Yaesu

FRG-7700

HF Receiver

Survival Guide

Revision 2 march 2008

SPECIFICATIONS

Frequency Range:
150 khz - 30 Mhz in 30 bands

Modes:
AM, SSB (USB, LSB), CW, FM

Sensitivity:

	AM	SSB/CW	FM
0.15 - 0.3Mhz	30 µV	3 µV/500 ohm	-
0.3 - 2Mhz	25 µV	2 µV/500 ohm	-
2 - 30 Mhz	5 µV	0.5 µV/50 ohm	1 µV/50 ohm

Selectivity:	**-6 db**	**-50 db**
AM wide	12 khz	25 khz
AM medium	6 khz	15 khz
AM narrow	2.7 khz	8 khz
SSB/CW	2.7 khz	8 khz
FM	15 khz	30 khz (-40db)

Stability:
Less than +/- 1 khz from 1-30 minutes after power-on
Less than +/- 300 hz after 30 minutes warm-up.

Antenna Impedance:
0.15 - 2 Mhz (BC) 500 ohms unbalanced
2 - 30 Mhz (SW/BC) 50 ohms unbalanced

Audio Output:
1.5 Watts (8 ohms, 10% THD)

Speaker Impedance:
8 ohms
4 - 16 ohms for external speaker or headphone

Power Requirement:
100/110/220/240 Volts AC, 50/60 hz

Power Consumption:		**With Memory Unit:**
Standby	10W	10W
ON:	33W	39W
12Vdc:	850mA	

Size:
334(W) x 129(H) x 225(D) mm

Weight:	**With memory unit:**
Approx 6 kg.	6.5 kg

FRG-7700 Survival guide

This is the second revision of the Survival Guide for the Yaesu FRG-7700, one of the most versatile receivers from Yaesu.
I hope that with the help of this guide your Frog can survive the next 20 years or more.
This Guide is in the true boatanchor tradition, a collection of known faults and the solution suggested and tried by hundreds of hams around the world, and a story of resurrection of a receiver at my workbench.
This second revision is updated and there are new chapters on the accesoires for the FRG-7700, some schematics and a lot of other useful stuff, usually from fellow users, that made their experiences available in the Fox-Tango groups.
My command of the english language could be better, so I apologise up front for languistic mistakes here and there.
I just hope, that in the true Ham spirit, I can help somebody to maintain his FRG-7700 in good condition.
This Survival Guide is by no means complete: there are daily new questions in the FRG-7700 forum, that need an answer.
So if you have something to add to this Guide,please drop me a line at wpenders-at-home.nl and I will publish it in the next revision. Happy listening and gd DX

73' Wim Penders PA0PGA

Description:

The FRG-7700 receiver is introduced in 1981, as a compact communication receiver, for the reception of AM/SSB/CW and FM signals between 150khz and 30 Mhz in 30 segments of 1 Mhz. The receiver is very sensitive and stable, and has a pleasant audio from the built-in speaker.
The design is very basic, there are no special bells and whistles, but it was designed with the shortwave listener in mind, who can listen to Hams, AM broadcast, utilities, pirates, CB and all the other fascinating stuff that you still can hear on the shortwave bands. The price of the FRG-7700 was very reasonable, so it was a success.
Tuning is simple and exact, choose band and mode and you are in business, no trills and frills, listening with this receiver is very basic, and instead of fiddling with menu's, you learn to listen.
Maybe that is the reason that this receiver is still very popular, and in demand by hams, even after 20+ years.
You can obtain a used one in good condition for a reasonable price on hamfests or (with care) on Internet.
On some of the next pages you find a guide for buying and things you have to look out for, before you spend your hard-earned $$, and more info to keep your FRG-7700 alive for a while.

The shortwaves, where to find what :

Most "shortwave" radios sold today actually tune a much broader frequency range that includes the AM broadcast band and parts of the longwave spectrum. A typical tuning range is from about 150 kHz to 30 MHz. By international agreement, the radio spectrum has been divided up among various users. While there are some exceptions, most nations and the stations they authorize do follow the allocations described below.
While the list was apparently made with the US amateurs in mind, it can be useful for all listeners all over the world.

150 kHz and below: Signals on these frequencies cannot propagate well via the ionosphere, but are able to penetrate ocean water well. As a result, several military stations used for submarine communications are found here. Most transmissions are in CW and RTTY. You need a really large antenna to hear much here, and in most locations electrical noise and static will be too high.

150 to 540 kHz: This is what most SWLs mean by "longwave." Most stations heard in this range are navigation beacons that continuously repeat their call signs in Morse code. There is a also a broadcasting band in Europe from 155 to 281 kHz. Some RTTY signals are found in the upper end of this band. Marine weather and safety broadcasts, known as NAVTEX, are transmitted on 512 kHz. Your best reception here will be at night, especially during the fall and winter months.

540 to 1700 kHz: This is the AM broadcasting or "medium wave" band which use to end at 1600 kHz. The AM broadcast band now ends at 1700 kHz, with 1610 to 1700 kHz being the new "X" or "extended" band. New stations began appearing here in late 1997, and this new "X band" is providing excellent DX listening opportunities.

1700 to 1800 kHz: This is a "grab bag" of miscellaneous radio communications, mainly beacons and navigation aids. You may hear several transmitters that sound like chirping crickets; these are floating beacons used to mark fishing and offshore oil exploration locations.

1800 to 2000 kHz: This is the 160-meter ham radio band. Most voice communications will be in LSB, with best reception at night during the fall and winter months.

2000 to 2300 kHz: This range is used maritime communications, with 2182 kHz reserved for distress messages and calling. There are also several regularly scheduled maritime weather broadcasts by U.S. Coast Guard stations. Most activity will be in USB, and best reception is at night.

2300 to 2498 kHz: This is the 120-meter broadcasting band, mainly used by stations located in the tropics. However, the FCC has allowed WWCR in Nashville, Tennessee to broadcast here and others may follow.

2498 to 2850 kHz: More maritime stations are found here, as well as standard time and frequency stations WWV and WWVH on 2500 kHz.

2850 to 3150 kHz: This band is used mainly by aeronautical stations in USB. Several stations broadcasting aeronautical weather bulletins, and you can also hear traffic between airports and airplanes aloft.

3150 to 3200 kHz: This range is allocated to fixed stations, with most communications in RTTY.

3200 to 3400 kHz: This is a very interesting segment. This us the 90-meter broadcasting band, used mainly by stations in the tropics. Canadian standard time and frequency station CHU can be heard on 3330 kHz. Several fixed stations also use this range, including several associated with various agencies of the U.S. government. Best reception will be at night.

3400 to 3500 kHz: This range is used for aeronautical communications in USB.

3500 to 4000 kHz: This is the 80-meter ham radio band. The 3500 to 3750 kHz range is used for CW and RTTY communications, and the rest of the band is used for LSB voice. The 3900 to 4000 kHz range is used for broadcasting in Europe and Africa. Best reception is at night.
The European band is from 3500-3600 for CW,3600-3800khz LSB voice. 3790-3800 khz is used as DX-window.

4000 to 4063 kHz: This is a fixed station band, mainly used by military forces for SSB traffic.

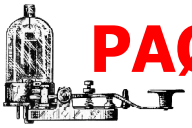
4063 to 4438 kHz: This is a band used for maritime communications in USB, with 4125 kHz being used as a calling frequency.

4438 to 4650 kHz: This range is mainly used for fixed and mobile stations in USB.

4750 to 4995 kHz: This is the 60-meter broadcasting band, used mainly by stations in the tropics. Best reception is in the evening and night hours during the fall and winter. In winter, stations to the east of you begin to fade in an hour or two before your local sunset, and stations to the west of you don't start to fade out until an hour or so after your local sunrise.

4995 to 5005 kHz: This range is allocated internationally to standard time and frequency stations. In North America, you'll mainly hear WWV and WWVH on 5000 kHz.

5005 to 5450 kHz: This range is a real jumble! Several broadcasting stations are found in the lower part of the segment, and fixed and mobile stations in SSB, RTTY, and CW



are found throughout this band. Best reception is during the evening and night hours.

5450 to 5730 kHz: This is another band for aeronautical communications in USB.

5730 to 5950 kHz: Another jumble of different stations! For years, this band has been used by fixed stations of the U.S. government for communications in USB and RTTY. However, several broadcasters are also showing up here.

5950 to 6200 kHz: This is the 49-meter broadcasting band, and is loaded with signals from late afternoon to a couple of hours after your local sunrise.

6200 to 6525 kHz: This is a very busy band for maritime communication in USB and various FSK modes like AMTOR and FEC.

6525 to 6765 kHz: This is another busy band, this time for aeronautical communications in USB. Best reception is during the evening and night hours.

6765 to 7000 kHz: This segment is allocated to fixed stations, with signals in SSB, CW, FAX modes, and miscellaneous digital modes.

7000 to 7300 kHz: The 7000 to 7100 kHz range is allocated exclusively to ham radio worldwide, although an occasional broadcaster will show up here. The 7100 to 7300 kHz range is allocated exclusively to ham radio in North and South America, but is used for broadcasting in the rest of the world. Several station transmit programs intended for reception in North and South America in this range. As a result, interference is often very heavy here during the night and evening hours. Hams use CW and RTTY from 7000 to 7150 kHz, and mainly LSB from 7150 to 7300 kHz. Best reception is from the late afternoon to early morning, although some hams can usually be heard here around the clock. The European band is from 7000-7045 CW, 7045-7200 LSB voice, DX around 7090-7100

7300 to 8195 kHz: This segment is mainly used by fixed stations, such as Canadian standard time and frequency station CHU on 7335 kHz, although several broadcasters can be found in the lower reaches. Various FSK (RTTY) and digital modes are used.

8195 to 8815 kHz: This is a busy maritime band from the late afternoon until early morning, with most traffic in USB and FSK modes.

8815 to 9040 kHz: This is another aeronautical communications band, with traffic in USB. Several stations hear broadcast aeronautical weather reports.

9040 to 9500 kHz: This range is used mainly by fixed station in various FSK and digital modes, but it is also used by several international broadcasters.

9500 to 9900 kHz: This is the 31-meter international broadcasting band, and is packed with stations from around the world. Best reception is usually from mid-afternoon to around mid-morning, although some stations can be heard here throughout the day, especially in winter.

9900 to 9995 kHz: Several international broadcasters use this range along with fixed stations using FSK modes.

9995 to 10005 kHz: This is set aside for standard time and frequency stations, like WWV and WWVH on 10000 kHz.

10005 to 10100 kHz: This range is used for aeronautical communications.

10100 to 10150 kHz: This is the 30-meter ham radio band. Because it is so narrow, operation here is restricted to CW and RTTY.

10150 to 11175 kHz: This segment is used by fixed stations. In addition to various FSK and digital modes, you may hear several international broadcast stations being relayed in SSB. These "feeder" stations are used to send programming to relay sites not served by satellite downlinks.

11175 to 11400 kHz: This range is used for aeronautical communications in USB.

11400 to 11650 kHz: This segment is mainly used by fixed stations in FSK and digital modes, but some international broadcasters also operate here.

11650 to 11975 kHz: This is the 25-meter international broadcasting band. You can usually hear several stations here no matter what time of day you listen.

11975 to 12330 kHz: This band is primarily used by fixed stations in FSK and digital modes, although several international broadcasters are found in the lower area.

12330 to 13200 kHz: This is a busy maritime communications band during the day and evening hours, with traffic in USB and various FSK modes.

13200 to 13360 kHz: Aeronautical communications in USB are heard here during the day and evening.

13360 to 13600 kHz: This range is used by fixed stations, mainly in FSK and digital modes.

13600 to 13800 kHz: This is the 22-meter international broadcasting band, with best reception generally during the daytime and early evening.

13800 to 14000 kHz: This is used by fixed stations, with most communications in FSK modes.

14000 to 14350 kHz: This is the 20-meter ham radio band. The lowest 100 kHz is reserved for CW and RTTY use, with USB popular in the rest of the band (although U.S. hams cannot transmit in SSB below 14150 kHz). Best reception is during the daytime and early evening.

14350 to 14990 kHz: This segment is used by fixed stations, primarily in FSK and digital modes. Canadian standard time station CHU is also found here, on 14670 kHz.

14990 to 15010 kHz: This sliver is reserved for standard time and frequency stations, with the best heard being WWV and WWVH on 15000 kHz.

15010 to 15100 kHz: This range is for aeronautical communications in USB, although a few international broadcasters do show up here.

15100 to 15600 kHz: This is the 19-meter international broadcasting band, and it is usually packed with signals during the daytime and early evening.

