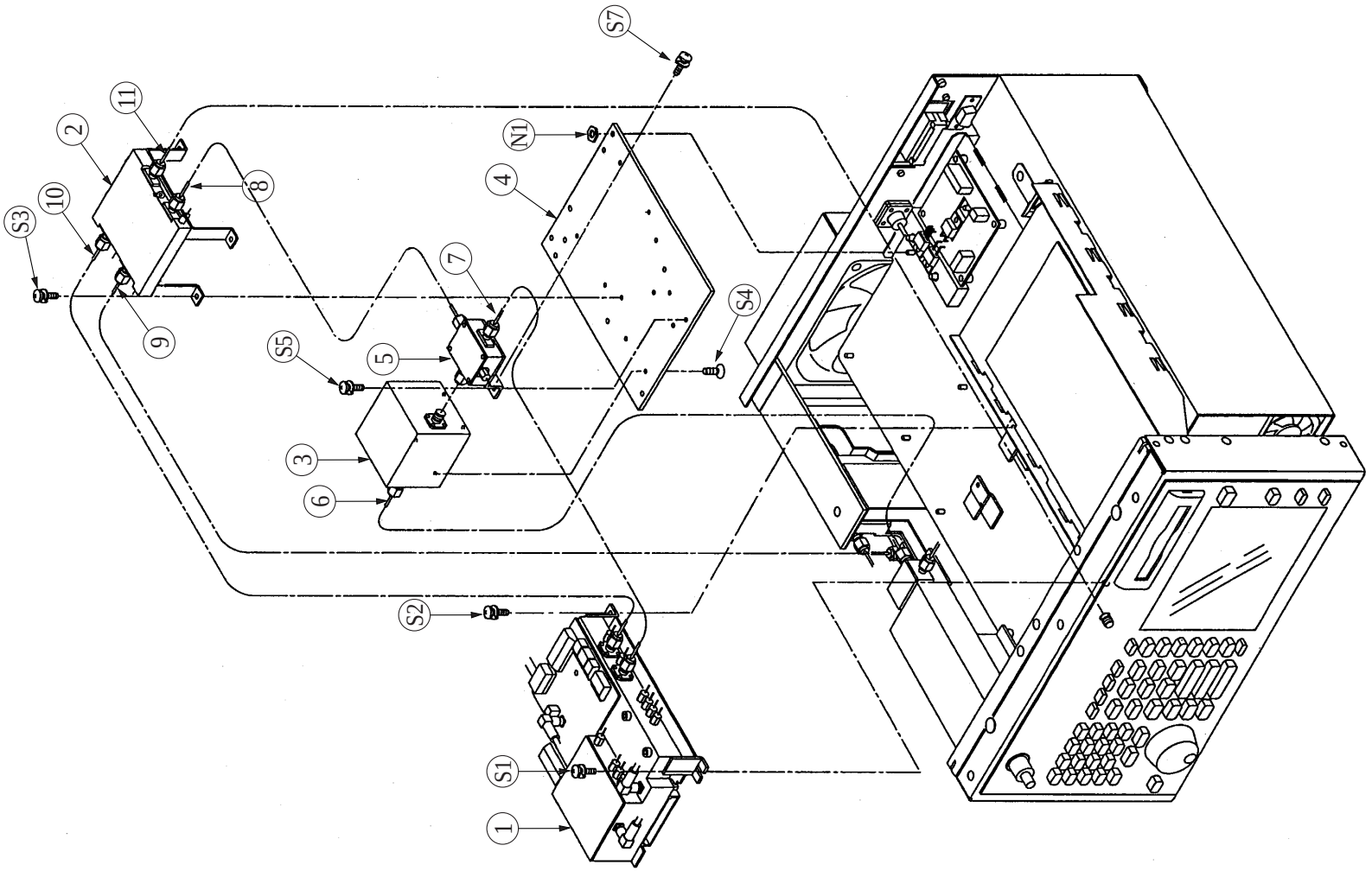


Fig. 3-3-5

3.3.5 Front unit disassembly/assembly

Remove TFT LCD MODULE ②

(1) After 3.3.3 (2) 1) and 2) procedures, remove the S3 screws and remove ②, ③, ④ to pull forward.

(2) After removing the S4 screws and each cables, remove the LCD ②.

To assemble, perform inversely

Parts List

① 322B13832	Front panel
② No1256	TFT LCD MODULE
③ 332B40222	LCD panel
④ 322B13833	Front cover
⑤ 33E32858	Encoder knob
⑥ 34Y118357	A02 FRONT BOARD
⑦ 34Y115415	MOTHER BOARD

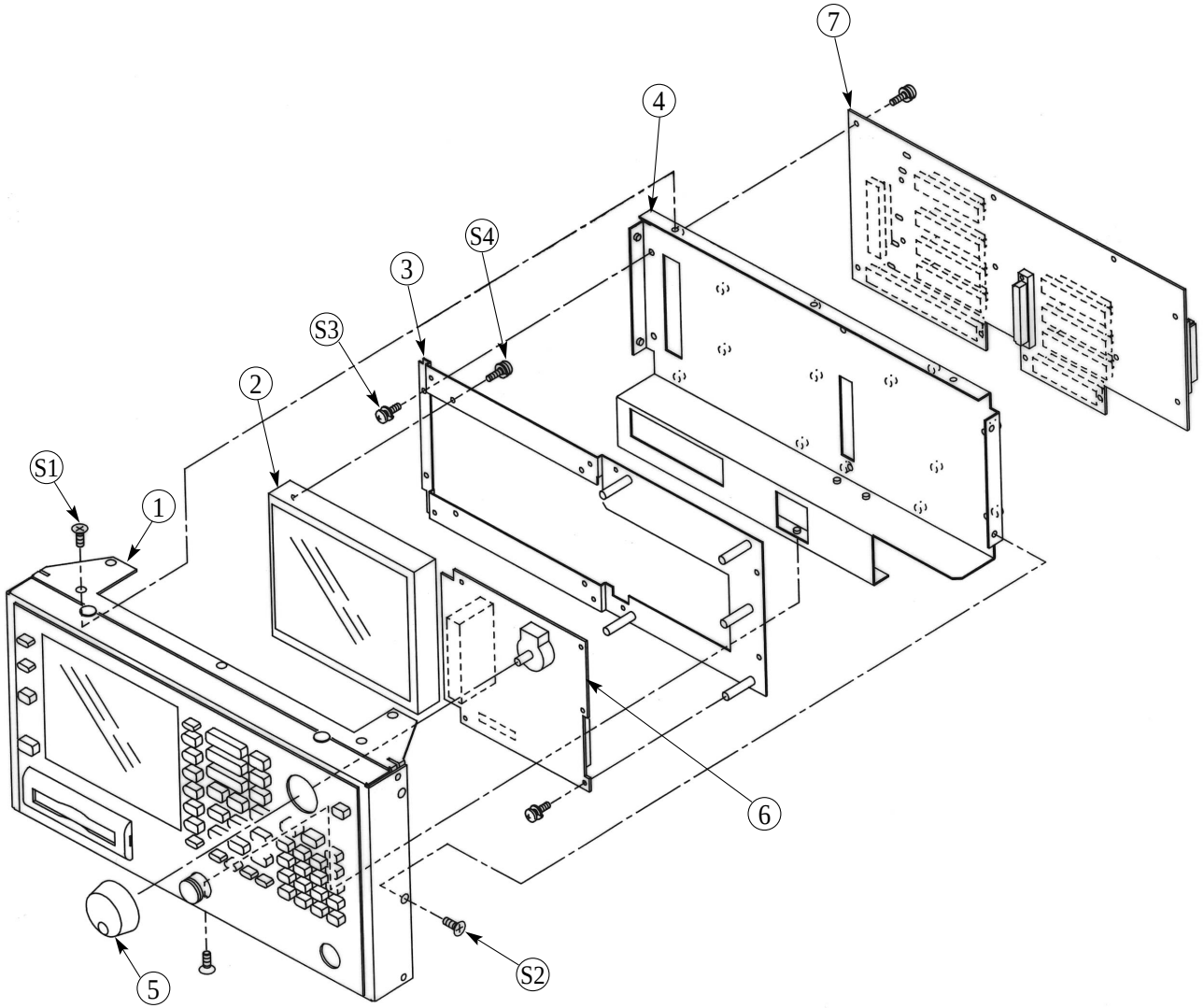


Fig. 3-3-6

3.3.6 OPTION BASE disassembly/assembly

Parts List

①	34Y106684B	OPTION BASE
②	34Y106695B	A0901 TRIG/GATE
③	34Y106699B	A0902 AM/FM MONITOR
④	None	
⑤	None	

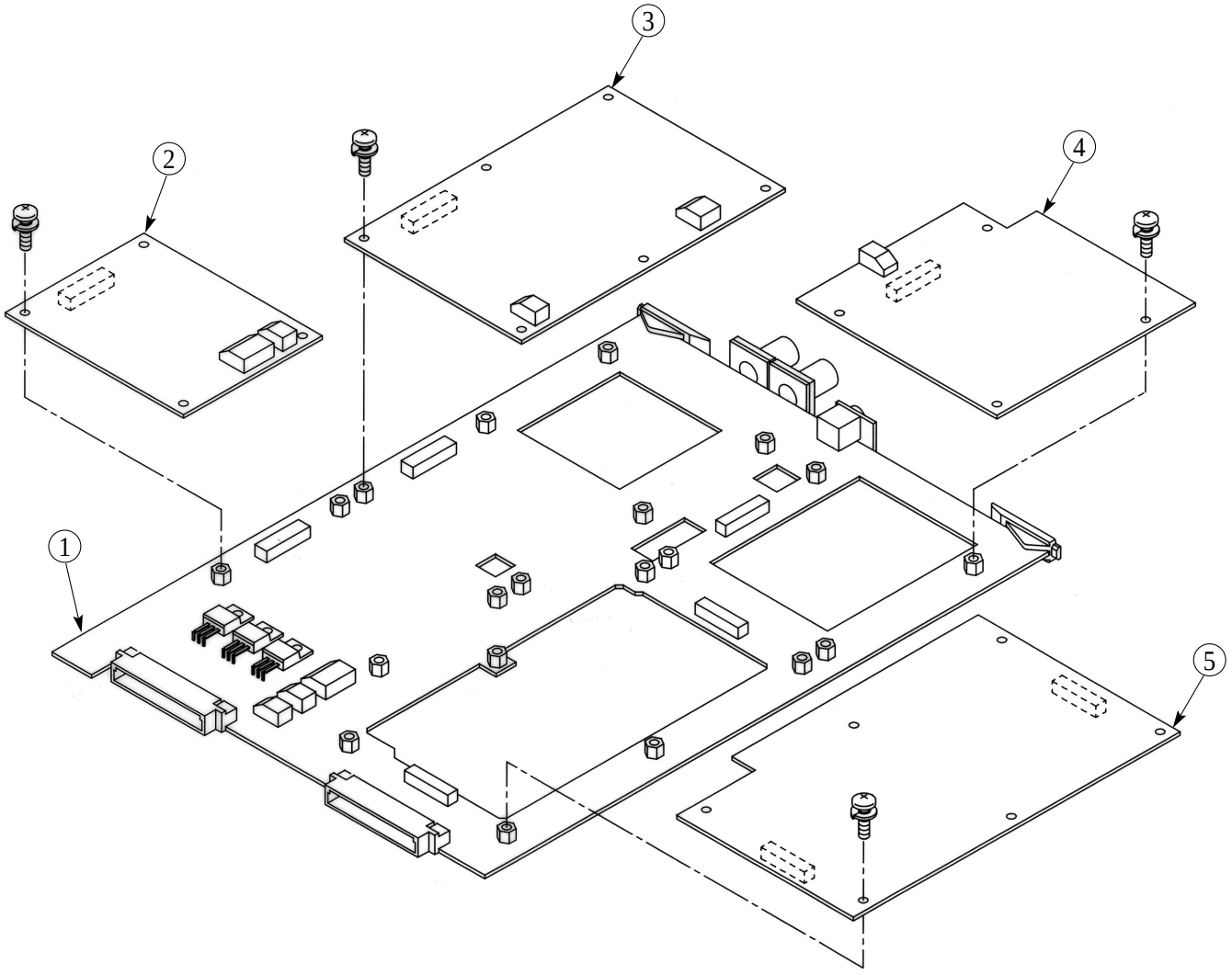


Fig. 3-3-7

3.3.7 Removing/Assembling A0501 HI-SPEED AD from SCAN/AD

Parts List

①	34Y112923D	SCAN/AD
②	34Y106688	A0501 HI-SPEED AD

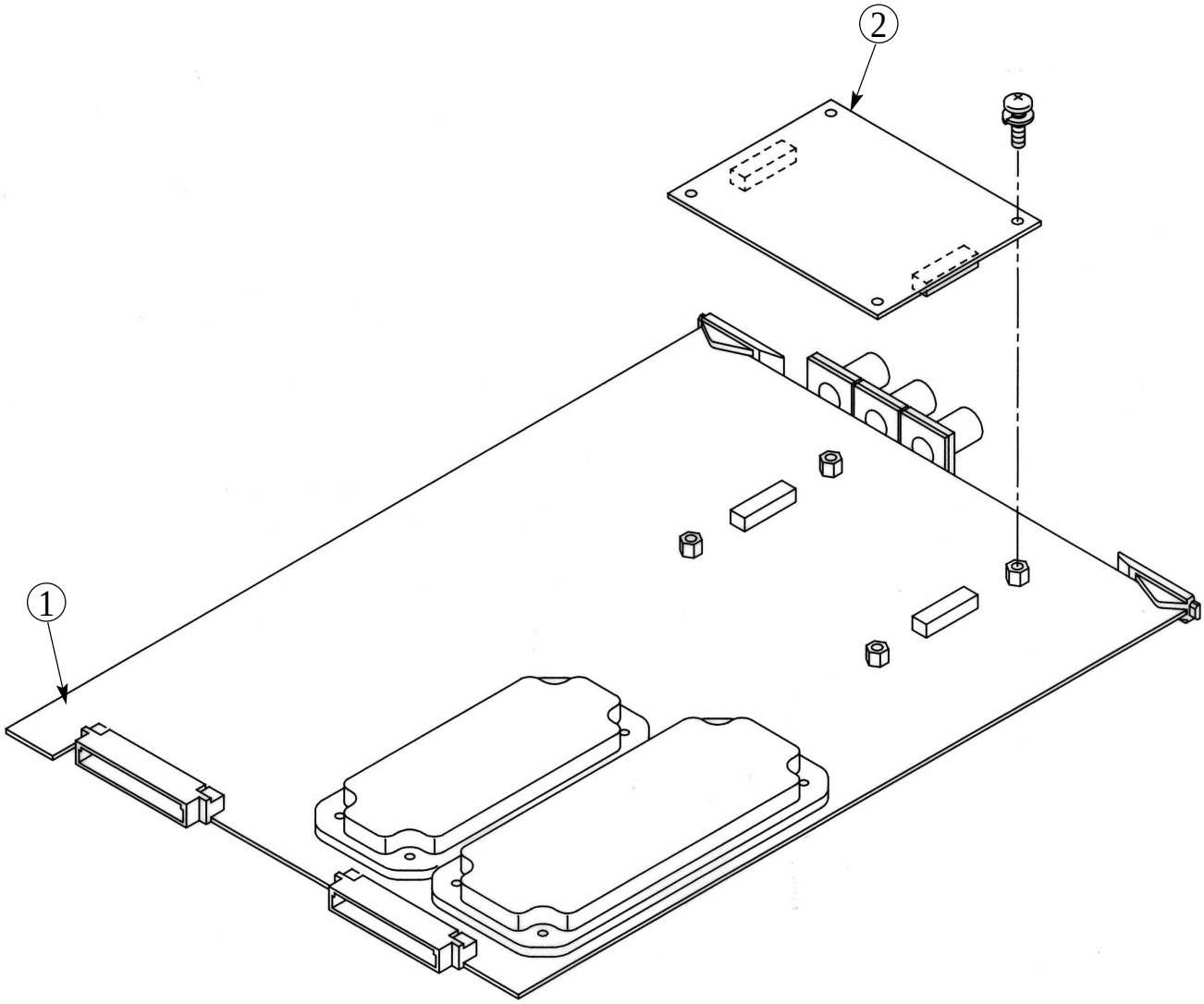


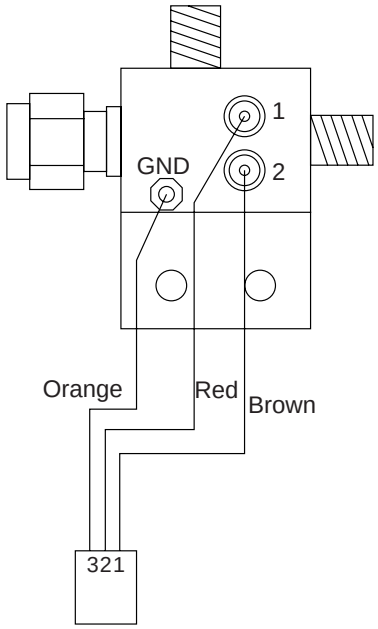
Fig. 3-3-8

3.3.8 Connecting the cable to Diplexing Bandswitch and F2626 (YTF)

(1) Connecting the cable to Diplexing Bandswitch

Connect each wire of the cable to following terminal of Diplexing Bandswitch.

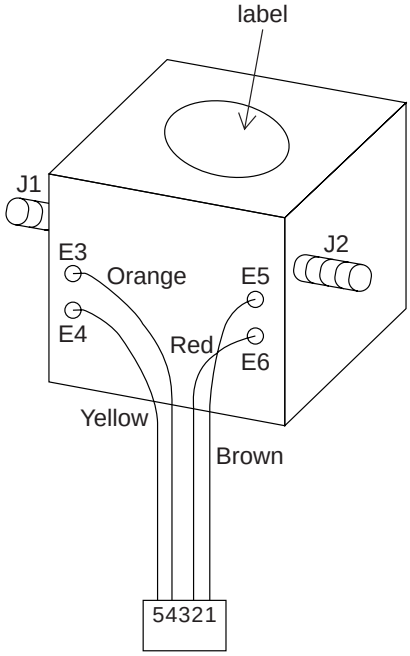
- Red (#2) wire to #1 pin of Diplexing Bandswitch
- Blown (#1) wire to #2 pin of Diplexing Bandswitch
- Orange (#3) wire to Ground pin of Diplexing Bandswitch



(2) Connecting the cable to F2626 (YTF)

Connect each wire of the cable to following terminal of F2626.

- Blown (#1) wire to “E5” pin of F2626
- Red (#2) wire to “E6” pin of F2626
- Orange (#3) wire to “E3” pin of F2626
- Yellow (#4) wire to “E4” pin of F2626



Section 4 MS2668C

4.1 Overall Circuit description

MS2668C is a superheterodyne system scanning-type spectrum analyzer.
This section describes overall circuit of the MS2668C spectrum analyzer with its block diagram.

An RF input signal after passing through an RF switch and variable RF ATTN in Switched Attenuator is switched by Diplexing Bandswitch to two different signal routes depending on input RF frequency.

For an RF input frequency of 9 kHz to 3.1 GHz (termed as band 0), the signal passes through 3.2 GHz LPF and then to 1st mixer (1st MIX), where it is mixed with 1st local signal (4.1 GHz to 7.2 GHz) to generate 4110.69 MHz 1st IF signal.
The 1st IF signal is then passed through an amplifier and image rejection filters, and fed to 2nd mixer (2nd MIX), where it is mixed with 4 GHz 2nd local signal to generate 110.690 MHz 2nd IF signal.

For an RF input frequency of 3.1 GHz to 40 GHz (band 1 to 5), the signal goes to YTF (YIG tuned filter), and then to 40 GHz H.MIXER. In 40 GHz H.MIXER, the RF signal gets mixed with the 1st local signal (3.6 GHz to 7.5 GHz) to (For bands of 1 and 2; RF Input frequency of 3.1 to 8.1 GHz) generate 689.31 MHz 1st IF signal.
At higher RF input frequencies (For bands of 3 to 5; RF Input frequency of 7.9 to 40 GHz) the 1st LO signal (3.6 to 6.8 GHz) is passed through a frequency doubler and the doubled frequency (7.2 to 13.6 GHz) is then fed to 40 GHz H.MIXER. In 40 GHz H.MIXER this signal gets mixed input signal to generate a 689.3 MHz 1st IF signal.
This 1st IF signal is passed through a series of amplifiers and image rejection filters before further mixing with 800 MHz 2nd local signal to convert the signal to the 110.690 MHz 2nd IF signal.

Depending on the active band of RF input, one of the two above 2nd IF signal is sent to IF section for further processing.

The 1st local signal generated at YTO (YIG tuned oscillator) is frequency-swept by scan signal from SCAN/AD section after phase-lock to reference signal (its frequency is 11 MHz to 14 MHz with the resolution of 1 Hz steps) generated on LOCAL-SP1, 2 section at the center frequency of its sweeping range, in normal sweep condition.

The YTO output is passed through an amplifier, and then divided into three paths with directional couplers. One of divided signal is fed to sampler circuit and the other are fed to the above mixers to frequency-convert.
In the sampler circuit, sampling signal (its frequency is 94 MHz to 106 MHz with the resolution of 1 MHz steps) generated on LOCAL-SP1, 2 section is frequency-multiplied, and then mixed with the YTO output to generate sampler IF signal with a frequency of 11 MHz to 14 MHz.
The sampler IF signal is compared with the reference signal of 11 MHz to 14 MHz at PFD.

The reference signal frequency (fREF) and the sampling signal frequency (fs) are controlled by CPU section according to the measuring frequency of the instrument, and set so that the center frequency of 1st local signal is fs * N ± fREF (, where N is an integer).
Meanwhile, the scan signal strength that is equivalent to frequency sweep width is controlled from LOCAL-SP1, 2 section.

The 2nd local signals of 4 GHz and 800 MHz are also phase-locked to 100 MHz VCXO signal, of which the frequency is also phase-locked to 10 MHz crystal oscillator.

In the instrument, a high accuracy 625 kHz signal is present for level accuracy calibration. This signal is generated by frequency-dividing the 10 MHz reference signal, and its power level is varied with 1 dB steps by CAL ATT.
Internal calibration operation being carried out, this calibrating signal is fed to the RF signal-route through the switch in Switched Attenuator.

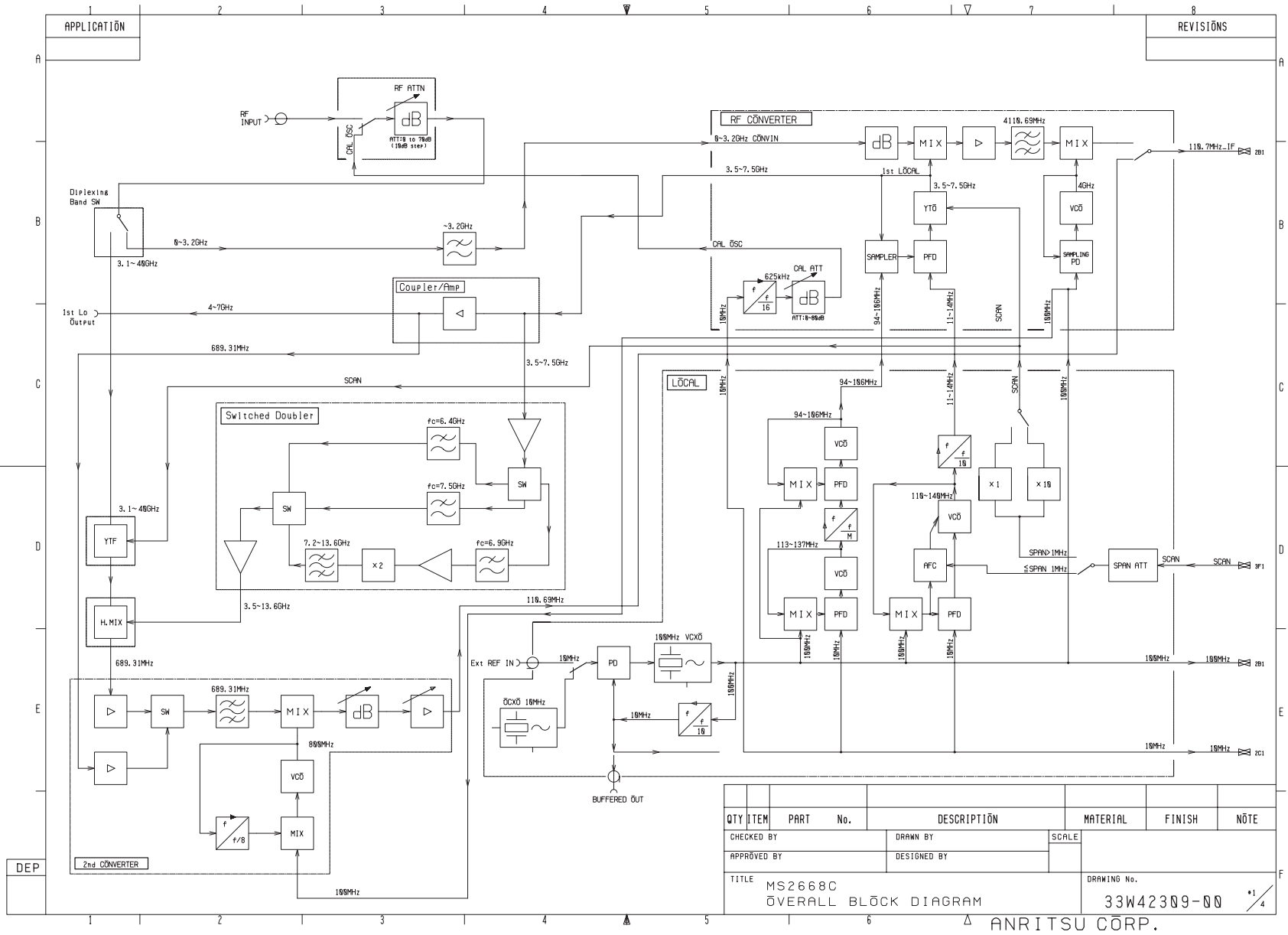
At the IF section the incoming signal is divided into two paths. The main route leads to image rejection filters while the second, a highly attenuated feeler path signal is used for generation of wide band trigger signal in TRIG/GATE section (option 06) situated on OPTION BASE board.
The main signal after passing through an image rejection filter is beat down to a 10.69 MHz signal using a 100 MHz reference signal. This signal is then sent to various Resolution Band Width (RBW) setting circuits.

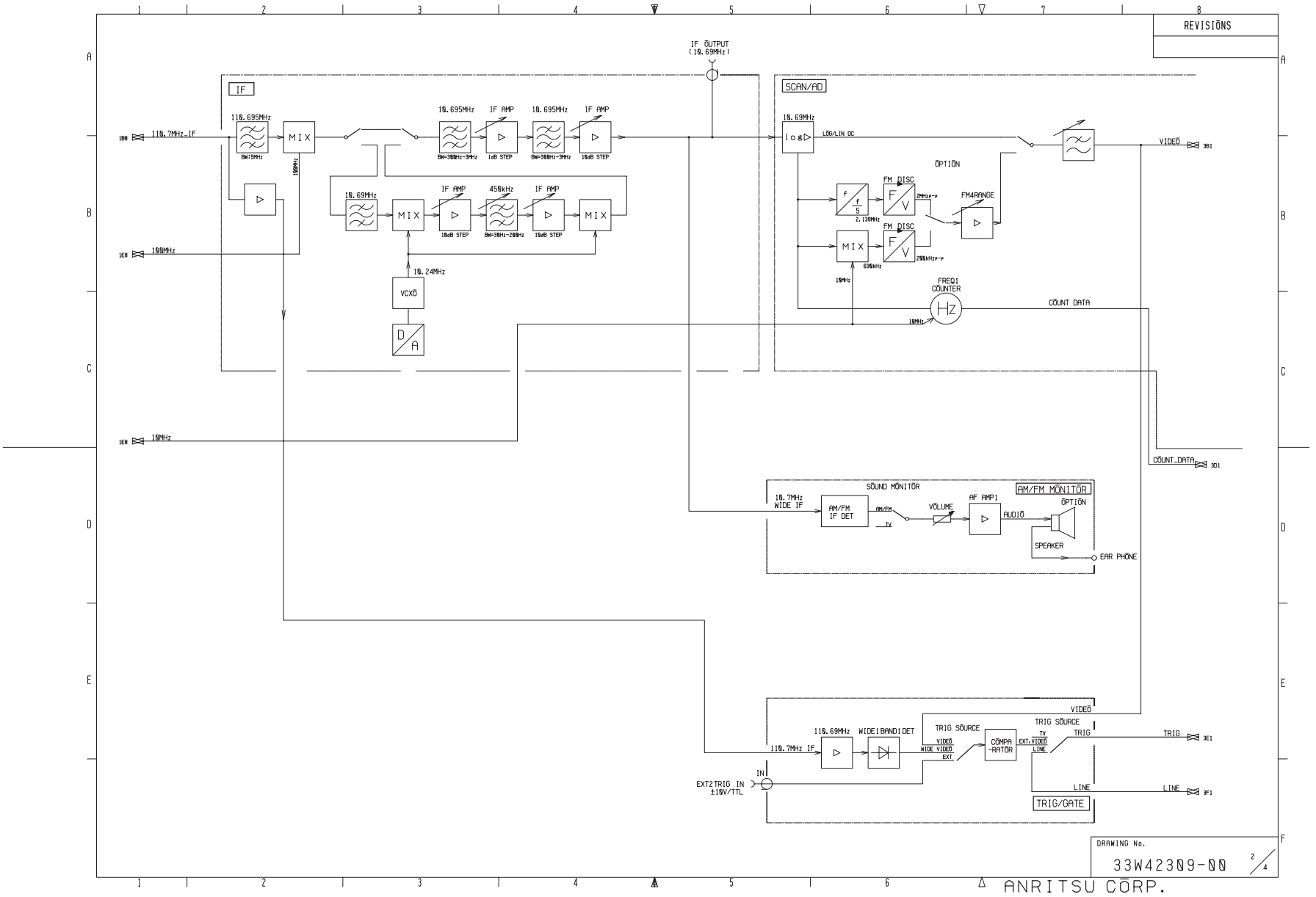
For RBW setting of 10 Hz to 100 Hz the signal is frequency converted to 450 kHz using 10.24 MHz signal. After passing through the RBW circuits (Crystal filter circuits) the signal is up converted back to 10.690 MHz signal and passed through wider RBW setting circuits. For RBW setting of 300 Hz to 3 MHz the signal is sent directly to wide RBW setting circuits without any frequency modifications.

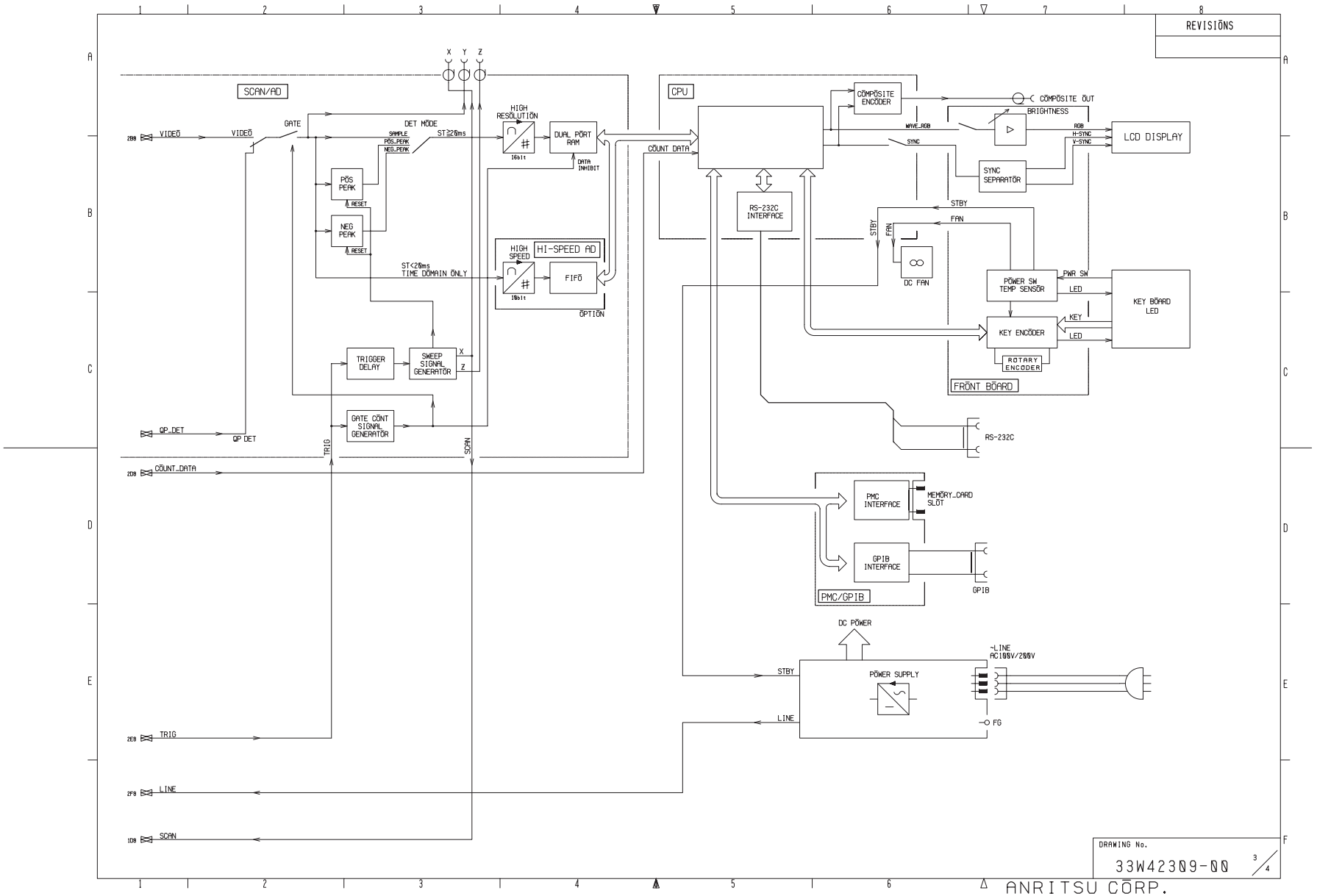
The RBW processed signal is passed onto SCAN/AD section, where it passes through logarithmic amplifiers and then to a linear detector. This linear detected signal is passed through smoothing filters called Video Band Width Filters (VBW). This smoothed signal is then passed through Positive or Negative peak detection circuits and the output is converted to digital signal by a Analog to Digital Converter (ADC) circuit.
The results are then written (in digital word format) to a Dual Port RAM through one of the ports.