15600 to 16460 kHz: This band is used by fixed stations in USB, FSK modes, and digital modes.

16460 to 17360 kHz: This range is shared between maritime and fixed stations using USB, FSK modes, and digital modes. Best reception here is generally during the daytime.

17360 to 17550 kHz: The range is shared by aeronautical and fixed stations using USB, FSK modes, and digital modes.

17550 to 17900 kHz: This is the 16-meter international broadcasting band, and best reception is usually during the daylight hours.

17900 to 18030 kHz: This band is used for aeronautical communications in USB.

18030 to 18068 kHz: This range is used by fixed stations, mainly in FSK and digital modes.

18068 to 18168 kHz: This is the 17-meter ham radio band, where CW, RTTY, and USB are used.

18168 to 19990 kHz: This large band is used by fixed stations, with a few maritime stations also found here. Most traffic is in FSK and digital modes. An interesting frequency is 19954 kHz, used for decades as a beacon frequency by Soviet/Russian manned spacecraft. Reception in this range will usually be limited to daylight hours.

19990 to 20010 kHz: This segment is reserved for standard time and frequency stations, like WWV on 20000 kHz. Reception here is usually possible only in daytime.

20010 to 21000 kHz: This range is mainly used by fixed stations and a few aeronautical stations. Most traffic is in FSK and digital modes as well as USB.

21000 to 21450 kHz: This is the 15-meter ham radio band. CW and RTTY is mainly found in the first 200 kHz, and USB is used in the rest of the band. Best reception here is in the daytime hours.

21450 to 21850 kHz: This is the 13-meter international broadcasting band, with best reception during the daytime.

21850 to 22000 kHz: This band is shared by fixed and aeronautical stations in FSK and digital modes as well as USB.

22000 to 22855 kHz: This range is reserved for maritime communications in USB and FSK modes. Best reception is in daytime during years of high sunspot activity.

22855 to 23200 kHz: This band is used by fixed stations, mainly in FSK and digital modes.

23200 to 23350 kHz: Aeronautical communications in USB are found here.

23350 to 24890 kHz: This segment is used by fixed stations in FSK and digital modes.

24890 to 24990 kHz: This is the 12-meter ham radio band, used for CW, FSK, and USB work. Reception is usually limited to the daytime during years of high sunspot activity.

24990 to 25010 kHz: This range is for standard time and frequency stations, although none are currently operating here.

25010 to 25550 kHz: This band is used by fixed, mobile, and maritime stations, many of them low powered units in trucks, taxicabs, small boats, etc. USB and AM are mainly used, along with FM having 5 kHz deviation. Best reception is during daytime in years of high sunspot activity or during a sporadic-E propagation opening.

25550 to 25670 kHz: This region is reserved for radio astronomy and is usually free of stations.

25670 to 26100 kHz: This is the 11-meter international broadcasting band. However, only Radio France International has any broadcasts scheduled here at this time.. Reception is usually possible only in daytime during years of high sunspot activity.

26100 to 28000 kHz: This band is used by fixed, mobile, and maritime stations, many of them low powered units in trucks, taxicabs, small boats, etc. USB and AM are mainly used, along with FM having 5 kHz deviation. The citizens band (CB) is found from 26965 to 27405 kHz. Best reception is during daytime in years of high sunspot activity or during a sporadic-E propagation opening.

28000 to 29700 kHz: This is the 10-meter ham radio band. Most activity is in USB from 28300 to 28600 kHz, with FM used on 29600 kHz. Best reception is during daytime in years of high sunspot activity or during a sporadic-E propagation opening.

29700 to 30000 kHz: This range is used by low powered fixed and mobile stations, mainly using FM with 5 kHz deviation.

How to buy a used Amateur Radio set.

A BUYER's GUIDE..... by: Wim Penders PA0PGA

There are several ways to buy your next Ham treasure:
On Hamfests, Internet (careful!), the ham next door, or ads in magazines. All very fine, if you have a sort of guarantee that it will work as described. It is always a big disappointment to receive a box of junk instead of the promised good working set.
If possible, collect yourself, that way you have at least seen the set, and have a general idea of the state it is in before you give up your hard-earned money. We try to help you by giving you tips to get the most for your $.

First of all: Buying older equipment is not unlike buying a oldtimer car: almost always it is in a state between "needs attention" to a complete wreck, that needs a lot of work done to be useful for you.
You have to ask yourself if you are up to that task, it takes time and money and the necessary knowledge to get it in good working order, but if you have it working, you have a experience that is next to building something yourself and you will work with much pride with it because you have learned a lot and understand how and why it works. You grow attached to it.

When I see some questions that are asked in the forums, it is clear that some new owners have not a clue how to proceed when it is not working as supposed, and I think that many of the sets are a write-off after they have tried it to repair, a real pity for the set involved and -worse- for the disappointed Ham maybe a reason to stop with the hobby altogether.
If your technical knowledge is not that good, stick to the somewhat newer sets, or buy a set with some form of guarantee that it will work as supposed. Be prepared of course to pay some more money for it than the usual run of the mill price.

Prices depend on demand and condition of the set, and prices of most of the older sets (25+ years), tend to go up lately, maybe because there is more demand for 'real' sets, where you can fiddle with knobs instead of menu's, and that looks as a radio really should look and feel, not the multiband car radio's that we see too often today.
Even the newer Hams are aware of that, and try to get one for themselves before it is too late.

General Appearance:
Frontplate lettering should be OK, because repair of lettering is next to impossible, and repainting the frontplate is only for the specialists. I am not.

Dust is not necessary a problem, you can clean it, but it gives a clue if and how the previous owner has neglected it: in many cases they have been stored in basement or garage for some time, so check for rust spots and other oxidation signs that points in the direction of storage in humid surroundings.
If so: Be prepared to do a big cleaning job, including the chassis, all modules, switches and relays and correct the occasional troubles with trimmers and potmeters.
Otherwise, a good cleaning job does wonders and there is no better way to get you aquitained to the set you are restoring.

Dents and scratches all over means a lot of cosmetic work, if possible to repair at all.
It shows also that the previous owner(s) had no respect for the things they use. This kind of people use their sets full bore until they give trouble, then buy another set, because they have more money than brains, leaving problems for others to solve.
So be prepared to find more troubles inside such a set as blown PA tubes and other, mostly power related faults.
Re-painting and re-working is possible but cost real money and then: you see it always, even when well done, because the color or structure is different from other sets that you may own.
Even when the set is electrically sound, it is annoying after all your troubles, money and work to fix the set, you have to look at ugly dents and scratches.
Buy such sets only as spare parts or at a very low price.

Modifications:
Look for odd looking switches and connectors on the backside, or worse, on the front without original description. This sets are modified and you will have a interesting time to find out what the previous owner has done and to bring it back to normal. It can be a real pain in the ass because these modifications are almost never documented by the previous owner(s).
A very common modification was: changing the 10M band segments to CB, or other HF bands to the nearest pirate band. Because most of this mods are done in a very haphazard way, you will have to restore the set back to normal for proper Ham use.
You need to change the crystals (not cheap), for the correct ones and maybe the setting of the display setup.

More often than not you have to replace the driver and PA tubes, because they are used full bore in the FM and AM mode and thus are on the end of their lifetime.
Use your nose and sniff at the set, when a transformer is cooked, you will smell it.
A new transformer, if available at all, is very expensive, in fact cost oft more than you paid for the whole set. Never pay top dollar for this, there is always more work and money required than you expect, and resurrection results are at best questionable.
My advise if you are not a very experienced Ham: keep away from this sets, or use it for spares.

The Shining Ones…
This are the rare sets from a collector or from a SK Ham. Also sets from Hams that are upgrading are a good source. They are nice and clean, complete with some options and documentation.
This are the sets for the lovers of older equipment, that don't want to repair or clean a set themselves. Usually the seller asks top dollar for this kind of sets, but they are worth it.

Still a word of warning: Some sets that are very nice and clean on the outside, are a mess inside.
A quick check is the condition of the fan: is it full of debris, you are warned. For some reason they always forget to clean that….
Try to find out why the set is sold. It is just like buying a used car: almost always there is some snag and is the real reason for selling different from what they say.
Maybe the PA tubes are shot (a pair of 6146B's set you back at least $ 60.-)
Maybe the OM is just making some money free to finance his new collecting item, or is quickly bored and has to have something new to play with every 2 months or so.
In that case you are in luck, you never can tell. Such super sets have of course to come with all documentation and must be complete.

Buying from a collector is never cheap, they have invested much time to perfect the set and are reluctant to let it go. You can be sure that the owner cared for it in every way, so even if you have to pay some more, you will have a excellent piece of equipment in your shack, that is worth that kind of money, say 20-25% above normal.
Sometimes you see rediculous prices for a collector item on E-pay, but they are only meant to make an excessive profit for the seller and aimed for people that have money to burn (mostly not their own hi), but not for you and me.

Complete:
Look for completeness: Cables and Handbooks. The special interconnection and power cables are a difficult find, so look to it that they are coming with the set. See the handbook for the parts you need.
The used cables have almost always special connectors that costs real money if you have to buy them, if obtainable at all.
I see often on Internet sets without any cables: they sell them separate, to bring some extra money. The same goes for optional boards, filters and more. So be alert.

Ask the vendor about the set, that way you have a idea how the set was used, and if there are problems to be expected. The less information the vendor gives, the more you can expect problems later. I may sound maybe cynic, but after dealing for more than 40 years with people who sell stuff, I know what I talk about. Better bad looking than burned….
Handbooks (User manual and optional Service Manual) are for ham sets almost always downloadable from internet. You can get them almost always for free and you can print them yourselves.
I like to have the originals when available, even when they cost money. The print is clearer and you have beautiful multi-page schematics, very useful if you have to work on the sets.

So your checklist so far:

Looks: Look through the dust, you can clean that.
Condition: working? /troubles? / heavy used?
Scratches/ dents: You will never get it in pristine condition.
Complete: Hardware, /cables, /handbooks, spares.
Vendor: Ham? / e-Pay score? / Commercial?

SO YOU HAVE YOUR SET
AND NOW:

You have your set arrive at your door or from the trunk of your car and you can't wait to put it to work.
Please wait a second or two and take your time to check some fundamental things.

Check for the proper voltage.
Check for the proper fuse rating in your powersupply.
Open the case, bottom and top.
Check for loose connections or wires, burned or discolored components, in power supply and in general for any unusual things. Boards tend to come loose in transport.
Clean the set inside and outside, switches and relays, pot-meters, if necessary. Use only De-oxid for this, under no circumstances K-40, because it leaves a oily film on components.
For cleaning and adjusting of your set, you find several more articles in this volume.

After you check everything, you may use the set, first the receiver, and when this to your satisfaction, you can tune up in a dummy-load and test if all is as it should be.

Never tune on the band: it is unneccesary and very annoying for the people who work on the tuning frequency.
Do not pollute the radiowaves with your signal, as we have already enough noise and interference as it is.
If you really have to tune on the band (adjusting antennatuner or so), keep it as short as possible and with low-power.
Mark your tuner settings for future use, so there is no need to tune again. That way you act as a considerate Ham.
Be welcome with your new set on the bands.
73, Wim PA0PGA

More info to get your FRG-7700 operational

Manuals:

Copies of the **User Manual** and the **Service Manual** can be obtained from the **Fox-Tango** website, by far the best website for all classic Yaesu equipment. If you want to work on your FRG-7700, it is a must to have the manuals and schematics.
See: http://www.foxtango.org
The manuals are very informative and deal with the use and alignment of the receiver, and have a complete partlist.

Another very good source for free manuals is KB2LJJ, http://www.kb2ljj.com/ who has manuals of almost all modern Ham equipment. On this site are also modifications, pictures, descriptions and more. Recommended!

Parts:

Unfortunately after 20+ years there is no dealer around who still carries spare parts, but fortunately there are not much special parts used in this receiver and most parts are easy substituted by standard parts.
The receiver is very rugged and, if normally used, there are not much problems.
The only parts that can give trouble after longer use are the mechanical parts as switches and potmeters. It is not easy to find replacements for them, keep an eye open for special parts at hamfests, or have a good junkbox filled with old radio parts.
I can recommend the Graveyard section on the Fox-Tango site, they are a excellent source for special parts. See for yourself at www.Foxtango.org.