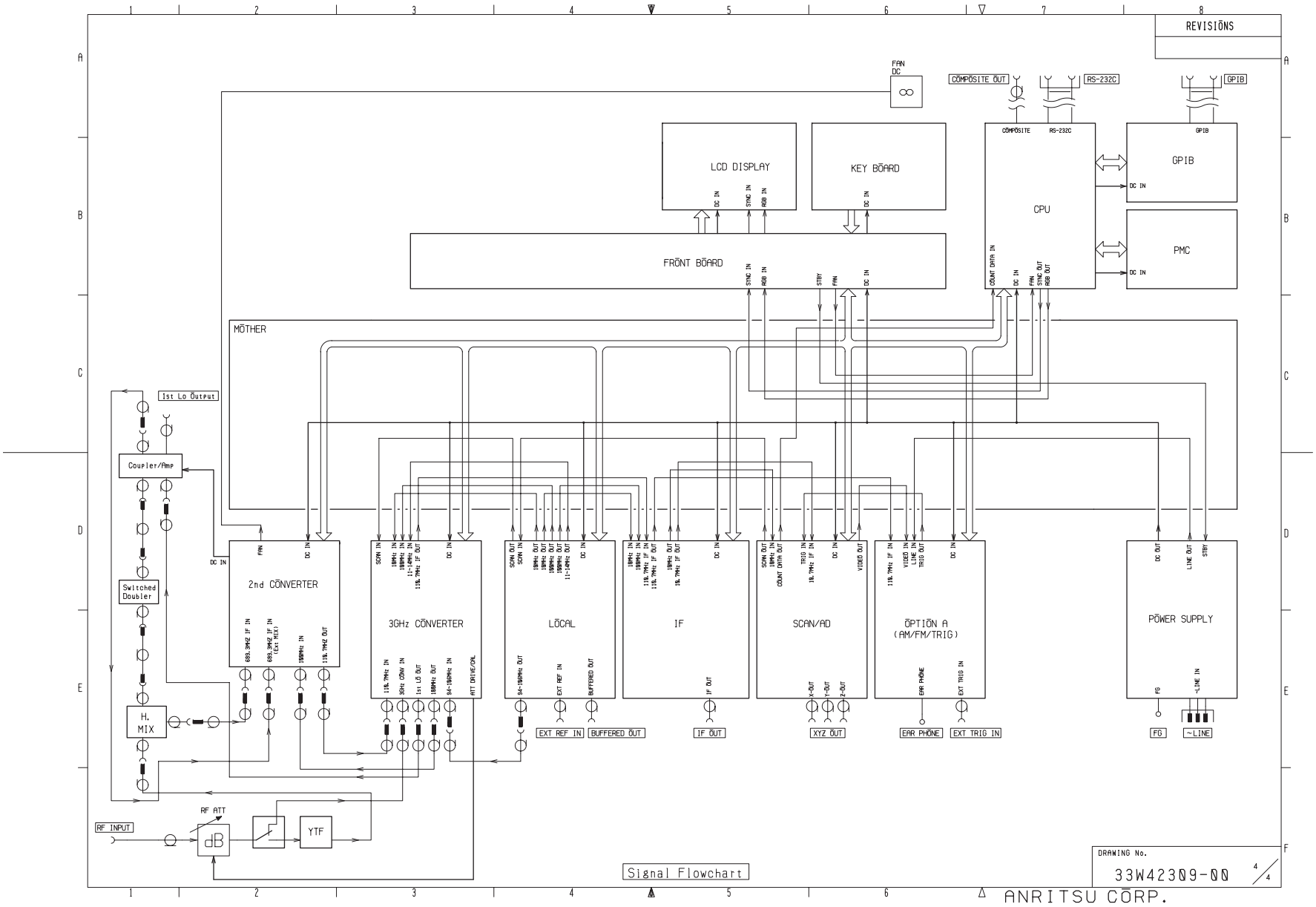
The CPU of the instrument on CPU section reads from the other port of Dual Port RAM and processes the data before displaying on the LCD screen. The CPU also controls various interface functions such as reading the Key Inputs or remote control commands received, and various outputs such as prints or plots of various data. The CPU also generates various commands required for controlling or setting of all hardware units inside the instrument.

FRONT BOARD section generates the KEY and rotary-knob encoder data, drives the LEDs, detects the power switch (PWR SW) setting, controls the power-supply On/Stby setting, and supplies power for the LCD backlight, etc.


APPLICATIÕN
REVISIÕNS
RF INPUT
RF ATTN
ATT:0 to 70dB (10dB step)
CAL ÕSC
RF CÕNVERTER
0~3.2GHz CÕNVIN
4110.69MHz
1st LÕCAL
3.5~7.5GHz
4GHz
YTÕ
VCÕ
SAMPLER
PFD
SAMPLING PD
110.7MHz_IF
2B1
Diplexing Band SW
0~3.2GHz
3.1~40GHz
~3.2GHz
CAL ÕSC
CAL ATT
625kHz
ATT:0~80dB
Coupler/Amp
1st Lo Õutput
4~7GHz
689.31MHz
SCAN
LÕCAL
10MHz
94~106MHz
11~14MHz
Switched Doubler
fc=6.4GHz
fc=7.5GHz
fc=6.9GHz
SW
×2
7.2~13.6GHz
YTF
H.MIX
3.5~13.6GHz
110.69MHz
MIX
PFD
×1
×10
110~140MHz
113~137MHz
AFC
SPAN>1MHz
≦SPAN 1MHz
SPAN ATT
3F1
Ext REF IN
PD
100MHz VCXÕ
ÕCXÕ 10MHz
BUFFERED ÕUT
800MHz
2nd CÕNVERTER
f/8
DEP
QTY ITEM PART No. DESCRIPTIÕN MATERIAL FINISH NÕTE
CHECKED BY
APPRÕVED BY
DRAWN BY
DESIGNED BY
SCALE
TITLE
MS2668C
ÕVERALL BLÕCK DIAGRAM
DRAWING No.
33W42309-00
*1
1/4
ANRITSU CÕRP.


REVISIÕNS
IF ÕUTPUT (10.69MHz)
IF
SCAN/AD
119.695MHz
BW:5MHz
MIX
19.695MHz
IF AMP
BW=30MHz~3MHz
1dB STEP
19.695MHz
IF AMP
BW=30MHz~3MHz
10dB STEP
119.7MHz IF
10.69MHz
MIX
IF AMP
10dB STEP
450kHz
BW=30Hz~20kHz
IF AMP
10dB STEP
MIX
10.24MHz
VCXÕ
D/A
10MHz
10MHz
10MHz
10.69MHz
LOG/LIN DC
VIDEÕ
3B1
ÕPTIÕN
FM DISC
2MHz/V
FM4RANGE
2.138MHz
FM DISC
200kHz/V
MIX
699kHz
10MHz
FREQ1 COUNTER
COUNT DATA
10MHz
COUNT_DATA
3D1
SÕUND MÕNITÕR
AM/FM MÕNITÕR
10.7MHz WIDE IF
AM/FM IF DET
AM/FM
TV
VÕLUME
AF AMP1
AUDIÕ
ÕPTIÕN
SPEAKER
EAR PHÕNE
VIDEÕ
119.69MHz
WIDE1BAND1DET
119.7MHz IF
TRIG SÕURCE
VIDEÕ
WIDE VIDEÕ
EXT
CÕMPA -RATÕR
TRIG SÕURCE
TV
EXT.VIDEÕ
LINE
TRIG
TRIG
3E1
LINE
LINE
3F1
IN
EXT2TRIG IN ±10V/TTL
TRIG/GATE
DRAWING No.
33W42309-00
2/4
ANRITSU CÕRP.


REVISIONS
SCAN/AD
CPU
X
Y
Z
VIDEO
GATE
DET MODE
SAMPLE
POS.PEAK
NEG.PEAK
ST≧20ms
HIGH RESOLUTION
16bit
DUAL PORT RAM
DATA INHIBIT
COUNT DATA
POS PEAK
NEG PEAK
RESET
HIGH SPEED
HI-SPEED AD
ST<20ms
TIME DOMAIN ONLY
18bit
FIFO
OPTION
TRIGGER DELAY
SWEEP SIGNAL GENERATOR
GATE CONT SIGNAL GENERATOR
TRIG
SCAN
QP_DET
QP DET
COUNT_DATA
COMPOSITE ENCODER
COMPOSITE OUT
BRIGHTNESS
WAVE_RGB
SYNC
RGB
H-SYNC
V-SYNC
LCD DISPLAY
SYNC SEPARATOR
RS-232C INTERFACE
STBY
FAN
DC FAN
POWER SW TEMP SENSOR
PWR SW
LED
KEY BOARD LED
KEY ENCODER
KEY
ROTARY ENCODER
FRONT BOARD
RS-232C
PMC INTERFACE
MEMORY_CARD SLOT
GPIB INTERFACE
GPIB
PMC/GPIB
DC POWER
POWER SUPPLY
LINE
AC100V/200V
FG
TRIG
LINE
SCAN
DRAWING No.
33W42309-00
3/4
ANRITSU CORP.


REVISIONS
FAN DC
COMPOSITE OUT
RS-232C
GPIB
LCD DISPLAY
KEY BOARD
CPU
PMC
FRONT BOARD
MOTHER
1st Lo Output
Coupler/Amp
Switched Doubler
H. MIX
2nd CONVERTER
3GHz CONVERTER
LOCAL
IF
SCAN/AD
OPTION A (AM/FM/TRIG)
POWER SUPPLY
RF INPUT
RF ATT
dB
YTF
EXT REF IN
BUFFERED OUT
IF OUT
XYZ OUT
EAR PHONE
EXT TRIG IN
FG
~LINE
Signal Flowchart
DRAWING No.
33W42309-00
4/4
ANRITSU CORP.

4.2 Troubleshooting

4.2.1 Introduction

This section describes how to troubleshoot the MS2668C.

4.2.1.1 Service kit

Refer to 2.2.1.1.

4.2.1.2 Required equipment

Refer to 3.2.1.2.

4.2.1.3 Circuit reference

This paragraph supplies the exchange module list of the spectrum analyzer with its overall circuit diagram.

Table 4-2-1 Exchange Modules of MS2668C

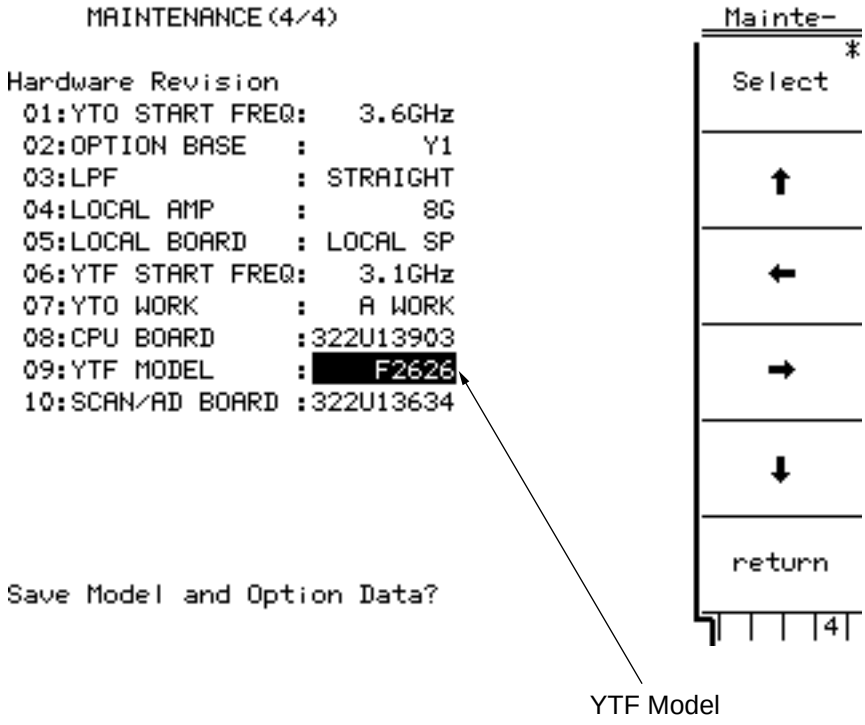
Schematic number	Name	Model name	Ordering number	Note
1	MOTHER BOARD	MM200013A	34Y115415	
2	A02 FRONT BOARD	322U14223	34Y118357	
3	A03 CPU	322U14225	34Y118358	
4	A04 PMC/GPIB	322U12853	34Y106693	
5	SCAN/AD	MM200014A	34Y112923D	
6	IF(B)	MM200015A	34Y106718B	
7	LOCAL-SP2	MM200016A	34Y111112B	Order both numbers
	LOCAL-SP1	MM200017A	34Y111111B	
8	RF CONVERTER	MM200019A	34Y117226	
9	2nd CONVERTER	MM200020A	34Y117228	
10	COUPLER/AMP	MM200023A	34Y118006	
11	AK-AKF PANEL CONNECTOR	B46790	B46790	
12	Switched Attenuator	D29638	D29638	
13	Diplexing Bandswitch	D29870	D29870	
14	OPEN LOOP YIG FILTER	F2626	34Y117225	
	F2626 MODULE	MM200025A	339H42762	
	MLFP1312 MODULE	MM200026A	339H42762B	
15	40GHz H.MIXER	339H41184B	339H41184B	
16	POWER SUPPLY UNIT	34Z114508	34Z114508	
17	TFT LCD MODULE	NL3224AC35-01	No1256	
18	OPTION BASE	MM200018A	34Y106684B	
19	Switched Doubler	D29650	D29650	
Options				
20	A0501 HI-SPEED AD	332U36333	34Y106688	Option 04
21	A0901 TRIG/GATE	34Y106695B	34Y106695B	Option 06
22	A0902 AM/FM MONITOR	34Y106699B	34Y106699B	Option 07
23	A04 PMC/CENTRONICS	34Y106692B	34Y106692B	Option 10

To identify a exchange module, a label printed “Model number” is pasted on module.

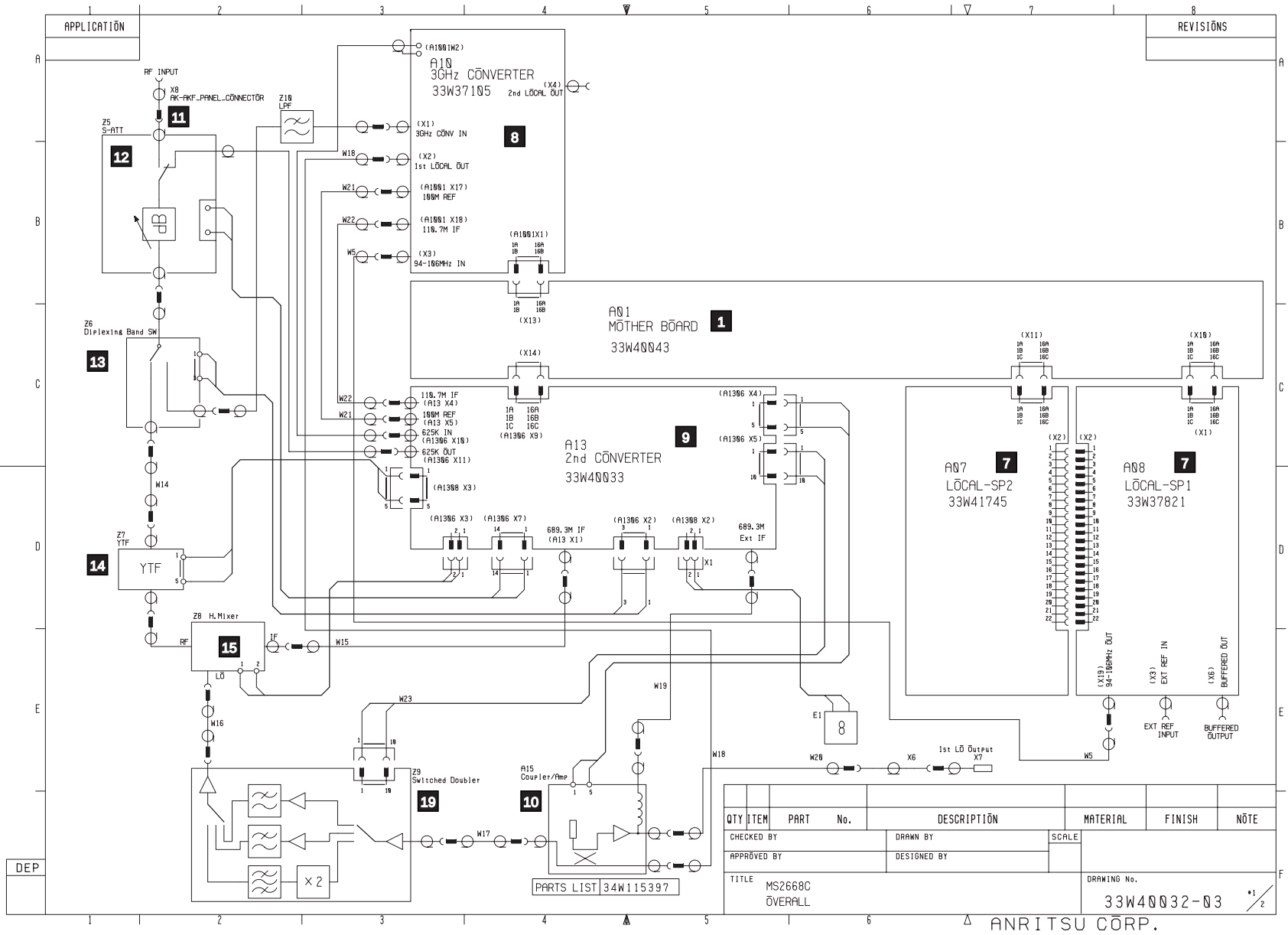
Remark :

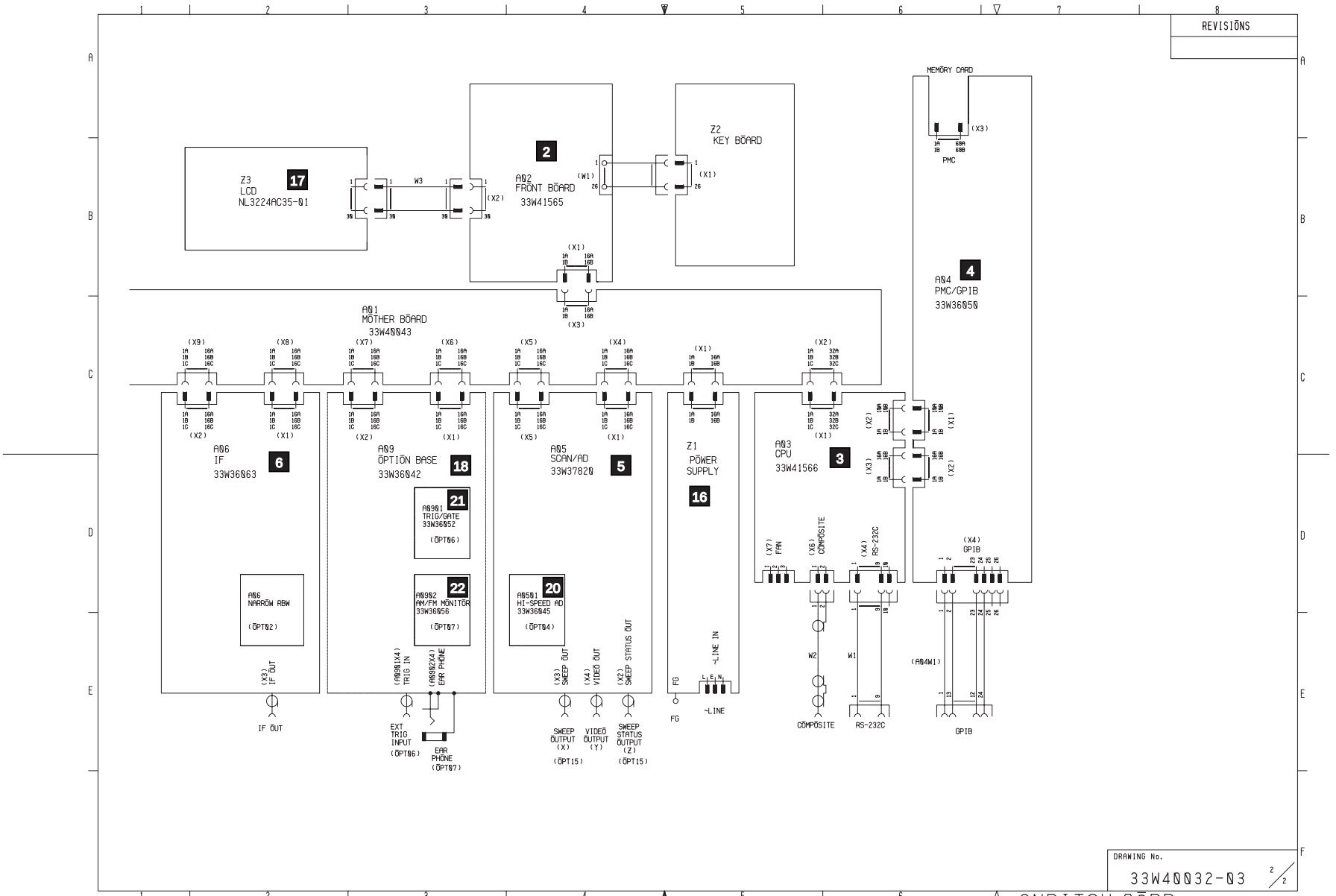
1. MS2668C has three kinds of YTF as exchange module. When you replace a YTF, check YTF model according to following procedure .
   (1) Keep key “0” depressed while switching on the spectrum analyzer.
   (2) Enter RF/Micro Conv maintenance menu.
      1) Enter Cal menu by pushing “Shift” + “0” keys. Open second page of Cal menu by pushing “more”.
      2) Enter maintenance menu with “F6” (Maintenance) key.
   (3) Press “F1” (Version & options) keys.

(4) Press Key “more” 3 times. MAINTENANCE (4/4) page appears. Check YTF model. If “09 : YTF MODEL” is not indicated, order “F2626”.
If “09 : YTF MODEL : F2626” is indicated, order “F2626 MODULE”.
If “09 : YTF MODEL : MLFP1312” is indicated, order “MLFP1312 MODULE”.



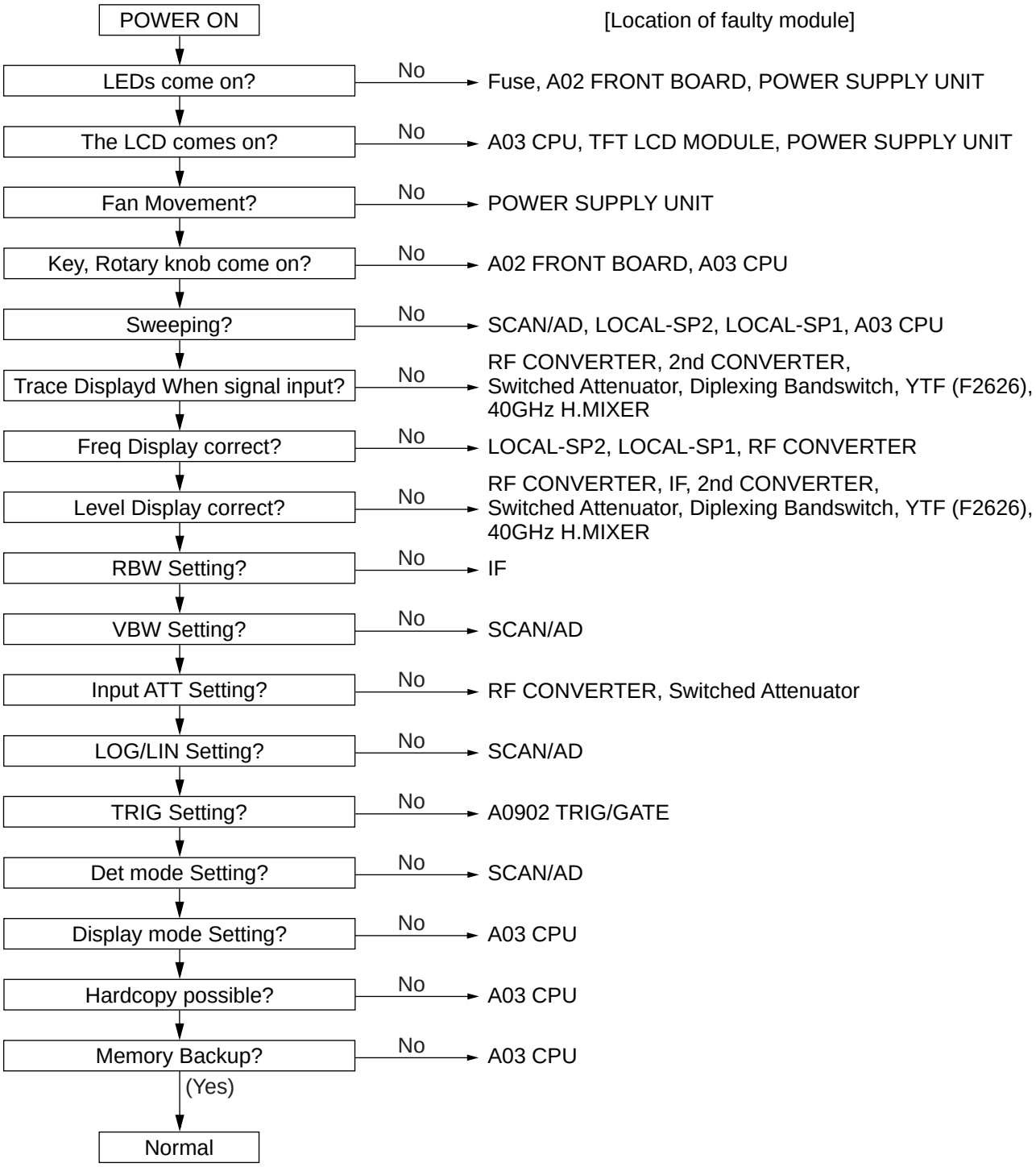
2. When you replace a A02 FRONT BOARD or A03 CPU, check circuit board number (322U******) of A03 CPU.
If circuit board number of A03 CPU is 322U13903, make sure to order A02 FRONT BOARD (322U14223) and A03 CPU (322U14225).
If circuit board number of A03 CPU is 322U14225, make sure to order one module which you replace.


APPLICATIŌN
REVISIŌNS
RF INPUT
X8
AK-AKF_PANEL_CŌNNECTŌR
A10
3GHz CŌNVERTER
33W37105
2nd LŌCAL ŌUT
(X4)
(X1)
3GHz CŌNV IN
(X2)
1st LŌCAL ŌUT
(A10Ø1 X17)
10ØM REF
(A10Ø1 X18)
11Ø.7M IF
(X3)
94-106MHz IN
(A10Ø1W2)
(A10Ø1X1)
Z10
LPF
Z5
S-ATT
Z6
Diplexing Band SW
W14
Z7
YTF
Z8 H.Mixer
RF
IF
LŌ
W15
W16
W18
W21
W22
W5
W23
W19
W17
W20
A01
MŌTHER BŌARD
33W40043
(X14)
(X13)
(X11)
(X10)
A13
2nd CŌNVERTER
33W40033
(A13Ø6 X4)
(A13Ø6 X5)
(A13Ø6 X3)
(A13Ø6 X7)
(A13Ø6 X2)
(A13Ø8 X2)
(A13Ø8 X3)
(A13Ø6 X9)
(A13Ø6 X10)
(A13Ø6 X11)
689.3M IF
(A13 X1)
689.3M
Ext IF
A07
LŌCAL-SP2
33W41745
A08
LŌCAL-SP1
33W37821
(X19)
94-106MHz ŌUT
(X3)
EXT REF IN
(X6)
BUFFERED ŌUT
EXT REF
INPUT
BUFFERED
ŌUTPUT
E1
1st LŌ Ōutput
X7
X6
Z9
Switched Doubler
A15
Coupler/Amp
X2
PARTS LIST 34W115397
QTY ITEM PART No.
DESCRIPTIŌN
MATERIAL
FINISH
NŌTE
CHECKED BY
DRAWN BY
SCALE
APPRŌVED BY
DESIGNED BY
TITLE
MS2668C
ŌVERALL
DRAWING No.
33W40032-03
*1
2
DEP
ANRITSU CŌRP.


REVISIONS
Z3
LCD
NL3224AC35-01
17
W3
A02
FRONT BOARD
33W41565
2
Z2
KEY BOARD
(W1)
(X1)
(X2)
(X3)
MEMORY CARD
PMC
A04
PMC/GPIB
33W36050
4
A01
MOTHER BOARD
33W40043
A06
IF
33W36063
6
A09
OPTION BASE
33W36042
18
A0901
TRIG/GATE
33W36052
(OPT06)
21
A0902
AM/FM MONITOR
33W36056
(OPT07)
22
A06
NARROW RBW
(OPT02)
A05
SCAN/AD
33W37820
5
A0501
HI-SPEED AD
33W36045
(OPT04)
20
Z1
POWER
SUPPLY
16
A03
CPU
33W41566
3
(X9)
(X8)
(X7)
(X6)
(X5)
(X4)
(X1)
(X2)
(X7) FAN
(X6) COMPOSITE
(X4) RS-232C
(X4) GPIB
(X3) IF OUT
(A0901X4) TRIG IN
(A0902X4) EAR PHONE
(X3) SWEEP OUT
(X4) VIDEO OUT
(X2) SWEEP STATUS OUT
FG
~LINE IN
L E N
W2
W1
(A04W1)
IF OUT
EXT TRIG INPUT (OPT06)
EAR PHONE (OPT07)
SWEEP OUTPUT (X) (OPT15)
VIDEO OUTPUT (Y)
SWEEP STATUS OUTPUT (Z) (OPT15)
FG
~LINE
COMPOSITE
RS-232C
GPIB
DRAWING No.
33W40032-03
2/2
ANRITSU CORP.

4.2.2 Detecting faulty module

The flowchart shows the way to locate the faulty module among them.



4.2.3 Disassembling cabinet

Refer to 4.3.1.

4.2.4 Replacement of faulty module

Refer to 4.3.2 to 4.3.8.

4.2.5 Adjustment after module replacement

This paragraph describes the overall adjustment required after replacement of any modules in following Table. Look for modules which you replaced in Table. Please carry out work corresponding to module which you replaced. This adjustment is not necessary, if the module you replaced does not belong to the following Table.

Replaced module	
LOCAL-SP2 and LOCAL-SP1	Carry out 4.2.5.1 and 4.2.5.2.
RF CONVERTER F2626 MODULE MLFP1312 MODULE OPEN LOOP YIG FILTER (F2626)	Carry out 4.2.5.2 and 4.2.5.3.
2nd CONVERTER	Carry out 4.2.5.2 to 4.2.5.4.
40GHz H.MIXER	Carry out 4.2.5.3.
A03 CPU	Carry out 4.2.5.3 and 4.2.5.4.

4.2.5.1 Reference crystal oscillator adjustment

Refer to 2.2.5.1.

4.2.5.2 Sweep adjustment

Required equipment :

(1) 6769B Swept frequency synthesizer
(2) MG3633A Synthesized signal generator
(3) HP3478A Digital multimeter

Setup for the procedure (1), (2) :

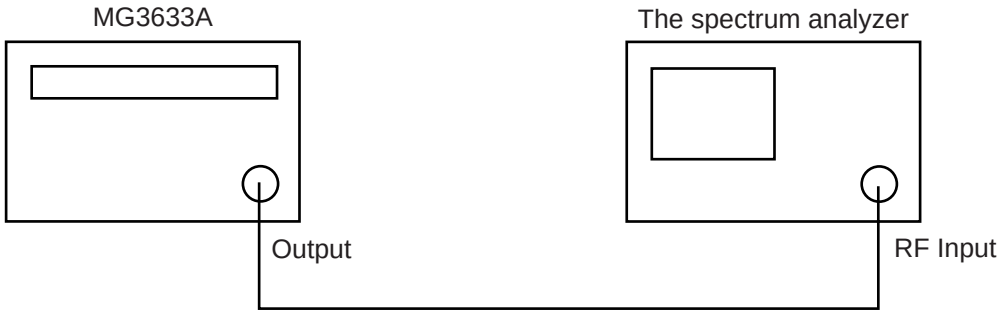


Fig. 4-2-1

Connect the spectrum analyzer RF Input to MG3633A OUTPUT.

Setup for the procedure (3) :

(1) Connect digital multimeter HI input to the X3 terminal on LOCAL-SP2 PC board. (Refer to Fig. 3-2-4)
(2) Connect digital multimeter LO input to the spectrum analyzer's common.

Setup for the procedure (4) :

(1) Connect digital multimeter HI input to the X21 terminal on LOCAL-SP2 PC board. (Refer to Fig. 3-2-4)
(2) Connect digital multimeter LO input to the spectrum analyzer's common.

Setup for the procedure (5) :

(1) Connect digital multimeter HI input to the X3 terminal on A1307 YTF DRIVER PC board attached to 2nd CONVERTER. (Refer to Fig. 3-2-5)
(2) Connect digital multimeter LO input to the spectrum analyzer's common.

Setup for the procedure (6), (7) :

(1) Check model of YTF. (Refer to "Remark" of 4.2.1.3)
(2) Set jumper pins, X10 and X12 on A1307 YTF DRIVER PC board attached to 2nd CONVERTER, to YTF model side which you checked at (1). (Refer to Fig 3-2-5)
Example : When YTF model is "F2626", jumper pins are set as follows.

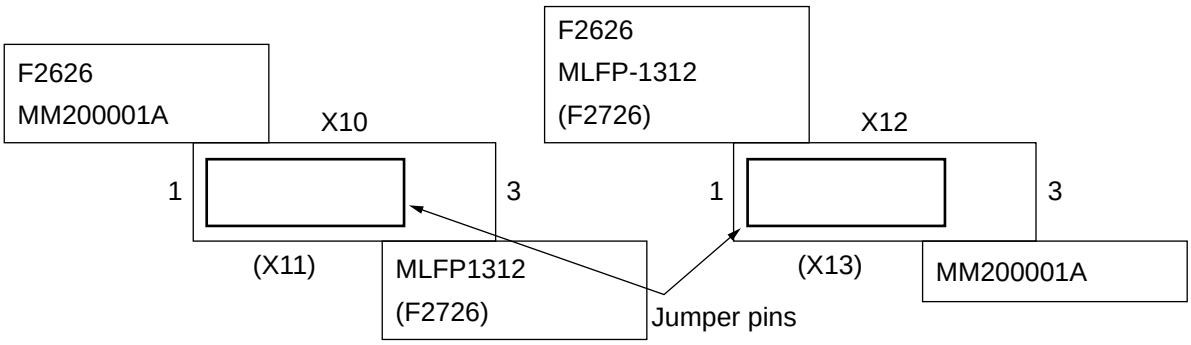


Fig. 4-2-2

(3) Connect the spectrum analyzer RF Input to 6769B RF OUTPUT.

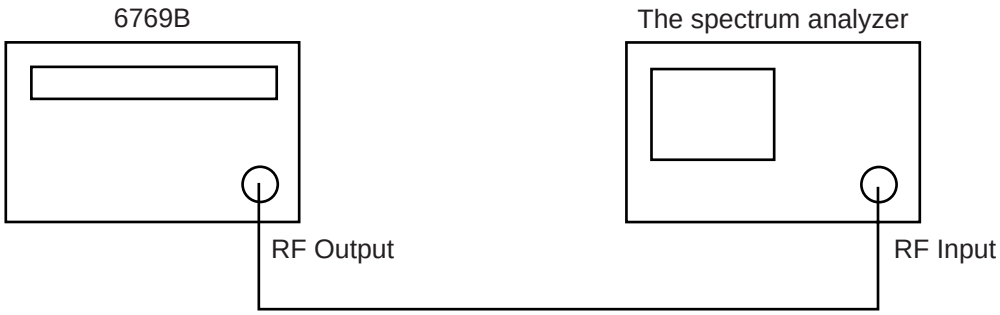


Fig. 4-2-3

Procedure :

(1) Local sweep adjustment
Refer to 3.2.5.2 Procedure (1) Local sweep adjustment.

(2) YTO FM sweep adjustment
Refer to 3.2.5.2 Procedure (2) YTO FM sweep adjustment.

(3) YTF offset voltage adjustment 1
Refer to 3.2.5.2 Procedure (3) YTF offset voltage adjustment 1.

(4) YTF offset voltage adjustment 2
Refer to 3.2.5.2 Procedure (4) YTF offset voltage adjustment 2.

(5) YTF tuning DAC adjustment
Refer to 3.2.5.2 Procedure (5) YTF tuning DAC adjustment.

(6) YTF tuning adjustment
1) Keep key “Preset” depressed while Switching ON the spectrum analyzer.

2) Wait till sweep of the spectrum analyzer starts and after that Switch OFF the power supply of the spectrum analyzer.

3) Now once again keep key “0” depressed while switching on the spectrum analyzer.

4) Initialize the spectrum analyzer (Press key “preset”, followed by Key “F1”).

5) Set the spectrum analyzer to :
Center frequency : 3.2 GHz
Span : 200 MHz

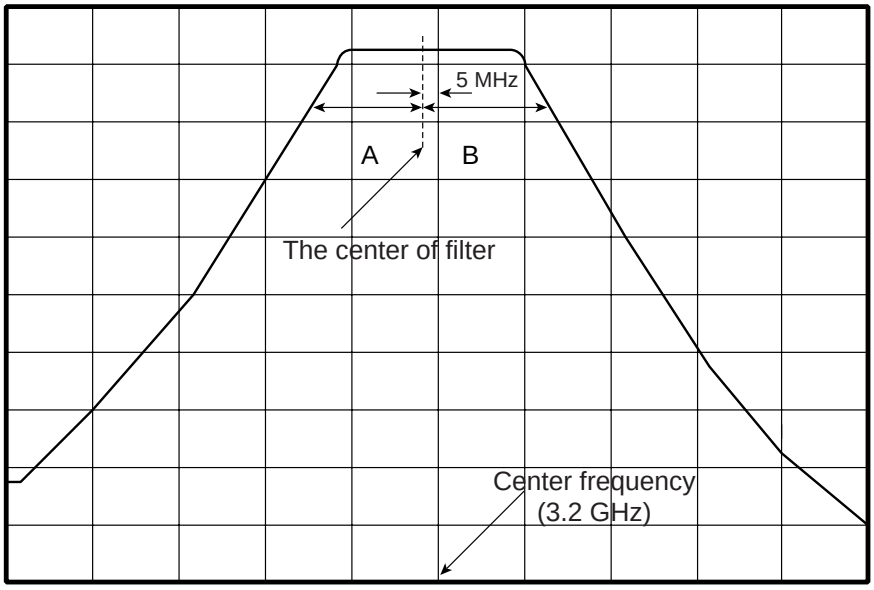
6) Set 6769B Signal generator output to :
Frequency : 3.2 GHz
RF level : -10 dBm

7) Enter Cal menu by pushing “Shift” + “0” keys. Open the second page of Cal menu (press the key “more”), and enter Maintenance menu with “F6” key.