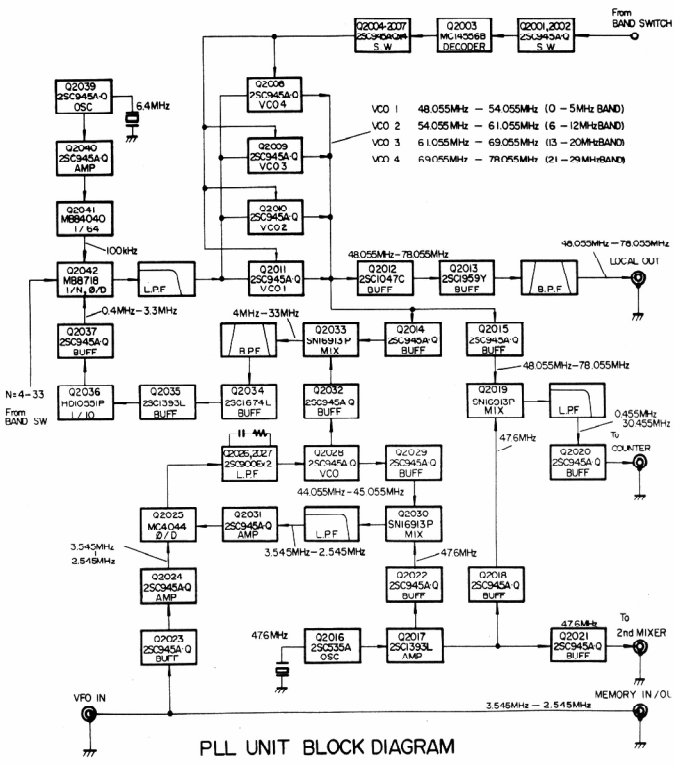
Alignment:

FRG-7700 receivers have no problems, but after 20+ years of use, a re-alignment can be necessary because some parts have changed their specifications.
To align the receiver, you have to be very familiar with the used circuits or you end up with a worthless piece of junk, if you don't understand what you doing. That is true for all kinds of communication equipment. I have seen all kinds of junky stuff on e-bay, that was tampered with and sold for high prices, to the chagrin of the new owner.

A common problem is a loss of the frequency coverage, usually at the end of the tuning scala due a detuned PLL oscillator.
The receiver has normally a overlap at each range from between 30 to 50 khz at each side from the range, for example at 7 Mhz the receiver tunes from 6950 to 8050 khz, and other bands have the same overlap at each end.

The PLL circuit in the FRG-7700 needs some attention if you have the following sympthoms:

If the end point of each Mhz range is getting lower at the high side of each band, a re-alignment of the first PLL is necessary, (receiver receives not higher than 950 or so on the analog scala)



PLL UNIT BLOCK DIAGRAM

If only the end points at the 5, 12, 20 and 29 Mhz bands are too low, a re-alignment of the second PLL is necessary.

This alignments are not difficult to do, you need a good counter, a VTVM, RF millivolt meter or oscilloscope and fitting plastic or ceramic tuning tools. Under no circumstances use metal screwdrivers for alignment of the coil cores, they will ruin the cores. Use only fitting plastic or ceramic alignment sets. For the trimmers use a small screwdriver or a ceramic one,

The procedure to align the PLL is described in the **Yaesu Operator** and also in the **Service Manual,**
There are some changes to make in the manual:
PLL Reference oscillator Adjustment:
Set the MR switch off, and connect a frequency counter to **TP04**, (instead of pin 9 of the MB-84040B ic, as the manual says) and adjust TC 2002 for a frequency of exact 6.400 Mhz on the counter.
The result is the same as in the manual, but you don't have to work at the ic, with the risk of shorting pins.

The PLL Local alignment can be done as in the book, if you don't have a HF VTVM to measure the voltage, you can use a HF oscilloscope for this alignment, together with a counter. However, if you do'nt have either, skip this alignment, If you receive signals, this section is working. Just check for a 47.6 Mhz signal.

For alignment of the first PLL, connect your dc VTVM to **TP05** in front of the first PLL box, and rotate the main dial to the "1000" position of the analog dial. Adjust T2007 for a reading of 7 volts on the meter. Try to make 7 volts as close as possible.

Rotate the dial to the "0" position and check the voltage, it will be around 2.4 Volts. The manual says between 1.5 and 2.0 Volts, but none of the four receivers I tested were in that range. All of them had higher values from 2.25 – 3.1 volt and are working fine, so I let it at that.

For alignment of the second PLL connect your dc VTVM to **TP03** just in front of the MB8718 ic and rotate the dial again in the **"1000"** position.
Set the bandswitch at the **5 Mhz** band and adjust T2004 for a reading of 7.4 volts dc.
Change the bandswitch to the **12 Mhz** band and adjust T2003 for a reading of 7.4 volts dc.
Change the bandswitch to the **20 Mhz** band and adjust T2002 for a reading of 7.4 volts dc.
Change the bandswitch to the **29 Mhz** band and adjust T2001 for a reading of 7.0 volts dc.
Try to make this adjustments very careful, often these voltages are too high, resulting in a loss of range or a failure to lock properly, with a high phase noise level as result.

Now rotate the dial to the **"0"** position and change the bandswitch to **0, 6, 13 and 21** Mhz position and check the voltage at **TP03**, they should be between 1.5 and 2.0 volts.
I measured voltages between 1.45 and 1.70 volts in my sets.
Be carefully with the coil cores of the PLL, they have been stabilized by a lot of wax, which can give some trouble.
Be gentle, you can "feel" trough the wax for the correct position of the core, normally there is not much movement necessary in any direction to obtain the correct voltage.
Don't force things, if the core breaks, you are in trouble.
In case of a broken core slot, remove the core altogether, and put it in upside down, you have a second try this way.
The cores are not interchangeable, so do one at a time.

The general alignment can be done as described in the manual, with the proper tools and equipment, it is a straightforward job.
For a fully alignment you need a signal generator with attennuator and a range from 0.1-65 Mhz, a frequency counter, VTVM, and if you want to align the noise blanker too, you need a noise generator.

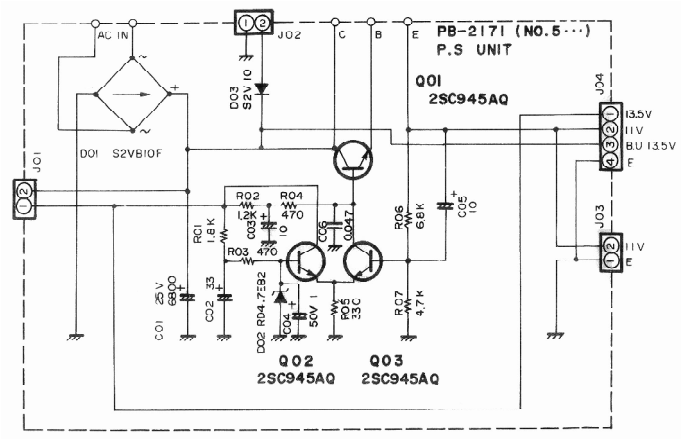
Follow closely the procedure in the manual, if the receiver is in a normal condition, the changes should be minor.
Is the set very unsensitive, check first the semiconductors in the circuit, or there can be resistor or condensor failure, that is much more likely than misalignment…
Closely check for abnormalities (burnt or cracked components, bad soldering joints, bad connectors and other trouble spots). If you check carefully, use the schematics and the very good circuit description in the handbook to make yourself familiar with the circuits used.

My experience with 4 of this receivers is that most of the failures I encountered, are small and easely reparable.
What really sticks out is the powersupply bridge rectifier, bad switch contacts and connectors, but they are common faults that almost all equipment of this age have. The only difficult part is the Display driver IC, because it is unavailable now.

Problems I have encountered:

Power Supply:

There is a source for trouble here: the transformer, rectifier bridge and condensor 6800u/40V are always on, because they deliver 13.5V to parts of the receiver, used for the clock and automatic switching at the selected time.
This should not put too much strain on the powersupply, because the current is minimal. The source for trouble is the rectifier, who becomes very hot, so hot in fact that in one case the wires to the transformer caught fire, and the condensor exploded. Check the soldering joints from the bridge, in the board, they can have some cratering, soldering them trough, is then the solution. A change for 4x 1N5405 or another bridge rectifier is also possible.
If you don't use the receiver for automatic recording of transmissions, or for a long time, disconnect the set from the mains, or mount a powerswitch at the backside of the set, that way there is no risk of fire. If you have the memory option, it is best to use the backup battery adapter.



Dial Lamps:

Dial lamps are long lasting, but have to be changed now and then. They are 12 Volt /100mA types, with long wires, and can be obtained in every parts store. Eventually you can use bulbs with short wires and solder them to the existing long wires after cutting away the old bulb, using isolation tube or crimping tube to isolate the wires and joints. That way you don't have to remove the metal frontplate for access to the soldering joints.

Be Careful: Remove the powercord first!!
The lamp of the VFO is mounted in a small reflector that is very close to the soldering side of the receiving board and this lamp is always "glued" to the grommet from the heat of the lamp, so changing is very difficult. To get access, you have to disassemble the front panel and the analog dial. During the change it is easy to bend the reflector somewhat, and make a momentary short to the board, destroying the counter/clock ic in the process, because the IC (and part of the powersupply) is **ON** all the time. It is really necessary to remove the power cord, otherwise you do not remove all the power, with disastrous results.

Displaydriver IC MSM-5524RS:

If the display is not working, there can be several problems, but the most common is the failure of the big driver IC the OKI MSM-5524RS or the surrounding switching circuit.
The MSM-5524RS is a 40-pin LSI chip, with a clock, dual timer (on/off time), a countdown timer for 60 minutes, and a 5-digit frequency counter, which is used in this receiver for the display of the received frequency.
The MSM-5524RS drives a 5 digit fluoricent (green tube!!!) multiplexed digital display for clock and frequency. A mode switch changes the display for frequency, clock, on-time, off-time and sleep function.
If the receiver is switched off, the display is off, however power to the IC is always on. The display stays on when the mode switch is in one of the clock modes and then displays the time even when the powerswitch is off.
The MSM-5524RS IC is the same as used in the Kenwood R-1000 receiver, and you can find some info of the chip and circuit diagrams in the R-1000 manual, which I reproduce at the next pages.

There are some things to know about the frequency display:
The displayed frequency is the PLL frequency (0.455 – 30.455Mhz) offset bij the IF frequency (455khz), resulting in a frequency display of 0.000 to 30.000Mhz. There is just one offset possible, so in SSB mode there is always a frequency difference between the carrier frequency and the displayed frequency of about 1.5 khz because the carrier of a SSB signal is at the lower or upper side of the signal. The highest resolution of the display is 1 khz, so there is always a frequency difference of 1-2 khz between the true and the displayed frequency.
This explains the difference in frequency as you are listening to a ham net on a given frequency.
For AM however, the displayed frequency is correct, if the received station is tuned in the center of the filter.

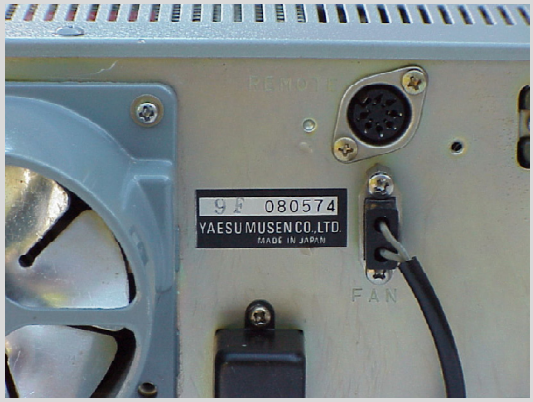
The MSM-5524RS IC is very dependable, and, when normally used, there is seldom a failure.
You see seldom a R-1000 with a display failure, because they use a different board layout.
Problems with this IC are almost allways man-made, like a short during the change of the light bulb in the VFO, (see above) or poking around in the set with the powercord attached.

If this IC fails, you are in big trouble, because the manufacturer stopped the production some 15 years ago, and supply is very scarce if found at all.
I saw one (used!!!) on e-bay, for a rediculous price (around $ 60.-), so be prepared for a long search.
Maybe they have been used in some clock radio's from the eighties, but I did not find any yet. Your best bet is to obtain a spare set with a defect display or otherwise, and use the good IC.
Kenwood used the same IC in their R-1000 receiver, so that can be a source as well.
Causes of trouble for this IC are the switch and the switching diodes which choose the mode of operation.
One of my sets had a bad mode switch. Using the clock was no problem, but the switch could not change to the frequency mode, it still displayed the time. The reasons where bad switching contacts in the mode switch.
I took the switch out and removed the back plate. If this is carefully done, you can put the switch back together again without problem. After a squirt of contactspray and working the switch a couple of times, everything worked nice again.
In another case I found diode D43 that was no diode anymore but a resistor of 5k-ohm, the on and off time of the display was the same, and there was a curious frequency display. The frequency displayed was the receiving frequency :10, plus 455, so 7455 displayed as 791, so apparently the 455 khz offset was not switched on.