8) Select key “Mainte RF/Micro Conv” (F2), and press the key “more”.

9) Press the key “Main Swp→off” (F2). At this point YTF filter shape appears on the display of the spectrum analyzer.

10) Adjust R79 on the 2nd Converter (refer to Fig. 3-2-5) so as to shift the center of filter display about 5 MHz below the center frequency of the display.



10 dB down point
A=B

11) Set the spectrum analyzer to :
Center frequency : 30 GHz

12) Set 6769B Signal generator output to :
Frequency : 30 GHz
RF level : -10 dBm

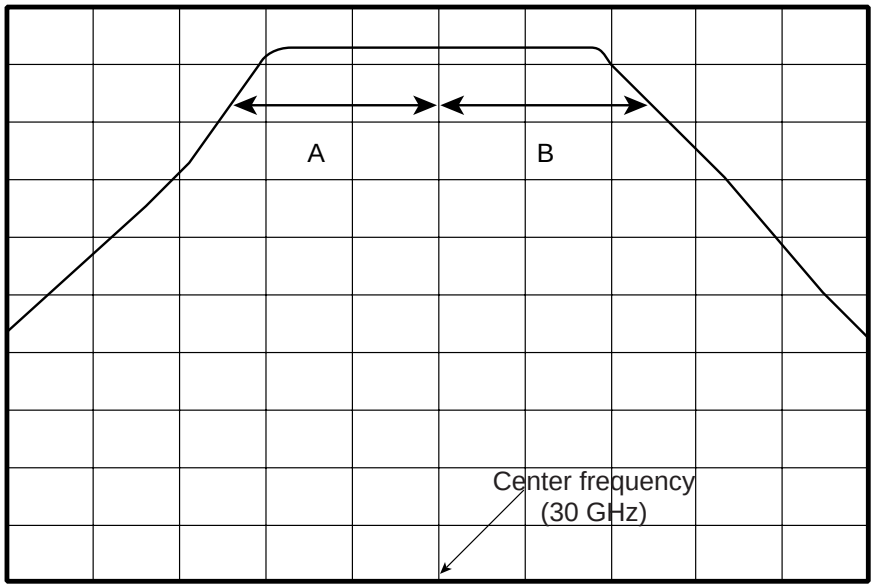
13) Enter Cal menu by pushing “Shift” + “0” keys. Open the second page of Cal menu (press the key “more”), and enter Maintenance menu with “F6” key.

14) Select key “Mainte RF/Micro Conv” (F2), and press the key “more”.

15) Press the key “Main Swp→off” (F2). At this point YTF filter shape appears on the display of the spectrum analyzer.

16) Wait 2 minutes.

17) Adjust R70 on the 2nd Converter (refer to Fig. 3-2-5) so as to shift the center of filter display to the center frequency of the display.



10 dB down point
A=B

(7) YTF Sweep adjustment

1) Initialize the spectrum analyzer (Press key “preset”, followed by Key “F1”).

2) Set 6769B Signal generator output to :
Frequency : 26.2 GHz
RF level : -10 dBm

3) Set Marker of the spectrum analyzer to 26.2 GHz (Press keys “Marker” + “2”+“6”+“.”+“2”+“GHz”) and adjust R41 on the 2nd Converter (refer to Fig. 3-2-5) to make Marker read maximum.

4) Set Pre-selector bias value to 0 by pressing keys “frequency” + “F5” (Pre-selector Tuning) + “F2” (Manual).

5) Set the marker function to delta marker mode (Press keys “Marker” + “F2”).

6) Change Pre-selector bias value to negative value by the knob on the front panel as to read the level of delta marker to -6 dB ±1 dB.
Now read Pre-selector bias value (P1).

7) Change Pre-selector bias value to positive value by the knob on the front panel as to read the level of delta marker to -6 dB ±1 dB.
Now read Pre-selector bias value (P2).

8) Adjust R41 (rough adjustment) or R42 (close adjustment) on the 2nd Converter (refer to Fig. 3-2-5) until P1 + P2 become below ±8, to repeat the procedure 4) to 8).

4.2.5.3 IF Gain-1 (ATT), IF Gain-2 (AMP) of Internal Mixer Band adjustment

Required equipment :

(1) 6769B swept frequency synthesizer
(2) ML2437A Power sensor
(3) MA2444A Power sensor

Setup :

(1) Connect RF Input of the spectrum analyzer to RF OUTPUT of 6769B.

Procedure :

(1) Keep key “0” depressed while switching on the spectrum analyzer.
(2) Initialize the spectrum analyzer :
    1) Enter Preset menu with “preset” key.
    2) Initialize the spectrum analyzer completely with “F1” key.
(3) Calibrate the spectrum analyzer using its internal calibration function :
    1) Enter Cal menu with “Shift” key and “0” key.
    2) Calibrate the spectrum analyzer by pushing “F1” key.

[Band 1-]

(4) Set Manual Band to Band 1- :
    1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
    2) Enter Internal mixer Band menu with “F1” (Internal Mix) key.
    3) Set manual band to Band 1- by pushing “F3” (Manual Band 1-) key.

(5) Set the spectrum analyzer to :
    Center frequency : 4.35 GHz
    Span : 200 MHz
    Set the 6769B output frequency to 4.35 GHz (CW).

(6) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s RF Input.

(7) Tune the spectrum analyzer’s pre-selector, using its pre-selector auto tune function :
    1) Press “frequency” key.
    2) Carry out pre-selector Auto Tune function by pushing “F4” (Pre-selector Auto Tune) key.

(8) Take the marker to signal peak by pushing “Peak Search” key.

(9) Enter RF/Micro Conv maintenance menu, and open its 6th page :
    1) Enter Cal menu by pushing “Shift” + “0” keys. Open second page of Cal menu by pushing “more”.
    2) Enter maintenance menu with “F6” (Maintenance) key.
    3) Enter RF/Micro Converter maintenance menu with “F2” (Mainte RF/Micro conv) key. Open the 6th page of RF/Micro converter maintenance menu (Press “more” key 5 times).

(10) Set IF Gain-1 and IF Gain-2 values to 0.

1) Press “F4” (IF Gain-1) + “0” + “enter” keys and on display appears a writing “IF Gain1 set to 0”.
2) Press “F5” (IF Gain-2) + “0” + “enter” keys and on display appears a writing “IF Gain2 set to 0”.

(11) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB.

- If the level is lesser than this, the level can be raised by increasing the Number of IF Gain-2 (F5) from 0 to 255 in single whole numbers.

  Press “F5” + “number (0 to 255)” + “enter” keys.
- If the level is greater than this, the level can be lowered by increasing the Number of IF Gain-1 (F4) from 0 to 255 in single whole numbers.

  Press “F4” + “number (0 to 255)” + “enter” keys.

[Band 1+ n=1]

(12) Set Manual Band to Band 1+ n=1 :

1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
2) Enter Internal mixer Band menu with “F1” (Internal Mix) key.
3) Set manual band to Band 1+ n=1 by pushing “F4” (Manual Band 1+ n=1) key.

(13) Set the spectrum analyzer to :

Center frequency : 6.75 GHz
Span : 200 MHz
Set the 6769B output frequency to 6.75 GHz (CW).

(14) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer’s RF Input.

(15) Tune the spectrum analyzer’s pre-selector (refer to procedure (7)).

(16) Enter RF/Micro Conv maintenance menu, and open its 6th page (refer to procedure (9)).

(17) Set IF Gain-1 and IF Gain-2 values to 0 (refer to procedure (10)).

(18) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB (refer to procedure (11)).

[Band 1+ n=2]

(19) Set Manual Band to Band 1+ n=2 :

1) Enter Frequency menu by pushing “Frequency” key, and open its second page with “more” key.
2) Enter Internal mixer Band menu with “F1” (Internal Mix) key and open its second page with “more” key.
3) Set manual band to Band 1+ n=2 by pushing “F2” (Manual Band 1+ n=2) key.

(20) Set the spectrum analyzer to :

Center frequency : 11.1 GHz
Span : 200 MHz
Set the 6769B output frequency to 11.1 GHz (CW).

(21) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer's RF Input.

(22) Tune the spectrum analyzer's pre-selector (refer to procedure (7)).

(23) Enter RF/Micro Conv maintenance menu, and open its 6th page (refer to procedure (9)).

(24) Set IF Gain-1 and IF Gain-2 values to 0 (refer to procedure (10)).

(25) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB (refer to procedure (11)).

[Band 2-]

(26) Set Manual Band to Band 2- :

1) Enter Frequency menu by pushing "Frequency" key, and open its second page with "more" key.
2) Enter Internal mixer Band menu with "F1" (Internal Mix) key and open its second page with "more" key.
3) Set manual band to Band 2- by pushing "F3" (Manual Band 2-) key.

(27) Set the spectrum analyzer to :

Center frequency : 20.3 GHz
Span : 200 MHz
Set the 6769B output frequency to 20.3 GHz (CW).

(28) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer's RF Input.

(29) Tune the spectrum analyzer's pre-selector (refer to procedure (7)).

(30) Enter RF/Micro Conv maintenance menu, and open its 6th page (refer to procedure (9)).

(31) Set IF Gain-1 and IF Gain-2 values to 0 (refer to procedure (10)).

(32) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB refer to procedure (11)).

[Band 3-]

(33) Set Manual Band to Band 3- :

1) Enter Frequency menu by pushing "Frequency" key, and open its second age with "more" key.
2) Enter Internal mixer Band menu with "F1" (Internal Mix) key and open its second page with "more" key.
3) Set manual band to Band 3- by pushing "F4" (Manual Band 3-) key.

(34) Set the spectrum analyzer to :

Center frequency : 33.1 GHz
Span : 200 MHz
Set the 6769B output frequency to 33.1 GHz (CW).

(35) Adjust the 6769B output level to make power meter reading -10 dBm at end of cable feeding the signal to the spectrum analyzer, and then connect the cable to the spectrum analyzer's RF Input.

(36) Tune the spectrum analyzer's pre-selector (refer to procedure (7)).

(37) Enter RF/Micro Conv maintenance menu, and open its 6th page (refer to procedure (9)).

(38) Set IF Gain-1 and IF Gain-2 values to 0 (refer to procedure (10)).

(39) Adjust IF Gain 1 and IF Gain 2 so that marker reading becomes -12 dBm ±0.5 dB (refer to procedure (11)).

[Writing the compensation values of IF Gain1 and IF Gain2 to Flash Memory]

(40) After the above adjustment is done, Press "F6" (return) + "F1" (Version & options) keys.

(41) Press Key "more" 3 times. MAINTENANCE (4/4) page appears.

(42) Press the cursor down key ("F5") till it falls on "Save model and Option Data?" and after that press "F1" (Select) Key.

(43) On pressing the above key F1 key turns to "SAVE". Press again and "F1" key turns "Really save?" at this stage press "F2" (Yes).

(44) The display shows a message "Now saving, Wait ....."

(45) Wait till this message disappears and after that Switch OFF the power supply of the spectrum analyzer.

(46) Now once again Switch ON the power supply of the spectrum analyzer with "Preset" key depressed.

4.2.5.4 IF Gain-1 (ATT), IF Gain-2 (AMP) of External Mixer Band adjustment

Refer to 3.2.5.4.

4.2.6 Assembling cabinet

Refer to 4.3.1.

4.2.7 Checking items after assembling cabinet

Refer to 2.2.7.

4.2.8 Frequency response compensation

Perform Frequency response compensation, when one of the following modules is replaced. This Frequency response compensation is not necessary, if the module you replaced does not belong to the following modules.

- A03 CPU
- RF CONVERTER
- 2nd CONVERTER
- F2626 MODULE
- Switched Doubler
- Switched Attenuator
- Diplexing Bandswitch
- OPEN LOOP YIG FILTER (F2626)
- MLFP 1312 MODULE
- 40GHz H.MIXER

With regards to the method of performing Frequency response compensation, refer to 2.2.8.

4.3 Mechanical configuration

4.3.1 Disassembling/Assembling cabinet

Refer to 3.3.1.

4.3.2 Removing/Assembling units and PC boards

Refer to 3.3.2.

4.3.3 Disassembling/Assembling Components around RF Input

Refer to 3.3.3.

4.3.4 Disassembling/Assembling Units and Components on lower surface

Caution :

For F2626 MODULE and MLFP1312 MODULE (A label printed "Model number" is pasted on plate ④), YTF are attached to the plate ④, to form the module, by the S4 screws which is tightened at pre-determined torque of 6kg. If torque of the S4 screws is changed, the performance specification of YTF will be affected.
Therefore YTF must not be disassembled from the plate ④.

Removing 2nd CONVERTER ①, Coupler/Amp ②, YTF ③, 40GHz H.MIXER ⑤ Switched Doubler ⑥.

(1) Removing 2nd CONVERTER ①
After 3.3.1 (2) removing procedure, remove the S1/S2 screws and remove the 2nd Converter ① to pull backward.

(2) Removing A15 Coupler/Amp ②
After 3.3.1 (2) removing procedure, remove the S3 screws and remove the Coupler/Amp ②.

(3) Removing YTF ③ (For F2626)
If YTF is OPEN LOOP YIG FILTER (F2626), perform this removing procedure.
If YTF is F2626 MODULE or MLFP1312 MODULE, perform (4) removing procedure.
   1) After 3.3.1 (2) removing procedure, remove the N1 nuts and remove the plate ④.
   (YTF ③, 40GHz H.MIXER ⑤, Coupler/Amp ② and Switched Doubler ⑥ are Attached on the plate ④).
   2) Remove the S5 screws.
   3) Loose the S7 screws. If there are no S7 screws, perform procedure 4).
   4) Disconnect 40GHz H.MIXER's connector which is connected to YTF ③.
   5) Remove the S4 screws.

(4) Removing YTF ③ (For F2626 MODULE or MLFP1312 MODULE)

If YTF is F2626 MODULE or MLFP1312 MODULE, perform this removing procedure. If YTF is OPEN LOOP YIG FILTER (F2626), perform (3) removing procedure.

1) After 3.3.1 (2) removing procedure, remove the N1 nuts and remove the plate ④.
(YTF ③, 40GHz H.MIXER ⑤, Coupler/Amp ② and Switched Doubler ⑥ are Attached on the plate ④).
2) Remove the S3 screws and remove the Coupler/Amp ②.
3) Remove the S6 screws and remove the Switched Doubler ⑥.
4) Remove the S5 screws.
5) Loose the S7 screws. If there are no S7 screws, perform procedure 6).
6) Disconnect 40GHz H.MIXER's connector which is connected to YTF ③.

Caution :

For F2626 MODULE or MLFP1312 MODULE, do not remove the S4 screws.

(5) Removing 40GHz H.MIXER ⑤

1) After 3.3.1 (2) removing procedure , remove the N1 nuts and remove the plate ④.
(YTF ③, 40GHz H.MIXER ⑤, Coupler/Amp ② and Switched Doubler ⑥ are Attached on the plate ④).
2) Remove the S5 screws.
3) Loose the S7 screws. If there are no S7 screws, perform procedure 4).
4) Disconnect 40GHz H.MIXER's connector which is connected to YTF ③.

(6) Removing Switched Doubler ⑥

1) After 3.3.1 (2) removing procedure, remove the N1 nuts and remove the plate ④.
(YTF ③, 40GHz H.MIXER ⑤, Coupler/Amp ② and Switched Doubler ⑥ are Attached on the plate ④).
2) Remove the S6 screws

Assembling 2nd CONVERTER ①, Coupler/Amp ②, YTF ③, 40GHz H.MIXER ⑤, Switched Doubler ⑥.

(1) Assembling 2nd CONVERTER ①

Perform removing procedure (1) inversely.

(2) Assembling Coupler/Amp ②

Perform removing procedure (2) inversely.

(3) Assembling YTF ③ (For F2626)

If YTF is OPEN LOOP YIG FILTER (F2626), perform this assembling procedure.

If YTF is F2626 MODULE or MLFP1312 MODULE, please perform (4) assembling procedure.

1) Tighten the S4 screws.
2) Connect 40GHz H.MIXER's connector to YTF ③'s connector.
   At this time, make sure that the lower surface cover of 40GHz H.MIXER is set parallel to Plate ④. (Refer to Fig.4-3-1)

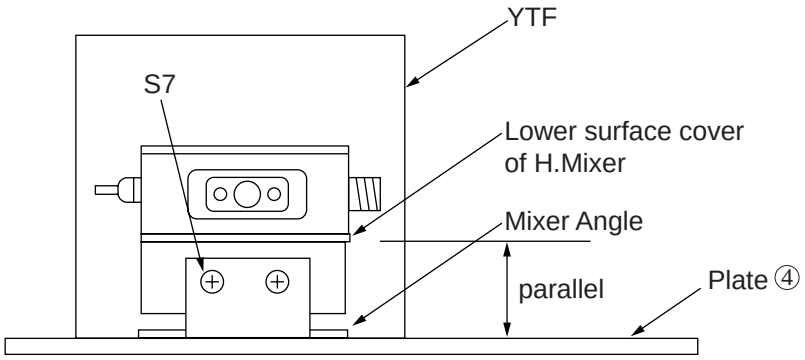


Fig. 4-3-1

3) Tighten the S7 screws. while making sure that the Mixer angle rests on the Plate ④ thoroughly with no gap between them (Refer to Fig.4-3-1). If there are no S7 screws, perform procedure 4).
4) Tighten the S5 screws.
5) Attach the plate ④ and tighten the N1 nuts.
   (YTF ③, 40GHz H.MIXER ⑤, Coupler/Amp ② and Switched Doubler ⑥ are Attached on the plate ④).