I changed all three diodes for 1N4448 types, because they had a bad oxydation of their leads. Later I found out that this particular receiver has been used in a sea-going yacht, and salt water spray left its corroding mark…
If you have some weird display problems, check those diodes first, or the attached switches and transistors.

Display:

The display type is FIP 5A8B, a 5-digit green fluoricent tube, of the kind that is much used in home audio equipment and in practically every receiver and transceiver of the eighties. Yeasu uses a amber filter, to change the color in the style of all their equipment of the time (FT101ZD, FT901)
This tube has a filament, and has in the long run the same problem as all tubes: the filament is coated with emitting material, but after long use, this material is exhausted and the display is getting dim. I never saw a dead one tough.

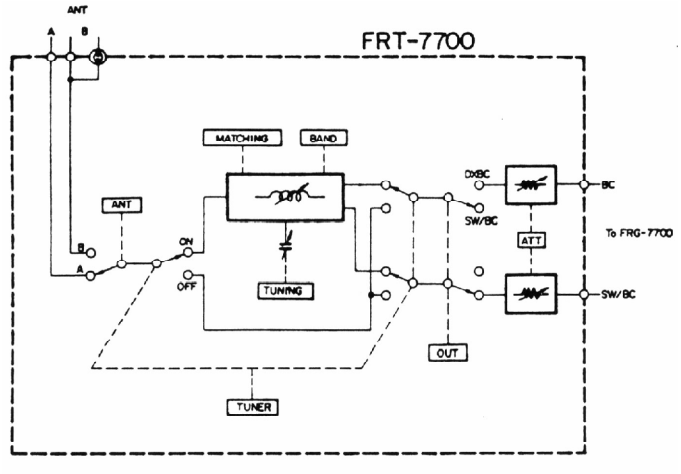


Yaesu Serial Numbers

If you want to know, how old your set is:
Just look at the Serial Number on the back of your set.
The first digit is the production year, (1979=9, 1980=0 the letter is the month (C= jan, D=feb, A & B not used), the two first digits give the production run, the last 4 give the production number. A "M" before the first digit indicates that this FRG-7700 was delivered with the Memory module fitted.

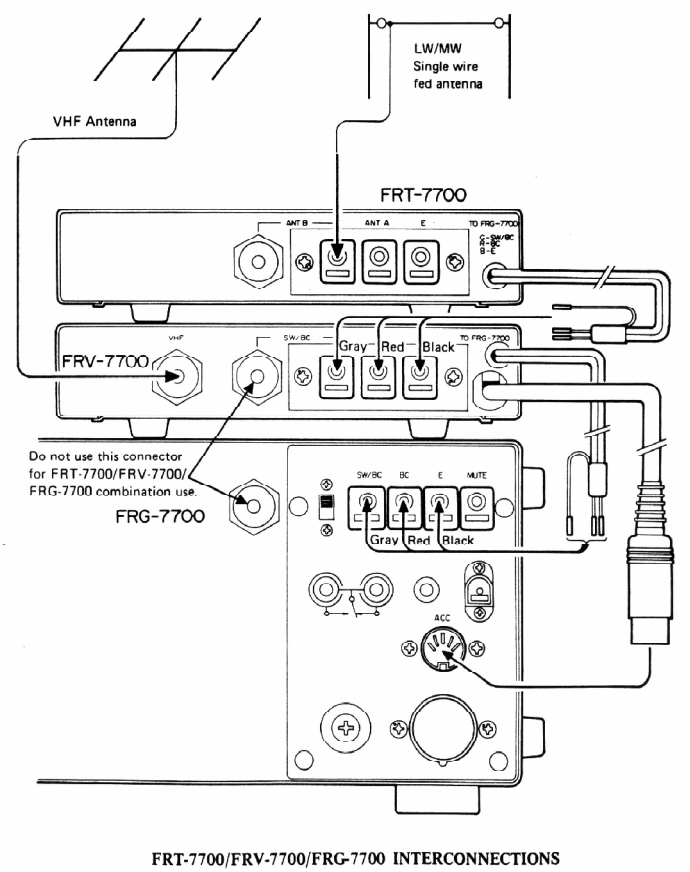
FRG-7700 Accessoires

The FRG-7700 had several useful accessoires that you can find in quantity on the used marked. There was a FRT-7700 antenne tuner, a FRA-7700 active listening antenna and a FRV-7700 VHF converter, that had three additional tuning ranges.



FRT-7700 Antenna Tuner

The FRT-7700 Antenna tuner matches all kind of receiving antenna's to input of the FRG-7700 receiver and thus optimalizes the energy transfer between antenna and receiver. No antenna is optimal for the whole frequency band of 0-30 Mhz, but is only optimal on the resonant frequency and the harmonics, so a antenna tuner of any kind is necessary for optimal receiving. It is simply connected between the antenna and the receiver, see below.
All accessories could be connected in daisy chain to the FRG-7700. The only problem was the increase of knobs and buttons and the many possibilities of the combinations, that confuses many a Ham. The antenna tuner has a step-attenuator and 6 extra bandfilters for even better selectivity.



FRT-7700/FRV-7700/FRG-7700 INTERCONNECTIONS

FRA-7700 Active Antenna

The FRA-7700 is an active antenna for use indoors, it allows you to listen to shortwave transmissions, if you can not place a outdoor antenna.
It consists of a whip aerial and a selective high-gain amplifier, with FET frontend. The gain is variable.
The preamp can also be used when you have a short outdoor antenna, or the higher bands to increase sensitivity there.
It is better than nothing, but in my opinion,a lenght of wire in the outside world, or even long wire in the attic is a much better choice.
At all times try to get the whip as close to the outside as possible. Modern buildings have sometimes concrete walls, that act as a Faraday screen to your radio.
The FRA-7700 is connected to the FRG-7700 in a similar arrangement as the picture at left and is powered by the accessoire socket of the FRG-7700. This power is further available at the acc1 connector at the back of the FRA for connecting the FRV converter, who has also a accessory connector (5-pol DIN 180 degree).

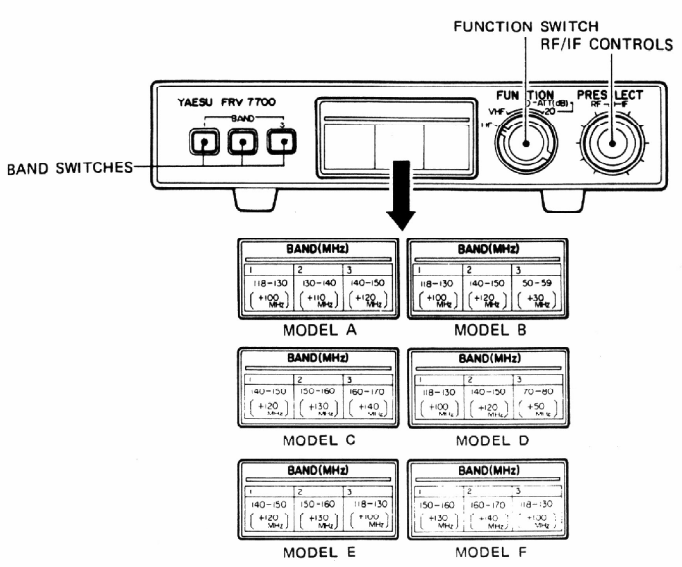
FRV-7700 VHF converter

The FRV-7700 VHF converter extends the receiving capacity of the FRG-7700 to the VHF bands. It is intended for receiving VHF Airband, 2-meter Amateur, Wheater satellites and Utility transmissions. Wich bands you can listen to depends on the model. The FRV-7700 has six models, all for a combination of 3 VHF bands:

Model A:	118-130 Mhz,	130-140 Mhz,	140-150 Mhz
Model B:	118-130 Mhz,	140-150 Mhz	50-59 Mhz
Model C:	140-150 Mhz,	150-160Mhz	160-170 Mhz
Model D:	118-130 Mhz	140-150 Mhz	70-80 Mhz
Model E:	140-150 Mhz	150-160 Mhz	118-130 Mhz
Model F:	150-160 Mhz,	160-170 Mhz	118-130 Mhz

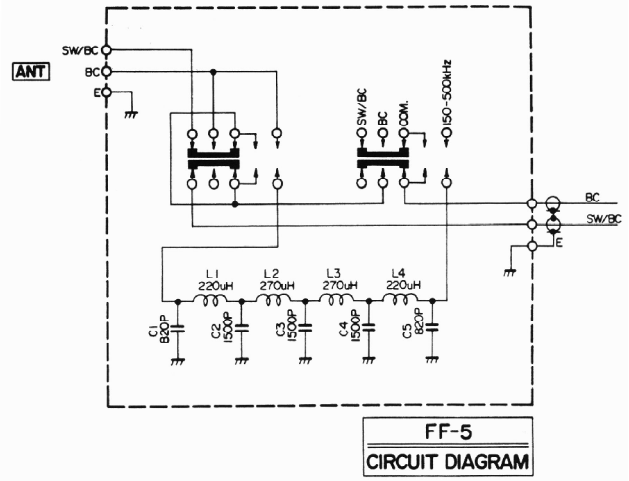
For Ham radio, model B was the most interesting because it could be used for 6 meters, 2 meters and VHF airband.

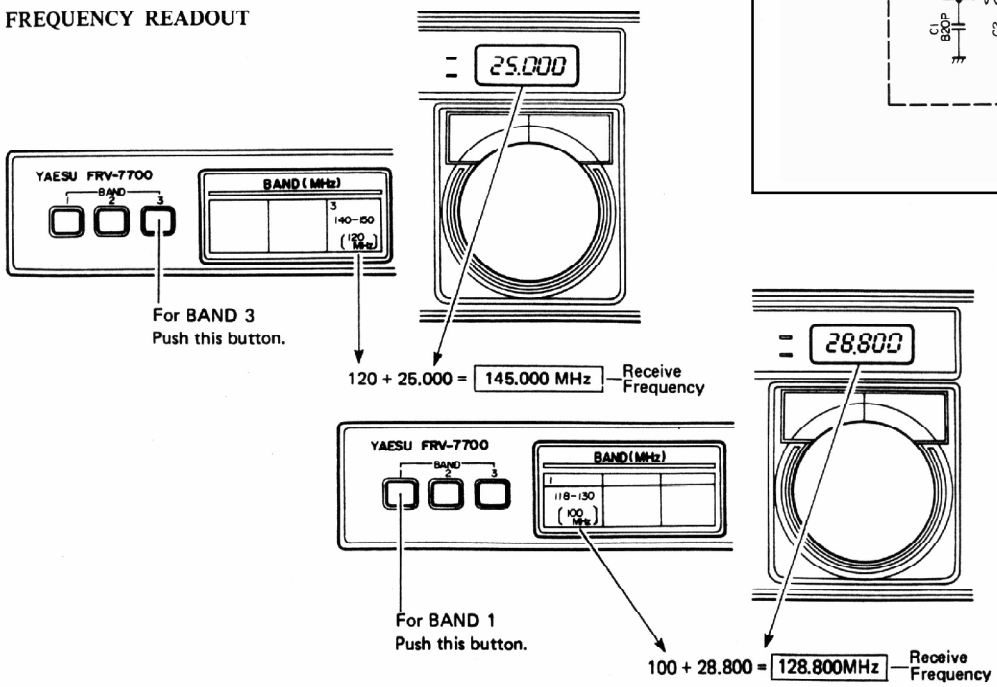
The tuning scheme is given by the picture below, and the circuit diagrams are on the next pages.



The FF-5 highpass filter/switch

The FF-5 add-on filter/switch was intended for use of one antenna for BC and SW/BC listening.
In the FF-5 was an extra BC filter for cutting out the BC frequencies above 500khz, neccessary when you live in the neighbourhood of strong AM transmitters. When there is strong Broadcast interference, the mixer of the receiver will be overloaded and produce a lot of mixing products that interfere with the signals that you want to listen to.





DMU-7700 Memory Unit

The FRG-7700 was standard rather complete, including power supply, all filters and a FM board, that was a option for the majority of receivers of the time.
Another useful feature was the DMU-7700 Memory Unit, it was a (expensive) option unit for the FRG-7700.
It had 12 memory channels to store your most used frequencies on the push of the M button. You could recall the frequencies bij choosing the right memory channel and pushing the MR button. Then the receiver was automatically tuned to the stored frequency, including the bandsection. There were no facilities for storing the mode however, as is usual in the newer receivers.
Remember, when this receiver was coming out in 1981, the digital revolution was just about to begin in earnest, memory chips were real expensive, for 1K you paid as much as now for 1Gb....
After you recalled a frequency from memory, you could use the Fine tuning knob for exact tuning the station. Because the recalled frequency had just 5 digits, there was some frequency difference of - or + 100hz in the reception.
This can be corrected by the Tune knob, who has a range of abouth -5 to +5 khz, enough for normal use. You can also use the Tune knob as a RIT control by tuning the frequency, choosing a free memory position on the 12-position memory knob, pushing the M button to store the received frequency in memory and the push MR for recalling the stored memorized frequency. Now you can tune around the frequency with the Tune knob.

The DMU-7700 unit fits to the back of the receiver. After taking off a small cover plate, you get access to a handful connectors, that are marked and have all a different size, so connection to the FRG-7700 is easy as sliced bread.
The stored frequencies in the Memory Unit are retained in the memory, as long as the set is connected to the mains.
There is also a battery backup possible, with a battery adapter for 3x AA batteries. Use a good quality batteries here, leakage of the batteries can do a lot of damage.

By using the battery backup, the clock data is stored as well.

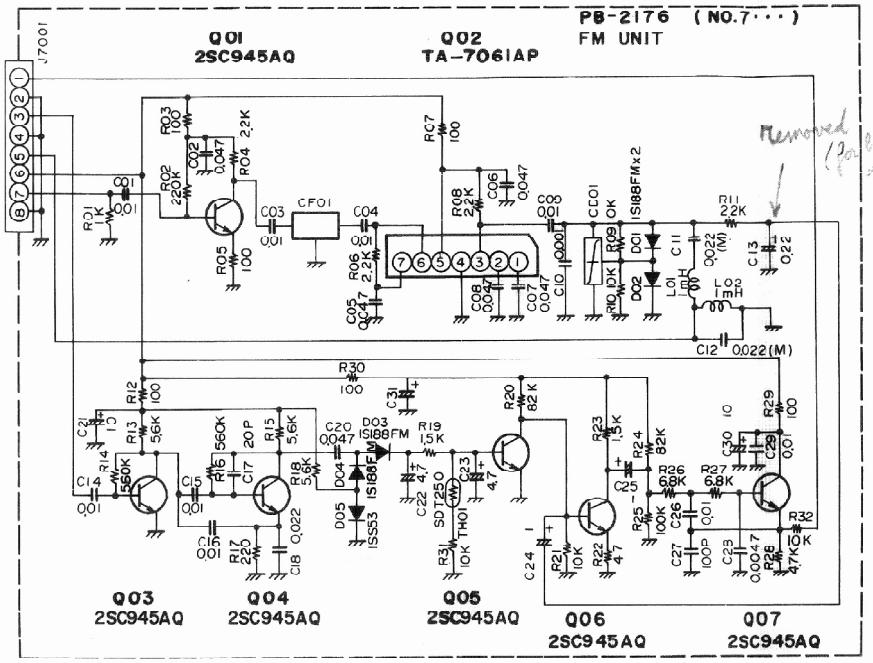
All in all, most receivers have no Memory Unit fitted.
If you buy a FRG-7700, always ask if the module is fitted.
When you are on a Hamfest, just look at the back of the FRG-7700, the memory unit is a rather big scewed-on module, you cannot miss it.
It is worth the extra money that is asked for a receiver with added module. It has not the versatility that the newer sets have, but it is very useful.

FM Unit PB 2176

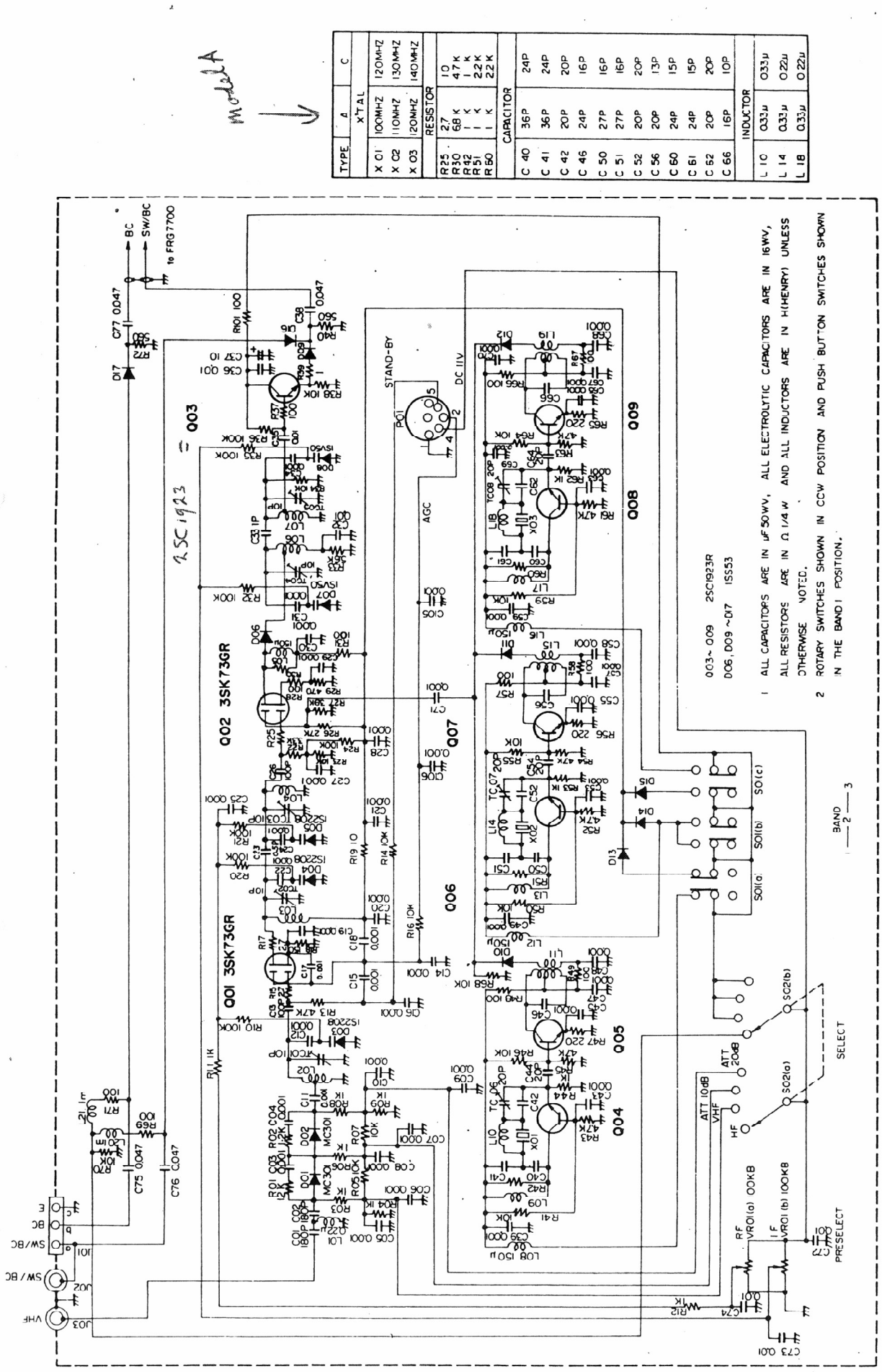
The FM Unit is not a option, but is interesting enough to give you the schematic for troubleshooting. It is a separate board that is mounted to the backside of the receiver.

It consist of a mixer to 455 khz, amplifier/limiter and a phase discriminator.
On the board is also a AVC detector and amplifier.

The design is simple but effective for listening to narrow-band FM transmissions in the 11 and 10M bands and for use with the VHF converters.



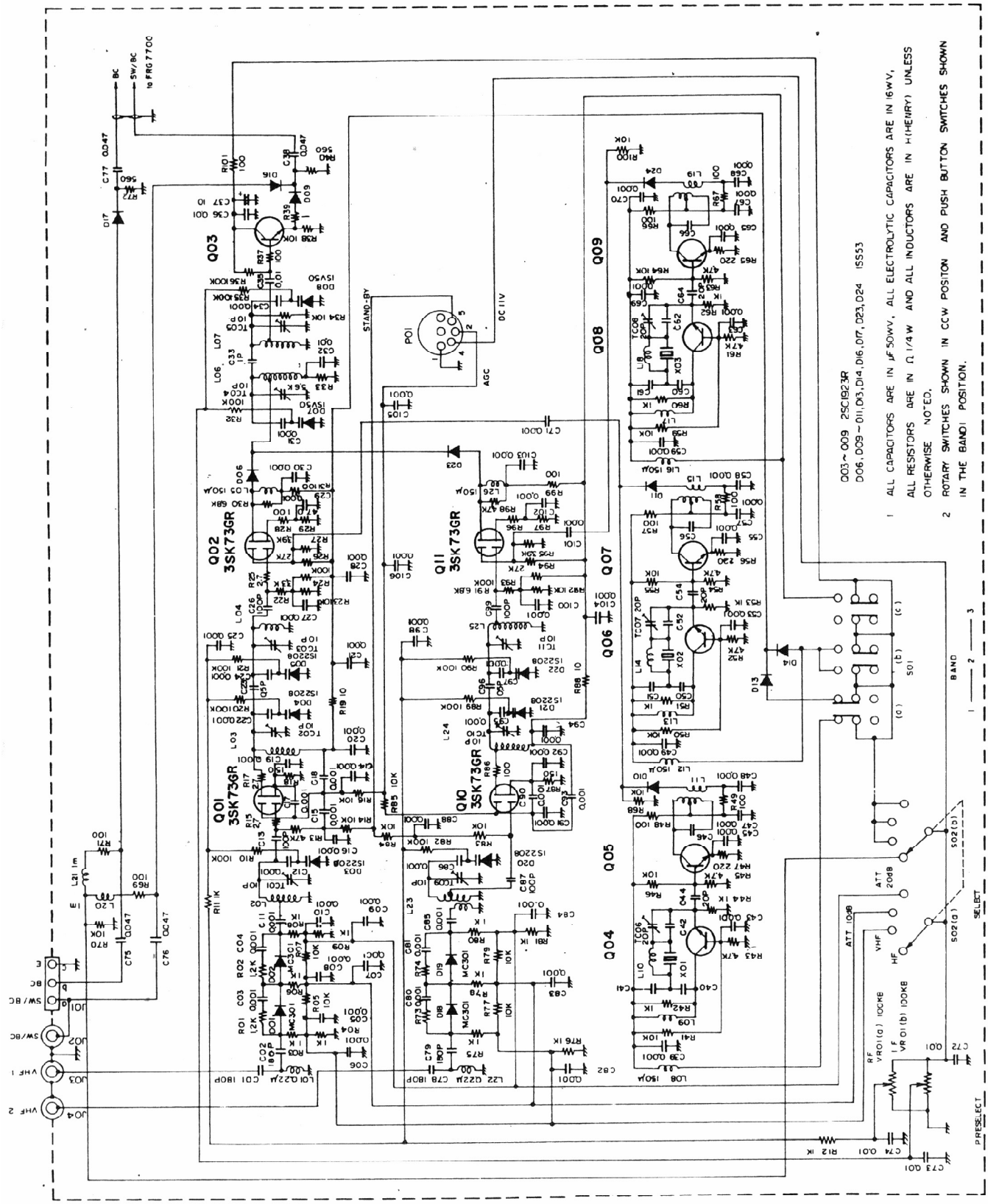
PAØPGA



Model

TYPE	B	D
X'TAL		
X01	100MHZ	100MHZ
X02	120 MHZ	120MHZ
X03	30MHZ	50MHZ
RESISTOR		
R73	220	330
R74	220	1K
R96	390	220
R97	180	330
CAPACITOR		
C40	36P	36 P
C41	36 P	36 P
C42	20 P	20 P
C46	24 P	24 P
C50	24 P	24 P
C51	24P	24 P
C52	20 P	20 P
C56	16 P	16 P
C60	75 P	15 P
C61	75 P	15 P
C62	20P	20 P
C66	36P	12 P
INDUCTOR		
L10	0.33 μ	0.33 μ
L14	0.33 μ	0.33 μ
L18	4.7 μ	1.8 μ