(4) Assembling YTF ③ (For F2626 MODULE or MLFP1312 MODULE)

If YTF is F2626 MODULE or MLFP1312 MODULE, perform this assembling procedure. If YTF is OPEN LOOP YIG FILTER (F2626), please perform (3) assembling procedure.

1) Connect 40GHz H.MIXER's connector which is connected to YTF ③.
   At this time, make sure that the lower surface cover of 40GHz H.MIXER is set parallel to Plate ④. (Refer to Fig.4-3-1)
2) Tighten the S7 screws. while making sure that the Mixer angle rests on the Plate ④ thoroughly with no gap between them (Refer to Fig.4-3-1). If there are no S7 screws, perform procedure 3).
3) Tighten the S5 screws.
4) Attach the Coupler/Amp ② and tighten the S3 screws.
5) Attach the Switched Doubler ⑥ and tighten the S6 screws.
6) Attach the plate ④ and tighten the N1 nuts.
   (YTF ③, 40GHz H.MIXER ⑤, Coupler/Amp ② and Switched Doubler ⑥ are Attached on the plate ④).

(5) Assembling 40GHz H.MIXER ⑤

1) Connect 40GHz H.MIXER's connector which is connected to YTF ③.
   At this time, make sure that the lower surface cover of 40GHz H.MIXER is set parallel to Plate ④. (Refer to Fig.4-3-1)
2) Tighten the S7 screws. while making sure that the Mixer angle rests on the Plate ④ thoroughly with no gap between them (Refer to Fig.4-3-1). If there are no S7 screws , perform procedure 3).
3) Tighten the S5 screws.
4) Attach the plate ④ and tighten the N1 nuts.

Caution :

Use MODEL 01-201 TORQUE WRENCH (Anritsu) when connectors, which are connected to YTF ③, are tightened.

If there is not it, use torque wrench whose torque is 8 IN-LBS.

Parts List

①	34Y117228	2nd CONVERTER
②	34Y118006	Coupler/Amp
③	34Y117225	YTF (F2626) or
	339H42762	F2626 Module or
	339H42762B	MLFP1312 Module
④	33B40911	Plate
⑤	339H41184	40GHz H.MIXER
⑥	D29650	Switched Doubler
⑦	33J41083	Semi-rigid cable
⑧	34J117450	Semi-rigid cable
⑨	34J119771	Semi-rigid cable
⑩	34J117453	Semi-rigid cable
⑪	34J117452	Semi-rigid cable
⑫	34J117454	Semi-rigid cable
⑬	34J117236	Semi-rigid cable

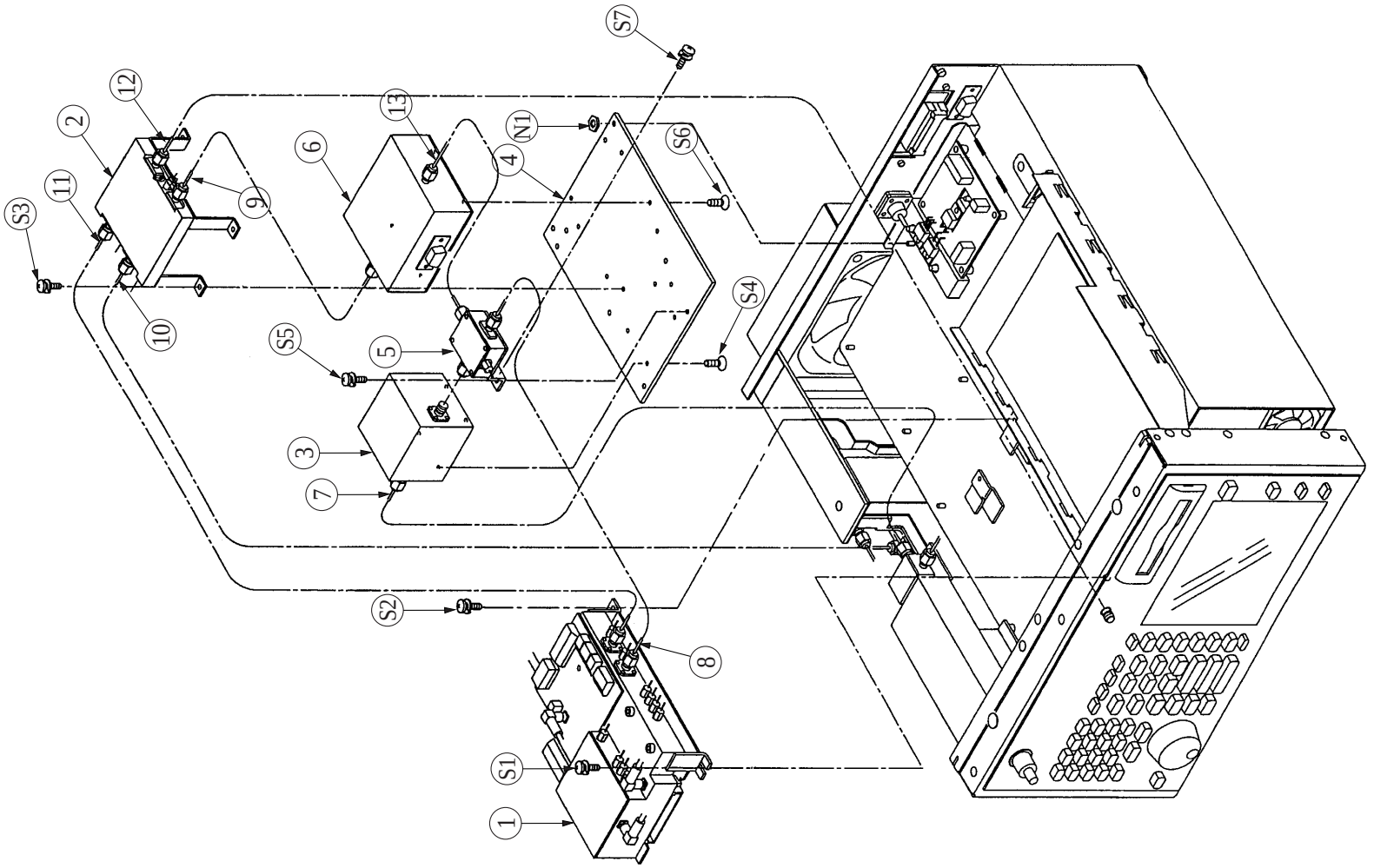


Fig. 4-3-2

4.3.5 Front unit disassembly/assembly

Refer to 3.3.5.

4.3.6 A09 OPTION BASE disassembly/assembly

Refer to 3.3.6.

4.3.7 Removing/Assembling A0501 HI-SPEED AD from A05 SCAN/AD

Refer to 3.3.7.

4.3.8 Connecting the cable to Diplexing Bandswitch and F2626 (YTF)

Refer to 3.3.8.

Section 5 Firmware installation

To install software, it needs 2 memory cards. Card 1 includes installer software. Card 2 includes spectrum analyzer firmware.
Installation process is as follows.

Refer to paragraph 2.3.1, on disassembly/assembly cabinet.

(1) Switch off the instrument and remove the AC cord.

(2) Place spectrum analyzer vertically with display facing down.

(3) Loosen 4 screws on spectrum analyzer front panel protector legs.

(4) Remove 4 screws on spectrum analyzer rear panel protector legs.

(5) Pull the spectrum analyzer cover upwards. (Tight due to earthling springs used inside, make sure to remove the springs along)

(6) Set the jumper pin X12 (ROM/PMC select) on A03 CPU board to PMC side (refer to Fig. 2-2-6).

(7) Set memory card 1 (installer) at upper side card slot and set memory card 2 (firmware) at lower slot.

(8) Connect AC cord and switch the power-on. Installation starts automatically. (It takes about 90 sec.)

(9) After installation is completed, switch the power-off and set the jumper pin back to ROM side.

(10) Place back the spectrum analyzer cover along with the earthling springs.

(11) Tighten the 4 screws on spectrum analyzer front panel protector legs.

(12) Tighten up 4 screws on spectrum analyzer rear panel protector legs.

(13) Switch on the power supply keeping the “PRESET” key depressed and keep it pressed till the spectrum analyzer starts sweeping.

Section 6 Performance test system

The following describes the summary of the performance test system on MS2665C/MS2667C/MS2668C. This test system consists of various measuring instruments that are controlled by GPIB, and covers major part of required performance test. The test process is divided into three groups according to instruments setup.

Meanwhile, average noise level and residual response measurement needs another software running on PTA function.

6.1 Required instruments

The following table shows the instruments of the performance test system.

Nomenclature	Model number	Manufacture	Note
Swept frequency synthesizer	6769B	Anritsu	
two Synthesized signal generators	MG3633A	Anritsu	
Power meter	ML4803A	Anritsu	
Power sensor	MA4701A	Anritsu	
Power meter	ML4803A	Anritsu	MS2665C only
Power sensor	MA4705A	Anritsu	MS2665C only
Power meter	ML2437A	Anritsu	MS2667, MS2668C only
Power sensor	MA2444A	Anritsu	MS2667, MS2668C only
Adapter (K female to K female)	K222B	Anritsu	
Programmable attenuator	MN63A	Anritsu	
Microwave channel selector	MN74A	Anritsu	
Spectrum analyzer	MS2602A	Anritsu	
Signal source	MG443B	Anritsu	
AM/FM test source	11715A	Hewlett Packard	
two 3 dB attenuators	41KC-3	Anritsu	
Four-point junction pad	MA1612A	Anritsu	
Lowpass filter	Lowpass filter	Anritsu	
Lowpass filter with fc 2 GHz			
50 ohms terminator			
IBM-PC/AT compatible			
GPIB interface board	GPIB-PC2/2A	National Instruments Corp.	

6.2 Required software

Please consult APCS (Anritsu customer service center) for confirmation of software requirements.
Performance test software of MS2665C/MS2667C/MS2668C spectrum analyzer.

6.3 Test group 1

6.3.1 Test items :

Frequency response

6.3.2 Setup :

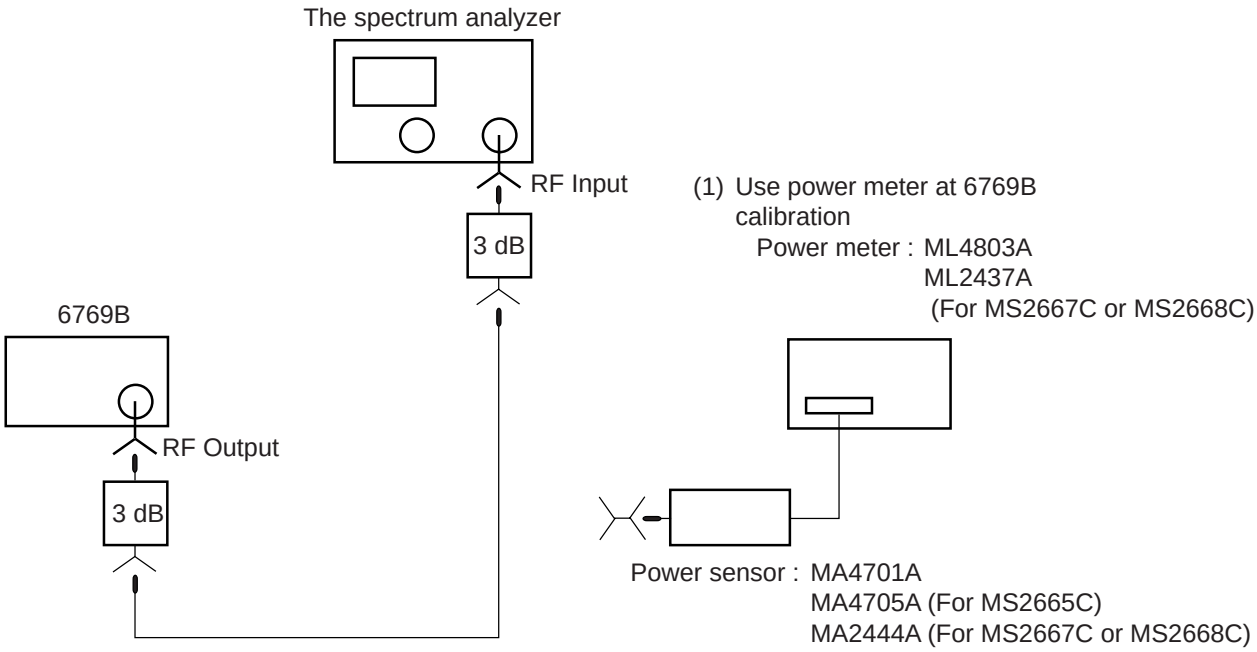


Fig. 6-3-1

At the measurement of frequency response, connect the spectrum analyzer's RF Input to 6769B RF OUTPUT through a signal feeder. The signal feeder consists of a coaxial cable (e.g. SUCOFLEX) less than 1 m length and two 3 dB attenuators (41KC-3) attached to each end of the cable.

(1) At the calibration of power output, connect the end of the feeder to power sensor.

Note :

1) The coaxial cable must be with a frequency range over the spectrum analyzer's range.
2) Use a torque wrench for tightening each connection.
3) After the power calibration, do not disconnect the connections of the 6769B and the signal feeder in order to keep the measured data valid.

6.4 Test group 2

6.4.1 Test items :

Displayed frequency accuracy,
Span accuracy,
RBW accuracy, selectivity,
VBW accuracy,
Side band noise at 100 kHz offset,
Reference level accuracy,
RBW switching error,
LOG/Linear scale switching error, Displayed level linearity,
Input attenuator switching error,
Image response,
Multiple response,
Sweep time, time span accuracy,
Detection mode switching error,
Frequency drift,
Narrow RBW accuracy, selectivity (option 02, option 03),
Hi-speed time domain sweep time accuracy (option 04).

6.4.2 Setup :

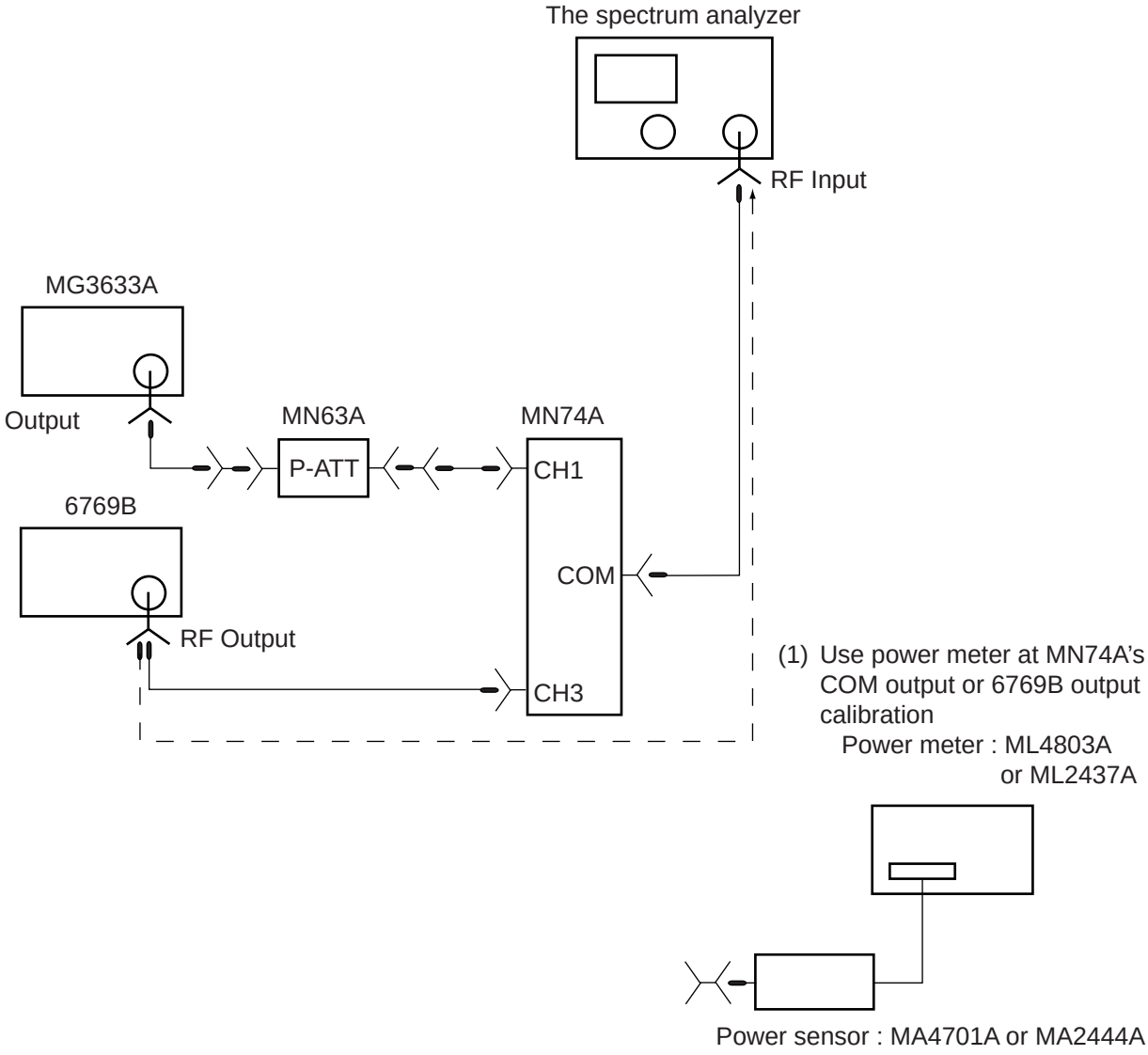


Fig. 6-4-1

On MN74A, connect CH1 to MG3633A OUTPUT through MN63A and connect CH3 to 6769B RF OUTPUT.
At the measurement, connect the spectrum analyzer's RF Input to COMMON of MN74A through a signal feeder. When Image response or/and Multiple response of MS2667/68C are measured, connect the spectrum analyzer's RF Input to 6769B RF OUTPUT through a signal feeder.

(1) At the calibration of power output, connect the end of the signal feeder to the power sensor.

6.5 Test group 3

6.5.1 Test items :

2nd harmonic distortion,
Two signal 3rd intermodulation distortion,
Other spurious responses,
IF through,
1 dB gain compression,
Local signal leakage,
FM demodulation frequency response (option 07),
FM demodulation marker display accuracy (option 07).