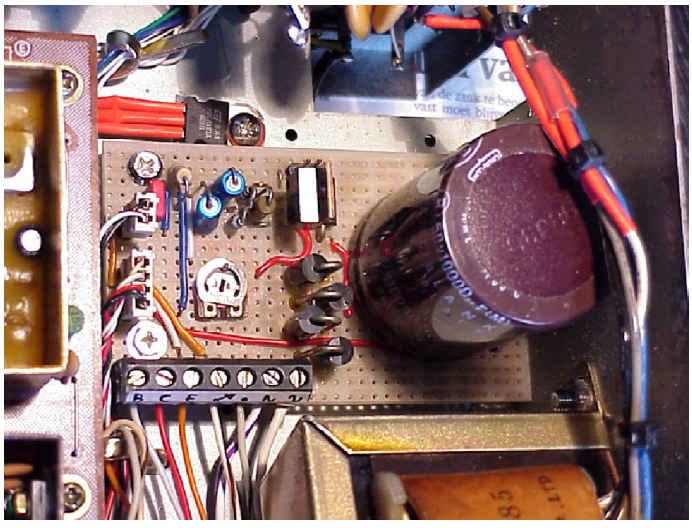
FRV-7700
CIRCUIT DIAGRAM

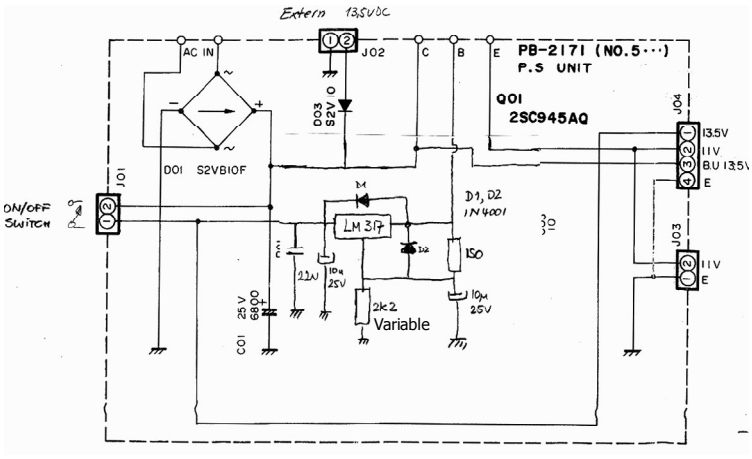


A FRG-7700 adventure (a resurrection story of a FRG-7700)

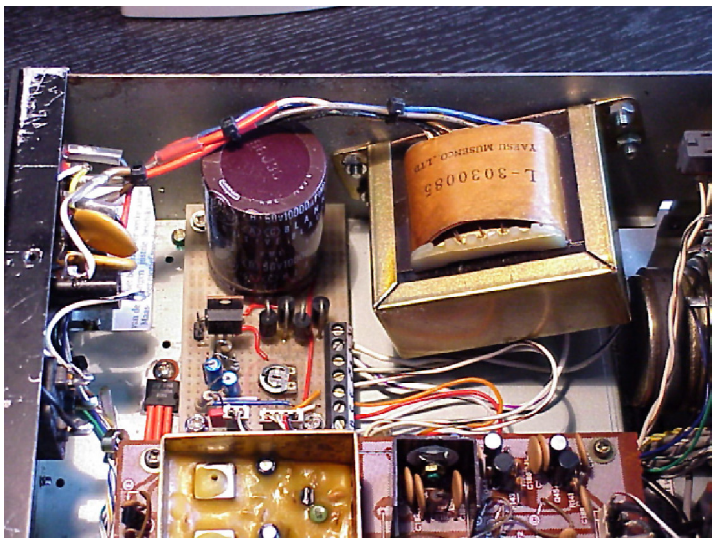
I have recently bought two receivers, one with a bad displaydriver, and another, defect one, as spare.
Well, as things go, the spare rx had also a display problem, the previous owner told me afterward that he had used the receiving and PLL board himself for a swap, because the powersupply of his receiver had blown up, so I expected that I had just got a bunch of spareparts for my other receivers.

After much searching, I found a source for the MSM-5524RS Clock-driver IC in Australia and repaired the receiver with the display fault. After desoldering the old IC, I put the new IC in a IC socket, because several times desoldering a 40-pin IC is not good for the quality of the board and the IC... It is best to put all IC's you have to repair in sockets, if they fail once, it can happen again.
The dead spare receiver didn't look too bad optically, so I decided to try how far I would get with the resurrection of this receiver, just for the fun of it. (After 46 working years I am retired now, so time is not a issue).
I had to construct a new powersupply for the receiver, because the owner had trown away the burned powerboard, but fortunately, at his place, I had fished the original transformer out of the dustbin, complete with burn marks and burned wires for eventually repair (rewinding).
I tested the transformer, after cutting off the burned wires and repairing them with the use of crimping tube and suitable wires. The transformer was OK, after a day under full load (2A) he was rather cool, so I decided to use him.
The transformer is a common type with a primary for 110/117 and 220/240V, the secundary is 15V @ 2 Amps.
For the power supply board I had 2 options: copy the existing boardlayout from another receiver or construct one myself.
I designed a board, centered around a trustful LM-317 regulator IC and a NPN power transistor. Very basic but highly dependable. For the bridge I used 4x 1N5005 3A silicium diodes and the ripple condenser is a 10000uF/50V type. I mounted all on a piece of epoxy experiment board, see the pictures and schematic below.
The LM-317 makes the construction very easy, and the output to the rx is adjustable to exact 11 Volts dc.



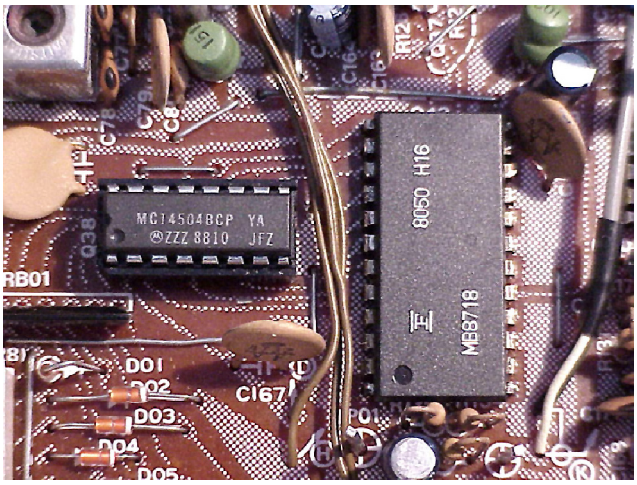


I put in a couple of protection diodes over the LM-317, for safety reasons.
The powersupply works excellent, and stays much cooler than the original one. After a day on there is no warming-up, and stability of this receiver is now the best of the lot.

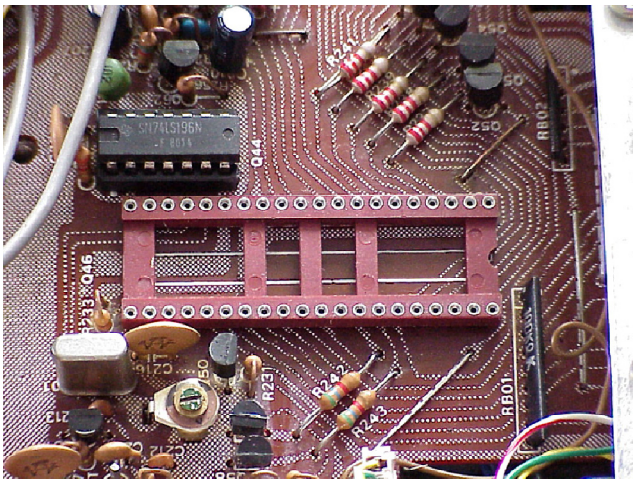


After connection of the power supply, the receiver seemed to work: it had a hissing sound, and after much searching (the display did'nt work, the bandswitch was not in the right position and the analog dial was off-scale, I found a station in the 13 Mhz commercial band, that I recognized, and after confirming with another receiver, I was able to "calibrate" the analog dial and put the bandswitch knob at the right position. Well, that was the only band with signals, but at least there was hope for the better.
After a careful inspection of the PLL board, I saw that the bandswitch had been tampered with, the switch had been removed and resoldered, but several print traces were pulled off, and repaired with some wires, so I measured the connections and found a broken trace. To repair the board, it was necessary to take the PLL board out of the receiver. While I was at it I measured all diodes and inspected the rest of the board very carefully. All seemed ok.
After studying the schematic, I suspected a partially defect MC14504. It is a level translator between the BCD bandswitch, memory unit and the MB-8718 programmable divider, so I soldered the IC out and put in a IC socket. If I got a spare, changing the IC was done in no time.
After inserting the board, I checked the bands, and now I had several more bands with signals.

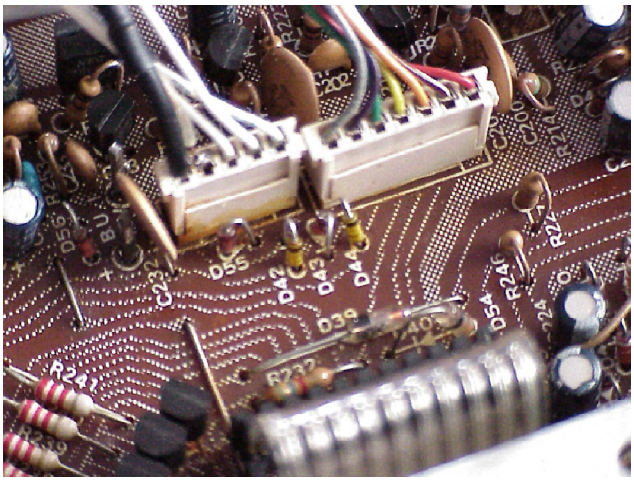
Several bands were there, but on the wrong position of the switch, 7.000 – 8.000Mhz was now 12-13Mhz, and other bands had also weird switch positions.
Because the display didn't worked either, I put a counter to the counter output of the PLL, to have at least a indication of the frequency. (the counter frequency –455khz is the receiving frequency).
I made a truth table of the 6 input pins of the MB-8718, and soon discovered that pin 15 had no true 0 or 1, but had always a voltage of 3.15V on it. When touched with the multimeter probe, the divider switched to the right frequency, so my suspection of a bad MC14504 proved correct and I ordered a new MC14504. After putting it in the socket, all bands were now in the correct order. I checked and adjusted the two PLL circuits, because they were way off the right tuning voltage.
I could see that here had been a very fustrated amateur at work, who had turned on every coil and trimmer, in the process making more trouble than he started with.



After re-alignment, the PLL board was working again, but now the VFO was not working well.
When I tested the output with the counter, I found that the output wire in the connector was broken, so I repaired the connector.
Now I had signals on every band, but had another curious problem: On USB or LSB I had signals, but also a steady tone of around 3khz, independent of the incoming signal. It seemed to me that both sideband oscillators were running at the same time, but I could not see how, because the sideband switch was working correctly. After pulling the board



out, I discovered that there was a solder connection between the power pins of the two oscillators, so they worked at the same time. Maybe a previous owner didn't like to switch between USB and LSB.
While the board was out, I desoldered the MSM-5524 and the 74LS196 IC and put them in a socket. Close inspection discovered some more shorts between solder joints. The OM who worked on this receiver was clearly not qualified to work at this kind of equipment, and has a BIG soldering iron…
After reinserting the board, I had now signals at all bands. The remaining problem was now the counter and the clock. The counter displayed only a righthand zero, the clock was partially working, the AM Led was on all the time, the ON and OFF timer had the same time, only the countdown timer was working. My first impression was that the clock/counter IC was defective.
I tested the counter amplifier and discovered that the 74LS196 dit not get a proper signal. The first 2 transistors of the amplifier were working, but then things went wrong, so I took the board out again to change the transistors, but after another close inspection I found that the BIG soldering iron has been there also, and made a short between collector and base of the third amplifier transistor. After correction I had a signal at the 74LS196 IC and surprise!, had now also a 3 digit frequency display. The displayed frequency was the counter input, without the IF offset of 455khz, and divided by a factor 10. (I had the counter still connected).
So, it seemed that the counter IC did at least something. The Xtal oscillator was working and on frequency.
Mode switching is done at pins 7, 8 and 9, so I checked the in



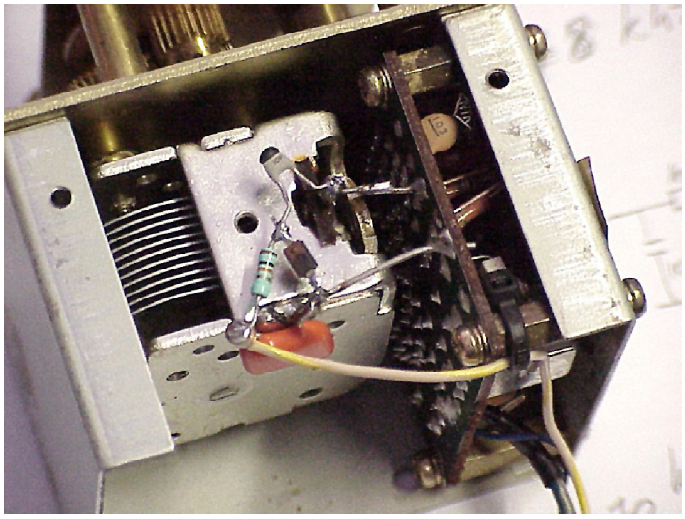
and outputs of the IC and found that pin 8 was no true zero. I checked again the mode switch, which was ok, and the diodes D42/D43/D44, who are used for switching.
Bingo.. D43 was defect and displayed a resistance of 5 K-ohm in both directions.
All the diode wires were very corroded, so I changed all three diodes. I found out afterwards that this receiver was used on a sea-going yacht, and some spots were corroded from the salt water, or the high humidity on-board.
After changing the diode the frequency display was working correctly, and the problem with the clock was solved also. The AM Led was changed because it seemed at the end of his lifespan. It was the first time I saw a burned – out Led, they seem to glow forever!

The S-Meter was not functioning properly, and after taking it out, I saw that the movement was just a block of rust. I cleaned it as far as possible, but the needle stuck every now and then, so I suspected a broken movement, or the coil was out of the bearings.
I had the meter out, searched my junkbox, and found a VU meter from an old cassettedeck, which was a near-perfect fit. I checked the resistance of the movement and even that was almost the same. I swapped the meter scale, and put the meter back.
The FRG-7700 was now working again, so I did a tune-up according the manual, surprisingly, it needed not much re-alignment.
Compared with my other FRG-7700, the signals were almost the same strenght, so I spended some time to clean the chassis, knobs and frontpanel, and then rebuild the set.
After rebuilding, I have tried some modifications, to improve selectivity and test some ideas of my own, like a clarifier, improve sensitivity for the AM bands and others. See below.

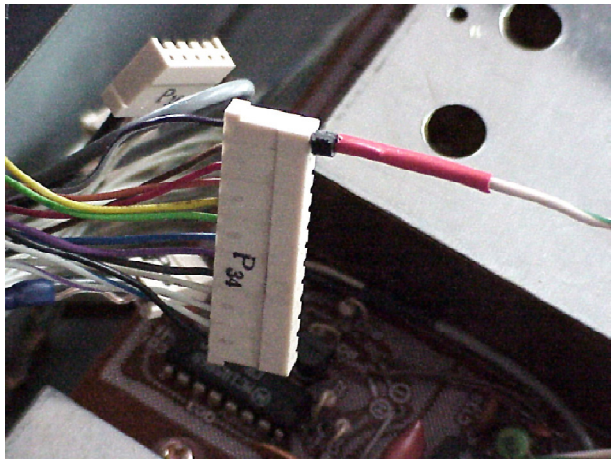
Modifications:

Fine tuning with ease:

One of the features I missed on this receivers is a small RIT control or fine tuning, a very handy device when I am listening in on a net or ragchewing Hams.
The ragchewers are not always at exactly the same frequency, and constantly tuning with the main dial is no fun, because you easely overcompensate, missing a part of the QSO.
The main dial can be set exact enough, but to follow quickly changing QSO's it is too coarse.
A FRG-7700 with a memory unit has no problem with that, you tune in, push the Memory button and then Memory read. You can then tune around the frequency with the Memory fine tune knob. After studying the circuit diagram I found that the Memory Fine potmeter is nothing more than a voltage divider, the output is used to tune a varicap in the memory unit. Well, why not tune a varicap in the VFO with the existing circuit ? I did it this way in a home brew transceiver some 25 years ago, and that worked fine.
So I took the VFO out the receiver, a very easy job, altough it means the removal of all knobs, scales and front panel.



Be careful with the lampholder on the VFO, (see above!!), disconnect everything, including the power cord. I then build in the VFO a small circuit with a VHF varicap that was on hand (BB 209), and a small ceramic condenser (10-12pf) over the existing variabele condenser. The tune voltage is HF decoupled by a 10k resistor and a 22n condenser. I soldered everything spider-style to the tuning condenser. See picture.
The only critical part in this mod is the ceramic condenser, it must be a type with a neutral temperature coefficient (NP 0, black dot). After testing, the VFO was retuned (with the



trimmer only)! to 2500 khz with the variabele condenser fully meshed. With the condenser fully open I had a frequency of around 3600Khz. The variabele tuning range changes somewhat over the band: on the low side the frequency span of the fine tuning is around 12 khz, at the high side it is around 3-4 khz, but because the fine tuning was meant for the hambands which are all on the low end, the variation is more than enough for normal use. The stability of the VFO is just the same as before, and the calibration of the analog scale is not affected in any way.
In normal use I have the fine tuning in the midposition, so I can tune either way of the station.
Should you need a smaller or greater variation, just change the ceramic condenser, I found that the variation at the low side is around 1 khz/pf.
A wire is soldered to the connection of the 10k resistor and the 22nf condenser and is brought out of the VFO, together with the 3 existing wires. This wire has to be 10 cm longer than the others. The variabele voltage from the fine tune potmeter is available on pin 13 of Plug 34. This plug is not connected if you don't have a memory module, so we can solder a pin to the end of the RIT wire, isolate everything with crimping tube, and plug this pin in position 13 of P34. For the pin I used a old wirewrap connectorpin, it has the right size. The wire of pin 13 has a white/violet color. See picture.
If you should obtain a memory module later, the only thing you have to do, is pulling the wire off the plug and earthing it, and connect the plug to the memory module.
This modification is very elegant, because there is no drilling or extra knobs necessary, simply undone if neccessary, easy to use and has no side effects in stability of the receiver.
I can recommend this mod and have now done it to all my FRG-7700's, except one, who had the memory module installed.

Another set of modifications are described on a very interesting Swiss internet site: The adress is:

http://www.dr-boesch.ch/radio/yaesu-frg7700-mod1.htm

You find very much interesting stuff there about ham equipment and a lot of very good descriptions of ham equipment. The pages are in German, so I will give a translation of the mods, for the benefit of all of you who are not fluent in that language.
I did only the listed mods on the receiver board, there are some more on the powersupply, but i did not use them, so look at the site eventually.
I used parts what I had on hand, special the minichokes, I listed the used ones.
After modification the receiver is to re-align according the service manual, for the best results.
The adjustments are very minor in a well-aligned set.
The original mods were described by Georg Lechner in magazine Weltweit Horen nr 11/1986

Description of the mod:

The FRG7700 is a half synthesiser, half conventional design, and is nearly identical to the Kenwood R1000. The circuit design is ok, but can be improved. The set and memory module is very stable, but some changes improve the receiver considerabely:

1) Put parallel to the SW socket a minichoke of 100-200 microhenry, and parallel with the BC socket a choke of 1 MilliHenry, to form a DC path to unload antenna charges.
2) Change R3 (47 ohm) near the antenna plug in 470 ohm, to make the attennuator more usable.

For the rest of the mods it is necessary to remove the receiver circuit board from the receiver.

3) Remove R01 (4k7) and R03 (470 ohm) to lessen the coupling between the BC and SW inputs.
4) Change C07 (47nf) to 4n7, and C69 (10nf) to 2n2, for lower audio interference.
5) Change R46 (470 ohm) to 330 ohm, and put a 500microHenry - 1 MilliHenry minichoke in series, for a higher collector current of Q1 to Q6.
6) Change R60, R61, R76 and R78 from 470 ohm to 330 ohm, for a better 1nd and 2nd mixer current.
7) Change R79 (100 ohm) in a 100-300microhenry minichoke for a better decoupling of the mixer.
8) Change C94 and C95 (all 10nf) in 1nf, for a lower load of T09 and T10.
9) Remove R85 (4k7) for a better Q of T09.

If step 8 and 9 is done, you have to re-align T09 and T10 for maximum signal.

10) Change C89, C101, C111 and C117 (all 10nf) to 560pf, to lessen the load on T08,T10, T11 and T12.
11) Remove R65 (12k) to raise the Q of T05
12) Remove R124 (10k) to raise the Q of T13.

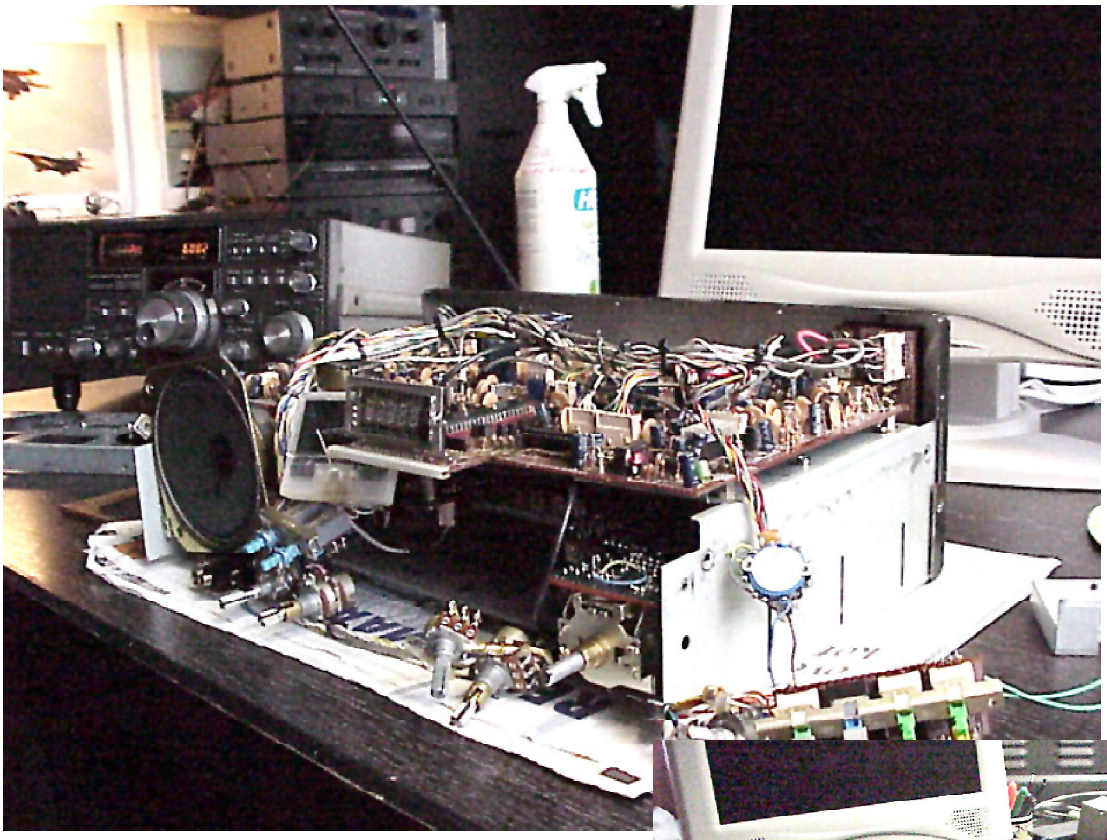
It is possible to remove also R115 (10k), but the gain and noise of the 2nd IF will raise to high level, and can cause oscillations. So it is not recommended.

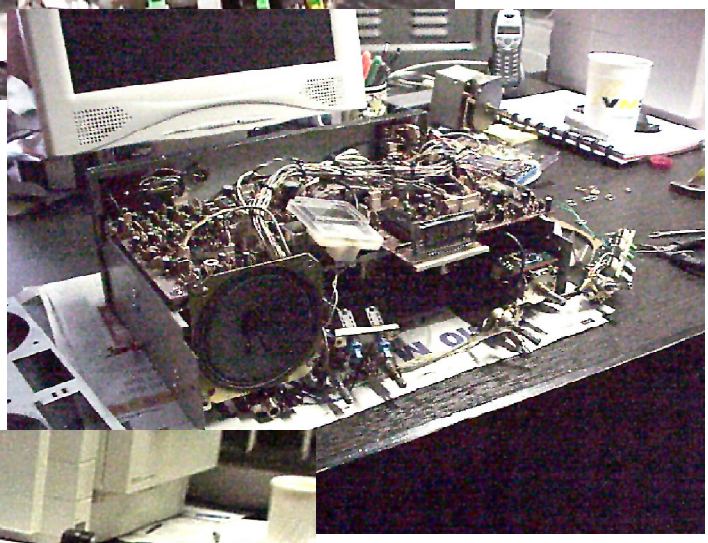
You can change the IF filters for better ones, a recommendation (I did not change any):
CF01: CFW 455HT or CFG 455H, bandwidth 6khz
CF02: CFJ 455k6 or, much more expensive: Icom FL44A, 2.3 khz
CF03: CFS 455J, 3khz
CF04: CFS 455H6, 6 khz

13) Change C164 (470 uF) to 47 uF, for a higher pitched audio.
Personally, i did not like the result, and changed this elco back to 150 uF.
14) Solder a 330nf condenser parallel to C158 (100nf), for a better tone correction. Again, I did not like the result, and changed C158 to 270nf.
This last part is a pure audio modification, and makes the audio somewhat higher, and gives a better SSB signal, but for SW broadcast, the audio quality is good as is and need no changes.