6.5.2 Setup :

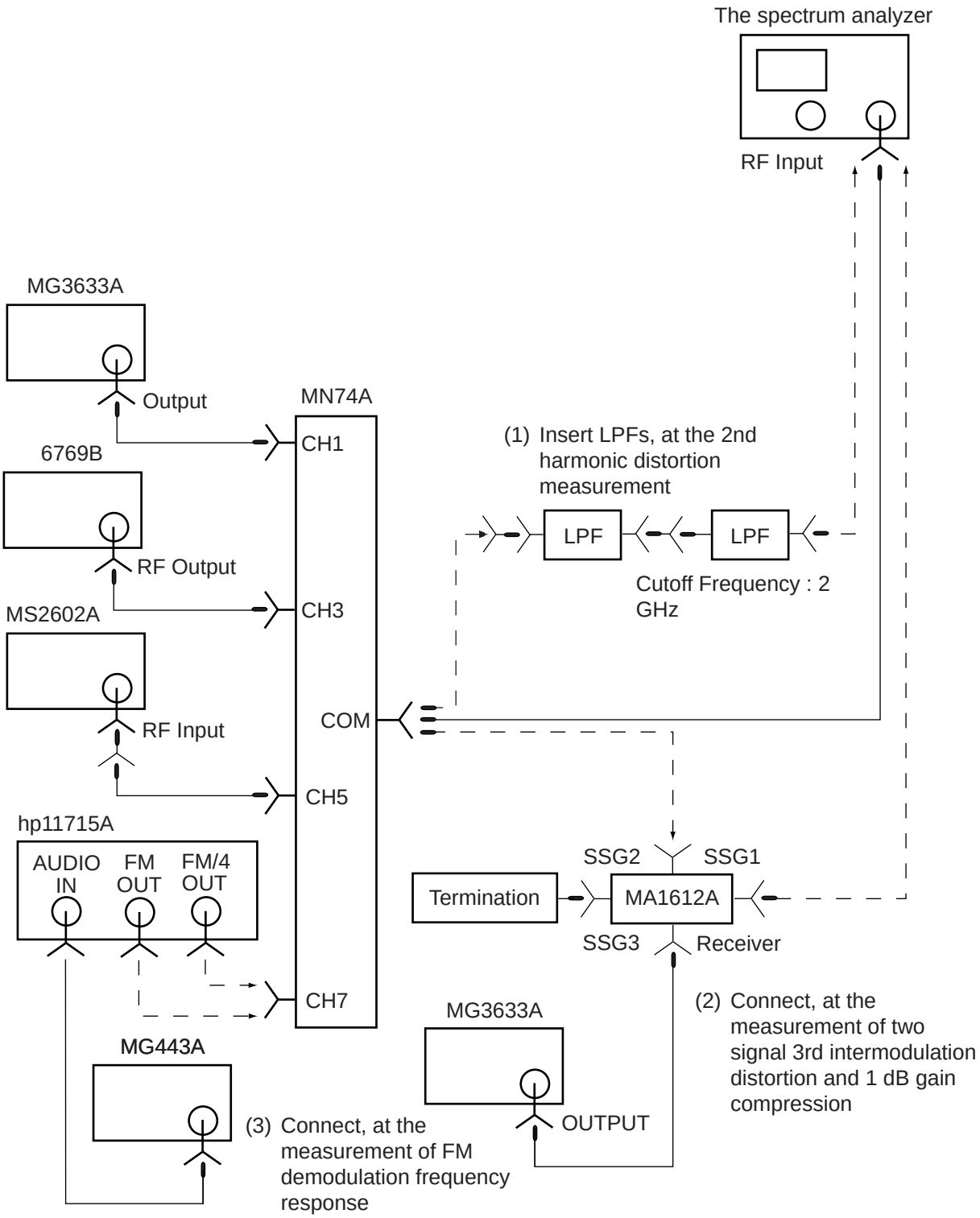


Fig. 6-5-1

Section 6 Performance test system

On MN74A, connect CH1 to MG3633A OUTPUT, connect CH3 to 6769B RF OUTPUT, and connect CH5 to MS2602A RF Input. Connect MG443B UNBALANCED to 11715A AUDIO IN. On MA1612A, connect SSG3 terminal to MG3633A OUTPUT and terminate SSG2 terminal with 50 ohms terminator.

At the measurement, connect the spectrum analyzer's RF Input to COMMON of MN74A.

(1) Measuring 2nd harmonic distortion, insert two lowpass filters between the RF Input and the COMMON.

(2) Measuring two signal 3rd intermodulation distortion and 1 dB gain compression, connect the RF Input to MA1612A's Receiver terminal and connect the COMMON of MN74A to SSG1 terminal.

(3) Measuring FM demodulation frequency response, connect the RF Input to the COMMON of MN74A, and connect 11715A's FM OUT or FM/4 OUT to CH7 of MN74A according to PC instruction.

Section 7 Options

7.1 Introduction

Current options available with MS2665C, MS2667C and MS2668C are shown in Table 7-1-1.

Table 7-1-1 Options

No of option	Name of option	65C (1)	67C (2)	68C (3)	Installation note
01	Reference crystal oscillator	✓			Soldering needed to attach crystal oscillator, etc. on A08 LOCAL-A PC board.
02	Narrow RBW (RBW: 30, 100, 300 Hz)	✓	✓	✓	Soldering needed to attach crystal filters on A06 IF PC board.
03	Narrow RBW (RBW: 10, 30, 100, 300 Hz)		✓	✓	Soldering needed to attach crystal filters on A06 IF PC board.
04	High-speed time domain sweep	✓	✓	✓	A0501 HI-SPEED AD needed, see Fig. 2-3-6 (for MS2665C) or Fig. 3-3-6 (for MS2667/68C).
06	Trigger/gate circuit	✓	✓	✓	Soldering and A0901 TRIG/GATE needed. A09 OPTION BASE needed, see Fig. 2-3-5 (for MS2665C) or Fig. 3-3-5 (for MS2667/68C).
07	AM/FM demodulator (voice monitor)	✓	✓	✓	Soldering and A0902 AM/FM MONITOR needed. A09 OPTION BASE needed, see Fig. 2-3-5 (for MS2665C) or Fig. 3-3-5 (for MS2667/68C).
10	Centronics interface	✓	✓	✓	
15	Sweep signal output	✓	✓	✓	Soldering needed to attach connector center conductor on A05 SCAN/AD PC board.

(1) “65C” means MS2665C.
(2) “67C” means MS2667C.
(3) “68C” means MS2668C.

7.1.1 Option structure summery

Option 06 Trigger/gate circuit and 07 AM/FM demodulator are mounted on a PC board named A09 OPTION BASE, that is not installed in our factory when an instrument with none of the two options is shipped. Refer to Fig. 2-3-5 (for MS2665C) or Fig. 3-3-5 (for MS2667/68C).
Option 04 High-speed time domain sweep is mounted on A05 SCAN/AD PC board. Refer to Fig. 2-3-5 (for MS2665C) or Fig. 3-3-5 (for MS2667/68C).

7.1.2 Retrofit

Retrofitting the options, the installation work must be done by only qualified service personnel in Anritsu service centers, because almost all options need disassembling cabinet and PCBs, some options need parts soldering.

7.2 Parts, PC board installation

7.2.1 Cabinet disassembly/assembly

Fig. 2-3-1 and 2-3-2 (for MS2665C) shows mechanical structure of the instruments (For MS2667/68C, see Fig. 3-3-1 and 3-3-2). To disassemble cabinet, perform procedures below.

(1) Remove eight feet.
(2) Draw enclosing cabinet backward and remove it.
(3) Remove rear panel

To assemble, perform inversely.

7.2.2 Parts/PCBs fitting for each option

7.2.2.1 Option 04 Hi-speed time domain sweep

Related units :

(1) A05 SCAN/AD

Additional parts :

(1) A0501 HI-SPEED AD constituent list (34Y106688)

Procedure :

Refer to paragraph 2.3.5 (for MS2665C) or paragraph 3.3.5 (for MS2667/68C).

(1) Connect A0501-X1 and A0501-X2 to A05-X6 and A05-X7.

(2) Fix A0501 to A05 with the strut and four screws.

(3) Turn on power, change option setting in Maintenance menu to OPT04 ON.

7.2.2.2 Option 06 Trigger/gate circuit

Related units :

(1) A09 OPTION BASE

Additional parts :

(1) For MS2665C, A09 OPTION BASE constituent list (34Y106684)
(not necessary when OPT07 is installed)
For MS2667C or MS2668C, A09 OPTION BASE constituent list (34Y106684B)
(not necessary when OPT07 is installed)

(2) For MS2665C, A0901 TRIG/GATE constituent list (34Y106695)
For MS2667C or MS2668C, A0901 TRIG/GATE constituent list (34Y106695B)

Procedure :

Refer to paragraph 2.3.4 (for MS2665C) or paragraph 3.3.4 (for MS2667/68C).

(1) Attach A0901-X1 to A09-X3.

(2) Fix A0901 to A09 with strut and four screws.

(3) Connect A09-X8 and A0901-X2 using the A0901-W1 cable.

(4) Remove BNC mounting plate (no hole) attached to the locations where EXT TRIG IN is indicated on the A09 PCB. (one screw)

(5) Attach A0901-X4 receptacle to a place where EXT TRIG IN is indicated on A09 PCB with BNC mounting plate (with hole) (three screws).

(6) Solder center conductor of the A0901-W2 cable to center conductor of A0901-X4. Solder mesh outer conductor to 2.6WH and fix along with the BNC mounting plate.

(7) Connect A0901-W2 cable connector to A0901-X3.

(8) Turn on power, change the option setting in the Maintenance menu to OPT06 ON.

7.2.2.3 Option 07 AM/FM demodulator (voice monitor)

Related units :

(1) A09 OPTION BASE

Additional parts:

(1) For MS2665C, A09 OPTION BASE constituent list (34Y106684) (not necessary when OPT06 is installed)
For MS2667C or MS2668C, A09 OPTION BASE constituent list (34Y106684B) (not necessary when OPT06 is installed)

(2) For MS2665C, A0902 AM/FM MONITOR constituent list (34Y106699)
For MS2667C or MS2668C, A0902 AM/FM MONITOR constituent list (34Y106699B)

Procedure :

Refer to paragraph 2.3.4 (for MS2665C) or paragraph 3.3.4 (for MS2667/68C).

(1) Attach A0902-X1 to A09-X4.

(2) Fix A0902 to A09 with the strut and six screws.

(3) Connect A09-X10 and A0902-X2 with A0902-W1 cable.

(4) Remove earphone plate (no hole) attached to the location where EAR PHONE is indicated on A09 (one screw).

(5) Attach A0902-X4 (earphone jack) with earphone plate (with hole) to a place where EAR PHONE is indicated on A09. (two screws)

(6) Solder wires of A0902-W2 cable to A0902-X4 terminals.

(7) Connect A0902-W2 cable connector to A0902-X3.

(8) Turn on power, change the option setting in the Maintenance menu to OPT07 ON.

Note:

(1) Do not loosen the screw near A0902-X1 at the corner of the PC board in step (2), or it result in circuit short.

7.2.2.4 Option10 Centronics interface

Related units :

(1) A03 CPU

Additional parts :

(1) A04 PMC/CENTRONICS constituent list (34Y106692A or 34Y106692B), refer to paragraph 2.2.1.3 (For MS2665C) or paragraph 3.2.1.3 (For MS2667C) or paragraph 4.2.1.3 (For MS2668C).

Procedure :

Refer to paragraph 2.3.2.

(1) Connect A04-X1 and A04-X2 to A03-X2 and A03-X3.

(2) Fix A04 to A03 and the front frame with strut and five screws.

(3) Remove a cover on the back panel, attach the PARALLEL connector of A04-W1 cable to the back panel with both a patch and the CENTRONICS plate (four screws).

(4) Connect A04-W1 cable to A04-X4.

(5) Do not remove PMC cap on the front panel.

(6) Turn on power, change the option setting in the Maintenance menu to OPT10 ON.

7.3 Software setting

Installation consists of four processes, cabinet disassembly, parts/PCB fitting, cabinet assembly, software setting and calibration/test. Software setting in Maintenance display is required for options to be effective.

Procedure :

Entering Maintenance display

(1) Turn on power while pushing 0 key.

(2) Enter Cal menu by pushing Shift+0 keys.

(3) Open the second page of the Cal menu and enter Maintenance menu with F6 key.

(4) Maintenance display appears with Version & Options (F1) key.

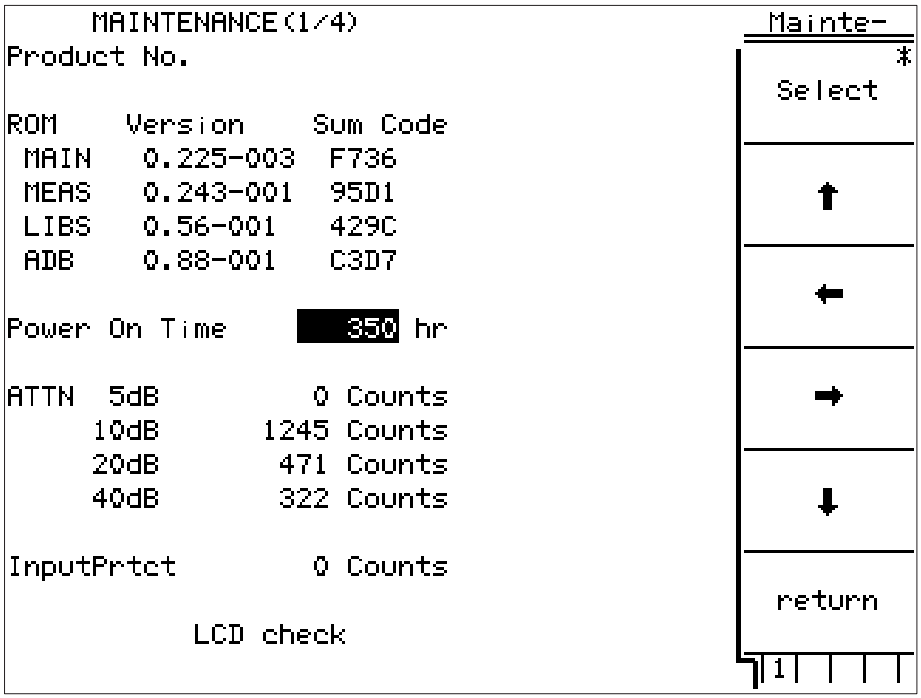


Fig. 7-3-1 Maintenance Display

Setting of option

(1) Open the second or third page of the Maintenance display.

(2) Set option state by using four arrow keys.

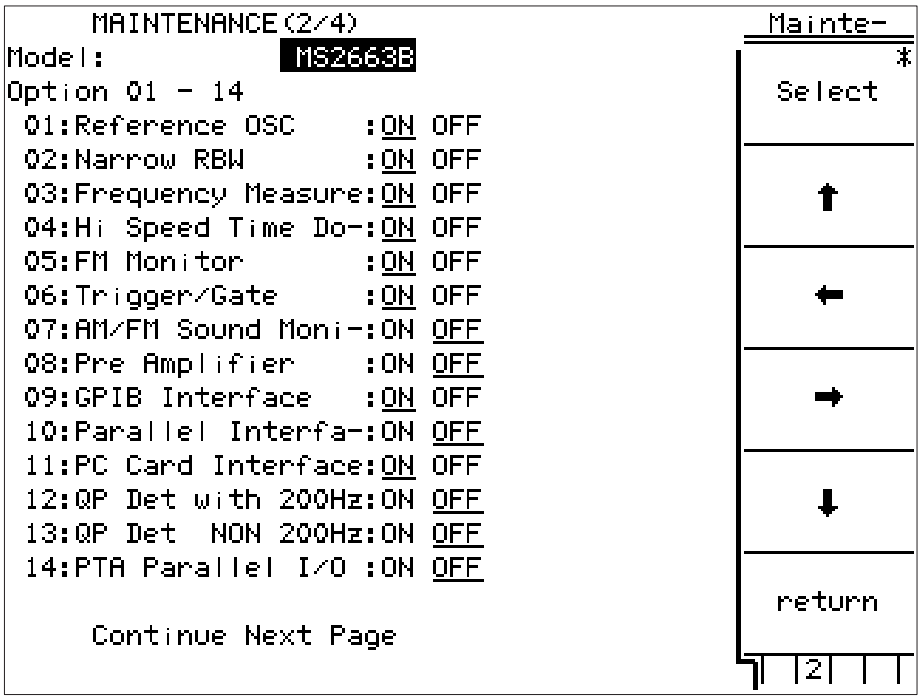


Fig. 7-3-2 Setting of option

Saving the state in EEPROM

When states of options are changed they must be saved in Flash Memory.

(1) Open the fourth page of the Maintenance display.

(2) Set cursor on “Save Model & Option Data?” by arrow keys.

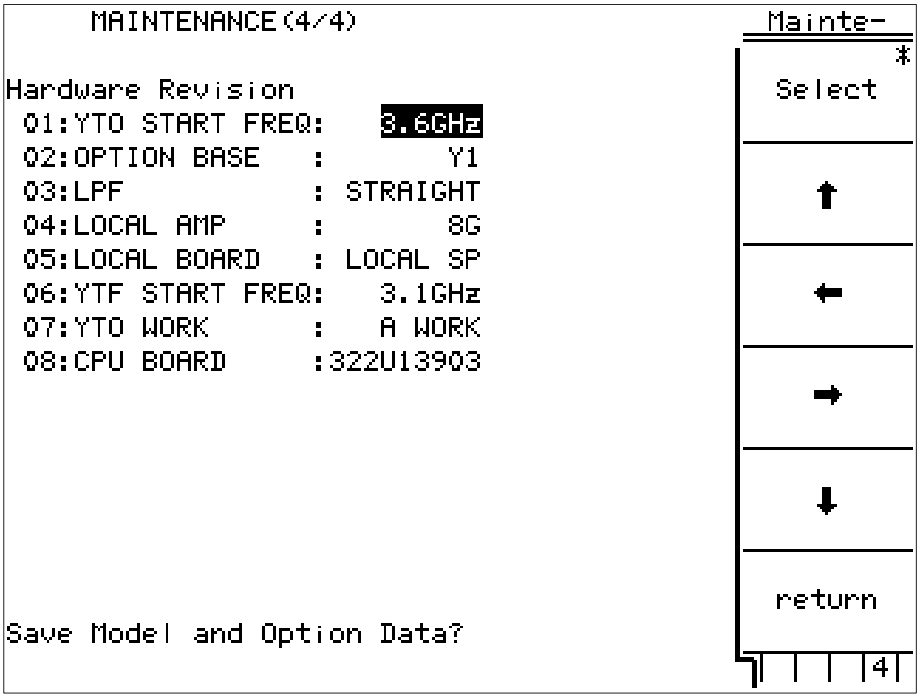
(3) Push Select (F1) key to enter Save menu.

(4) Push Save (F1) key and confirmation menu appears.

(5) Push Yes (F2) key.

(6) Push return (F6) key to exit Maintenance Display.

It takes about five seconds to save data in Flash Memory.



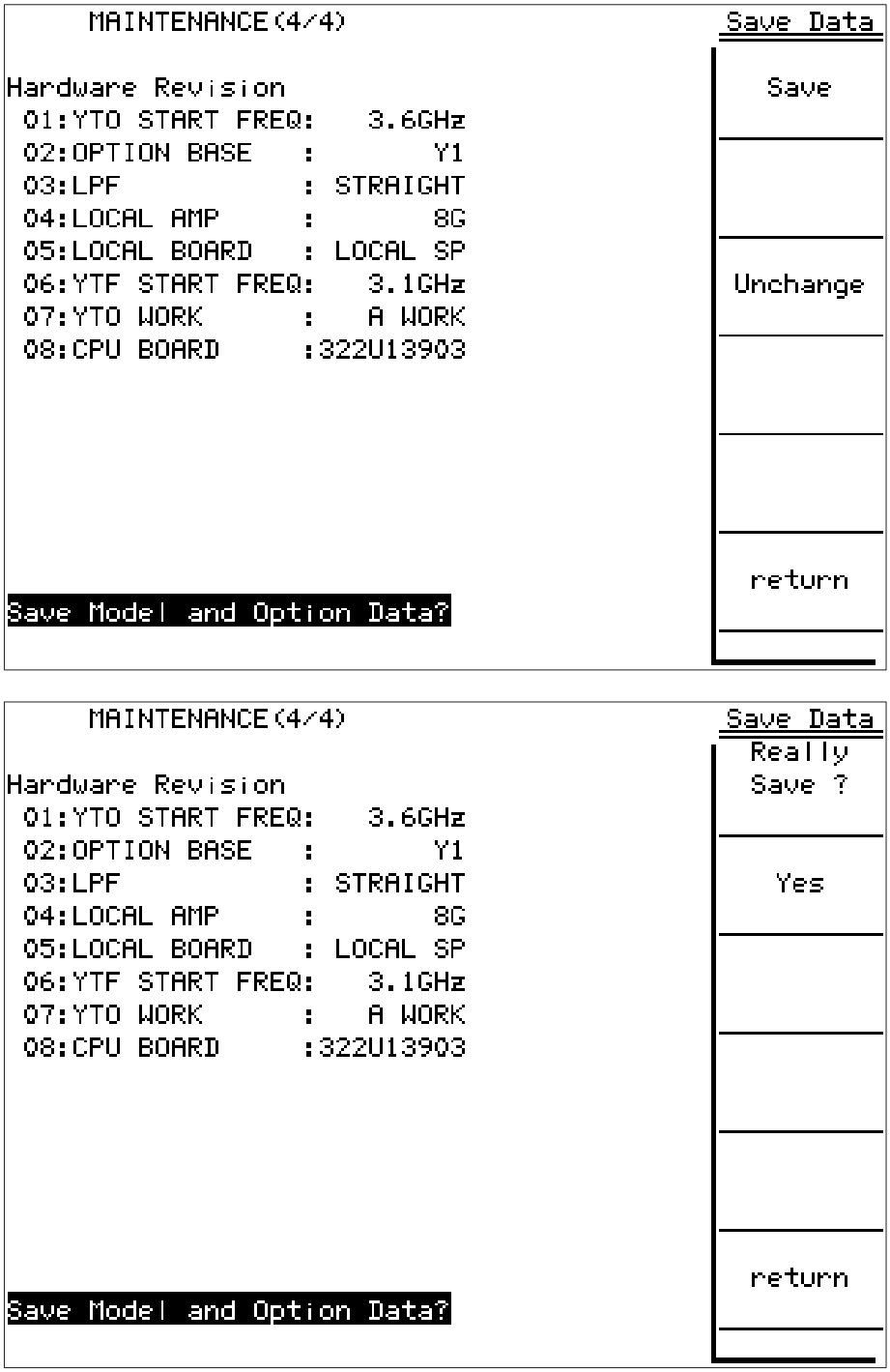


Fig. 7-3-3 Saving the state in Flash Memory

7.4 Performance test

7.4.1 Option 04 Hi-speed time domain sweep

(1) Required equipment :
6769B Swept frequency synthesizer (Anritsu)

(2) Specifications :
Setting range : 12.5 usec, 25 usec, 50 usec, 100 usec to 900 usec (One most significant digit settable), 1.0 ms to 19 ms (Two upper significant digits settable)
Accuracy : ±1%
Marker level resolution : 0.1 dB (LOG scale), 0.2% (Linear scale, relative to reference level)

(3) Setup :
Connect the spectrum analyzer's RF Input to 6769B RF OUTPUT.

(4) Measurement :
1) Initialize the spectrum analyzer and the 6769B.

2) After "All Cal", set the spectrum analyzer to :
Center frequency, 100 MHz
Span, 0 Hz
Sweep time, 12.5 usec
RBW, 1 MHz
VBW, 1 MHz
Set the 6769B to :
FREQUENCY, 100 MHz
RF LEVEL, -16 dBm
MODULATION, AM (Internal) 90%
MODULATION FREQ, 1.6 MHz

3) On the spectrum analyzer, press "→Ref" key, set the scale to Linear, and then press "Single" key.

4) After sweeping, move the spectrum analyzer's marker onto left most peak of the sine wave using the knob.

5) On the spectrum analyzer, set the marker function to delta marker mode, and then move the marker onto the 18th peak from the left most peak.

6) Read the difference of the delta marker, which correspond to 90% of time span.

7) Similarly, measure 90% of time span at each setting shown below :

The spectrum analyzer time span	6769B AM frequency	90% of specification (MIN/MAX)
25 usec	800 kHz	22.275 usec/22.725 usec
50 usec	400 kHz	44.55 usec/45.45 usec
500 usec	40 kHz	445.5 usec/454.5 usec
5 msec	4 kHz	4.455 msec/4.545 msec

7.4.2 Option 06 Trigger/gate circuit

(1) Required equipment

1) 6769B Swept signal synthesizer (Anritsu)
2) Function Generator (HP3325B)

(2) Setup

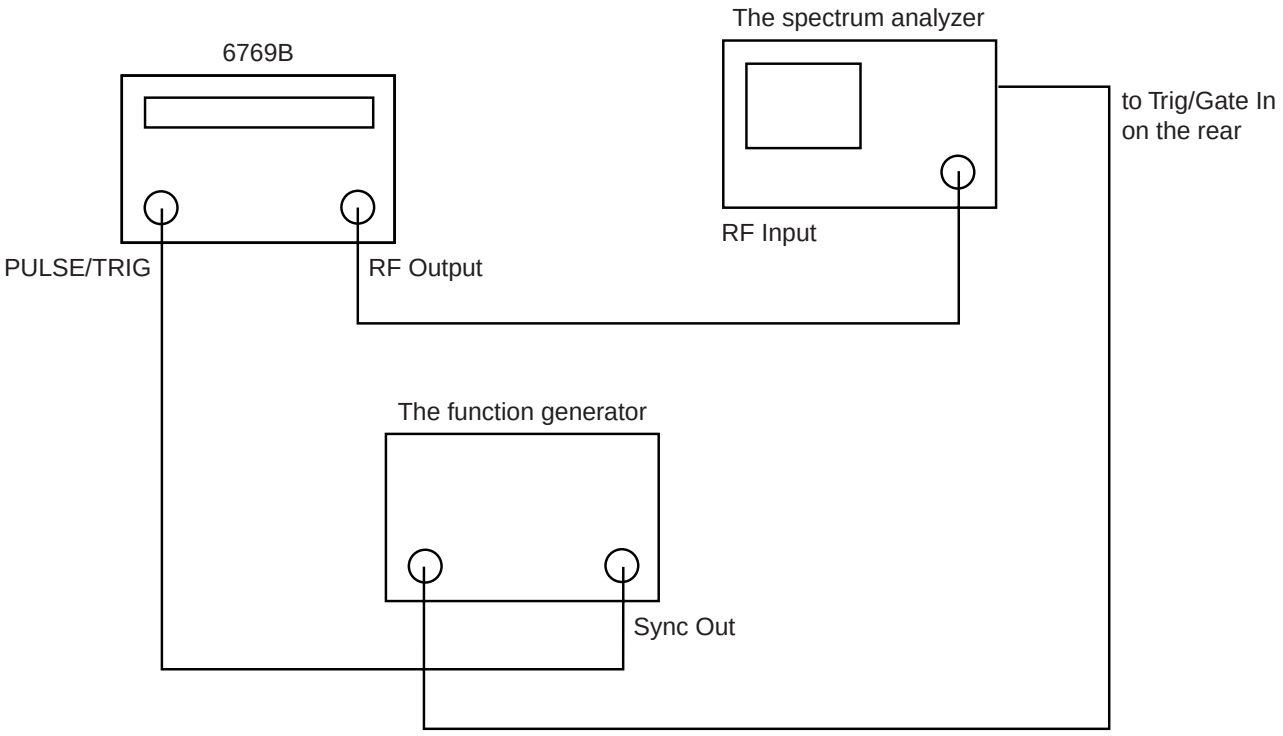


Fig. 7-4-1

(3) Setting

1) Function Generator (HP3325B)
Frequency : 100 Hz
Function : Square wave
Amplitude : 2.5 volts peak to peak
Offset : 0 V

2) 6769B
Frequency : 100 MHz (CW)
Output Level : -10 dBm
Pulse External

3) The spectrum analyzer
Center frequency : 100 MHz
Couple : Independent
Display : Time
RBt : 30 kHz
VBt : 300 kHz
Time Span : 20 ms
Attenuator : 0 dB

7.4.2.1 EXT TRIG Check

(1) Set the spectrum analyzer to :
Trigger, Triggered
Trigger Source, External

(2) Measurement
By changing the trigger level, find the point where sweep is stopped.
Because ±2.5 Volts pulse is entered from the HP3325B, sweep should be stopped near that voltage.
Set DC offset to 1.25 Volts on the HP3325B.
The spectrum analyzer is all right if synchronization is properly performed when EXT input is set to TTL.

7.4.2.2 GATE Check

(1) Set the spectrum analyzer to :
Time Span, 20 ms
Gate sweep, ON
Gate Display, 1 ms
Gate Length, 2 ms
Gate End, Int

(2) Measurement
A wave-form like the one shown in View Fig. 7-4-2 should be displayed.

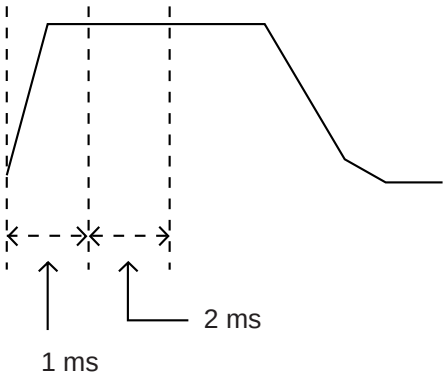


Fig. 7-4-2

7.4.2.3 VIDEO Trig Check

(1) Set the spectrum analyzer to :
Time Span, 20 ms
Gate sweep, OFF
Trigger, Triggered
Trigger, Source VIDEO

(2) Measurement
Change the trigger level, and make sure that synchronization is normal within the pulse range shown in Fig. 7-4-3.

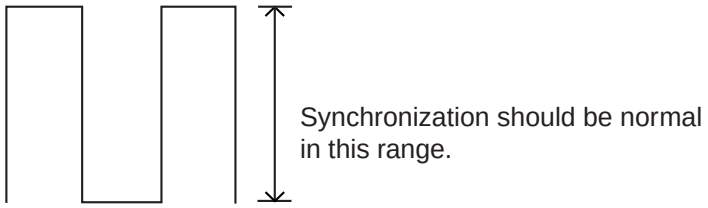


Fig. 7-4-3

7.4.2.4 Wide IF Video Trig Check

(1) Specification
Trig Level High : Approximately -5 to -10 dBm
Trig Level Middle : Approximately -15 to -20 dBm
Trig Level Low : Approximately -25 to -30 dBm

(2) Set the spectrum analyzer to :
Trigger Source Wide IF VIDEO
Wide IF Trig Level High

(3) Measurement
Change the output level of 6769B, and find the point where the signal goes out of synchronization.
Similarly, change the trigger level to middle and low, and take measurements.

7.4.2.5 Line TRIG Check

(1) Measurement
Set the HP3325B frequency to 50 Hz.
On the spectrum analyzer, set “Trigger Source” to “Line”, and make sure that synchronization is accomplished.

7.4.3 Option 07 AM/FM demodulator (voice monitor)

(1) Specifications :

AM >1.3 V peak to peak

FM (Narrow) >1.3 V peak to peak

FM (Wide) >1.3 V peak to peak

(2) Required instruments :

1) MG3633A Synthesized signal generator (Anritsu),

2) 8Ω terminator,

3) an earphone plug,

4) an oscilloscope.

(3) Setup :

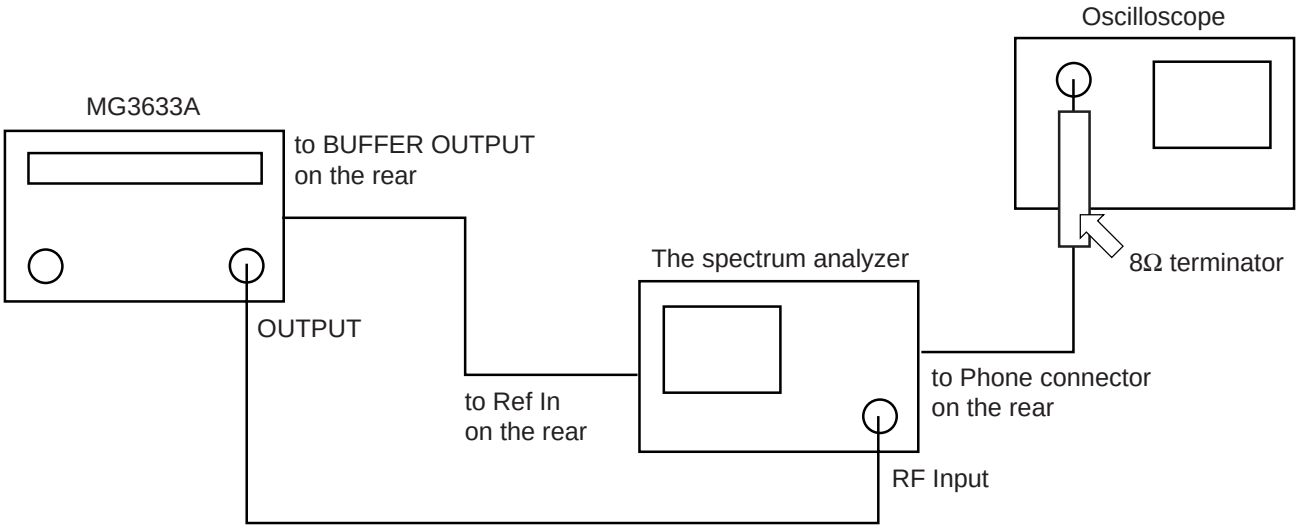


Fig. 7-4-4

7.4.3.1 Measure of AM Voice Monitor Voltage

(1) Set the MG3633A output to :
Frequency, 1 GHz
Level, -10 dBm
AM, 30%
AF, 1 kHz
Set the spectrum analyzer to :
Center frequency, 1 GHz
Span, 0 Hz
RBW, 10 kHz
Sound, AM
Volume, 20

(2) Measurement
Make sure that sound is heard from the internal speaker.
Make sure that the volume is turned up or down by changing the setting.
Set the Volume to 20, and fix the 8Ω terminator to Phone OUT on the rear of the spectrum analyzer, and check the voltage indicated on the oscilloscope.

7.4.3.2 Measure of FM Voice Monitor Voltage (Narrow Band)

(1) Set the MG3633A output to :
AM, OFF
FM, 3.5 kHz
Set the spectrum analyzer to :
Sound, FM
Volume, 20

(2) Measurement
Make sure that sound is heard from the internal speaker.
Make sure that the volume is turned up or down by changing the setting.
Set the Volume to 20, and fix the 8Ω terminator to Phone OUT on the rear of the spectrum analyzer, and check the voltage indicated on the oscilloscope.

7.4.3.3 Measure of FM Voice Monitor Voltage (Wide Band)

(1) Set the MG3633A output to FM 75 kHz.
Set the spectrum analyzer to :
RBW, 300 kHz
Volume, 20

(2) Measurement
Make sure that sound is heard from the internal speaker.
Make sure that the volume is turned up or down by changing the setting.
Set the Volume to 20, and fix the 8Ω terminator to Phone OUT on the rear of the spectrum analyzer, and check the voltage indicated on the oscilloscope.

7.4.4 Option 10 Centronics interface

(1) Summary
The confirmation of correct operation of centronics interface by printing a hard copy of Spectrum analyzer display to printer attached to the centronics port.

(2) Specification
A clear print out of the analyzer display should be obtained.

(3) Required equipment :
1) Printer with centronics interface-Epson VP-600 or equivalent (e.g. VP-800).

(4) Setup
1) Connect the printer to the spectrum analyzer's Centronics interface.

(5) Procedure
1) Initialize the spectrum analyzer (Press "Preset" key and press "F1" key).

2) Set the spectrum analyzer Connect to prt/plt to CENTRO :
Enter Interface menu by pushing "Shift + ." keys.
Select CENTRO with "F5" key.

3) Enter Copy Cont menu by pushing "Shift + Copy" keys.
Select Printer with "F1" key.
Open the second page of Copy Cont menu (Press "More" key), and enter Printer menu with "F1" key.
Select VP-600 with "F2" key, and magnify 1 * 1 with "F4" key.

4) Press Copy key to start printing.

5) Ensure the printing stops on pressing "Stop" key.