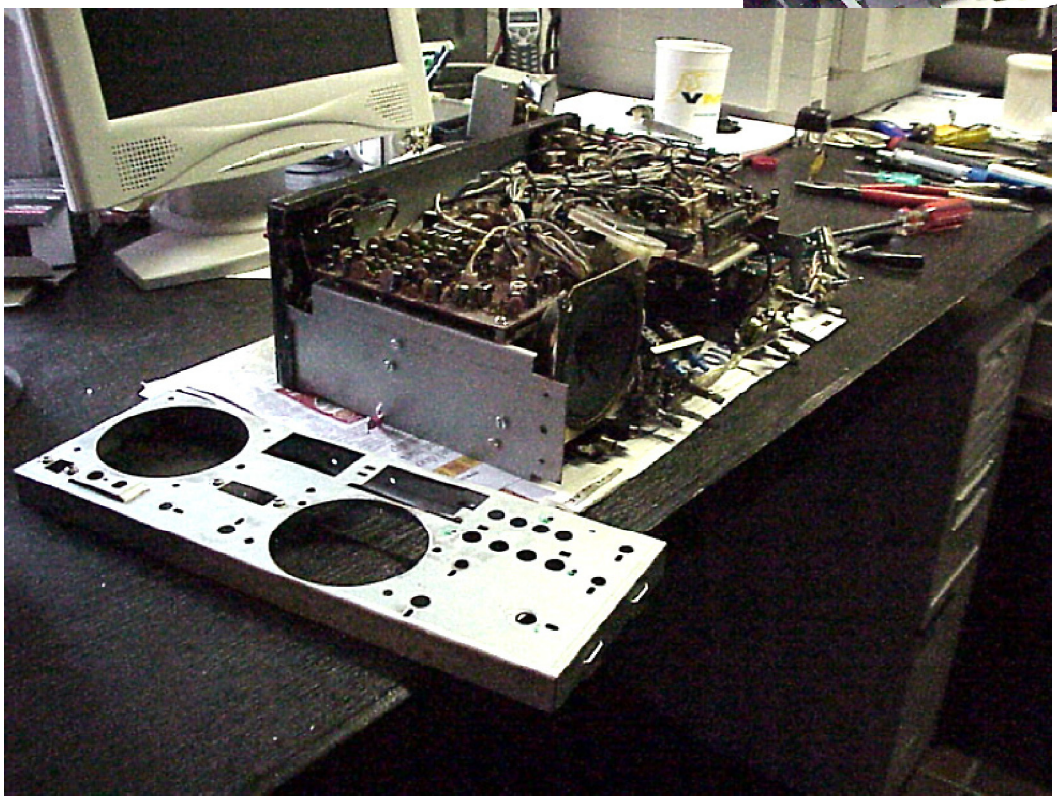
I *have done this mod on one of my receivers and think there is a improvement in performance, special in the AM band. I think that changing the filters brings even more improvement. (not tried) I saw this very mod also published in one of the Fox-Tango Newsletters, I think in 1982.*
The complete FoxTango Newsletter collection is available from the Candy store of W4CLM on CD. Great reading stuff about all the classic Yaesu gear like the FT-101's, Ft-901, 102, 101ZD and more. In my opinion worth every penny, you pay for it.

Wim Penders PA0PGA





You simply take the front off, said the man.....



Postings from the Yahoo FoxTango FRG-7700 group

I'm having a problem with my Yaesu FRG-7700's tuning.
On all bands I can only tune to approximately 939 even though the tuning knob keeps turning. For example in the 6000-7000 kHz band I can only tune to 6939 kHz.
Frequencies I can tune, ex: 10000 kHz, 15000 kHz, 630 kHz, 1500 kHz, 6165 kHz. 9580 kHz, etc are accurate with the expected stations.
Can the FRG-7700 be fixed? Is this something I can do myself?

My 7700 usually doesn't tune the bottom kHz of every MHz range. for example it will tune 5015 to 6015. sometimes when it gets really warmed up the range will increase but never to full capacity.

This needs a PLL re-alignment that is rather easy to do: you only need a dc voltmeter. See page 9

My display is 2khz off frequency: How to adjust?

The apparent displacement of the frequency is due to the fact that the tuning is made over the sideband instead of the (suppressed) carrier.
If you tune over one known transmiter in AM , then the frequency display is correct.
Instead, in SSB, (upper or lower), you tune the receiver to the center of the corresponding sideband, that seems displaced around 1.6 khz of the carrier.
This is not a failure of the display.
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need help .... FRG-7700 WILL NOT TUNE

I have a FRG-7700 that was just sitting here for some time, and now has new batteries but IT WILL NOT TUNE; the tune knob does not change
the received frequency or the displayed frequency, and the display last 3 digits is stuck at "106" ..The MHz and the display changes with the band switch position. it receives whatever is at the displayed
frequency. The tuning knob seems a bit stiff.
Any ideas about a simple solution ???.

Clean and refresh the grease in the reduction and in the bearings of the condenser.

Hi, On my FRV/FRT/FRG the black and red push-button antenna recepticals at the back are worn, in fact some are broken. The casing has split at the lower corners, where the rectangular push button is pressed against by the spring. Glueing is no option; the spring is too strong. Any ideas
to repare or replace these broken clamps?
Regards, Dirk
BTW after the first receptical broke, I immediately used some TSL-oil to lubricate the other ones. Easier to operate, less friction, less wear

Answer: What about Speaker-clamps?
They come mostly in pairs of two and can easily removed from their carrier-parts.

I have had an FRG-7700 for a while now and was wondering if it's just mine or are they all pretty weak in the M.W. department?
As a fellow FRG7700 owner I can tell you that in common with many similar designs there is deliberate attenuation below approx 2Mhz. In some parts of the world, particularly Europe, much of the entertainment broadcasting prior to VHF FM was on "Medium wave" frequencies. The transmitting stations have been, traditionally, owned and operated by national governments as public broadcasters and this has led to a preponderance of relatively few but high powered stations. At various times of the day depending on propogation conditions this can mean that with typical "channel" spacings of approximately 9khz receivers are assailed by a plethora of strong signals. The needs of DX'ers are not considered as highly as those of general listeners in this area and it has been common practice to reduce the susceptability of receivers to strong siganal effects by limiting sensitivity. The designers of the FRG770 provided even further attenuation through the addition of a "local/dx" switch on the rear panel. One thing you could check is the setting of this switch (they are not unknown to go high resistance also).

Reference to the manual for the FRG7700 will detail the difference in sensitivity for the lower frequency bands.
It is possible to modify the FRG7700 to improve sensitivity on the lower bands and also other aspects of performance but you should be aware that some considerable expertise and access to test equipment (beyond a simple VOM) are prerequisite.

73 de pat g4gvw

If you follow the #1 rule of working on electronics, you will NEVER get shocked. ALWAYS unplug the unit BEFORE you take it apart.....

Hello Everyone:
I've posted the mods at my Web site that I recently did to the above units.
The FRT tuner mods were more for operating convenience than performance, but I wanted to eliminate the series attenuator function and retain the Pi-network attenuator and finally provide a single output so that the tuner can be used with any radio.
The FRA active antenna was never of much use to me, but it does have a nice low noise preamp. And the components in the filter section are of high quality, but unfortunately the designer elected to configure it as a parallel filter which has always been way too broad. I measured the effective Q of the filter section which had very "soft" passband slopes. I suppose this is due to the characteristic impedance of the input and output. I then cut the ground lands to the filter section and wired it in series. The peaking effectivity is considerably tighter — amazingly tighter! I did most of this during the weekend between wife-given chores, so I don't have the exact figures, but in time, I will plot the two pass-band response curves and post them. The nice thing about

all this is that you can use both units with any receiver. The next step is going to be how to eliminate the two inputs on the FRG itself, and yet keep sensitivity at maximum — especially in the MF AM b'cast band.
I have developed a "balance" / "mix" circuit that works on paper. possibly, this weekend I'll have some actual test bench results to post here. The B/M circuit allows for a balancing and mixing of the two antenna inputs so that the best combination of the FRG's internal filters can be used, depending on which freq. you are tuned to.
You can see what I've done so far at my site. There are two pages,one with text and pics and the other with schematics. Just click the "Yaesu" link on the front page.
Happy Listening,
Bob, N1KPR
http://www.geocities.com/amdxlog/index.html

Hi everyone!
I was lucky enough to acquire a 7700 about a month ago. It seems almost mint. No mods that I can see and I don't think it's ever been opened. It has worked perfectly until recently.
I turned it on and after about a minute, the frequency started jumping up and down and the signals developed AC hum on them. I turned it off and after another minute turned it back on.
After a short time, the same thing occurred. I shut down once again and this time unplugged the line cord. After a few minutes I replugged the line cord and turned it on. It has worked fine ever since.
What do you think? Should I remove the bottom cover and re-solderthe bridge rectifier? Or, is this a sign of some other failure about to happen? I've been a ham since '64 and have worked on
many rigs but thought I'd ask the 'experts' first! Thanks in advance for any help you guys (and gals) can provide.
73, Joe-WA9LAE.

Joe, resolder the power board and check the 11 Volts on the board, think that you have a case of bridge-itis, bad contact from the rectifier bridge to board, a common fault.

Rants of an "old" Serviceman:

Read it, Cut it out and hang it above your Workbench

Andrew VK3BFA in:...> wrote:
OK, I will stick my head up and offer a few thoughts about old radios, in particular the TS520 which seems to feature so much in this group.

I have been a licensed amateur for 35 years, and am a working electronics technician. Thats not to say I know everything, far from it - I am only too aware of how much there is to learn....flexibility of mind, willingness to learn new tricks is an essential part of our hobby. And I like the old radios (for me, its relaxation) cause I can
SEE whats inside - SMD is a right proper bastard from a servicing point of view. And as for micro controlled devices - I prefer to buy an extended warranty, let someone else replace an entire board if necessary....

The TS520 is a good choice to start out in the "nuts and volts" of radio. Why? - because they are relatively simple, cheap, and any mistake you make is unlikely to be catastrophic. Get it grossly wrong, and it can kill you, or burn your house down. A short, spectacular learning curve.

Rules to live by - all from stupid mistakes I have made in ignorance or stupidity. If you want to debate brand or model numbers with me, or obscure engineering points, don't bother. Been there, done that. At 55, am a legitimate "old Grump". So there.

NEVER assume the previous owner(s) of your 30 year old radio were remotely competent.
Check the wiring of the mains cord, check the fuse is the correct rating. It usually isn't. Do a thorough visual inspection **BEFORE** you power it up. Clean the dust out, make some spiders homeless. Make up a test lead (known as "suicide leads" in the trade) with a 100 watt light globe in series with the mains input - any gross fault will show up as full brightness of the lamp. Shows something is wrong, wont burn out anything made of unobtainium. Turn the valve/tube filaments OFF for this test. Bulb should NOT come on.
With heaters on, slight brightness.

Read the F.... manual. Cover to cover. Then read it again. Put it next to your bed, read a few pages at night. They are EXCELLENT. They were written in an age when it was expected that the amateur could, and would, and did, fix his own gear. They assumed you were NOT an engineer with a masters degree in EE. Sometimes, they are terribly confusing as you will not understand some, or a lot, or even ALL of the terms used. Fine, Google on a term you don't understand, dig out your (older) ARRL book, look it up. If you don't have a basic understanding of how it works, you will not fix it. Period. Intuitive flashes of genius, or cheat sheets, rarely work. BUT they do work sometimes, so people kid themselves they are a substitute for logical fault finding....(more on this later...)

HV kills - or at the least, will throw you across the room and ruin your day. Not nice. Use the "one hand rule" - ie, use a clip lead to connect the negative lead of your multimeter to chassis, the other lead (the red one) is used to probe around. Your not used hand is in your pocket. Its not casually leaning on the chassis to make a ground return circuit. You will be

zapped, in time, by chance, by error, by stupidity, but hopefully it wont kill you. Do this, you will LESSEN the chance of being zapped by the HT. And on the same subject, you WILL destroy your first multimeter by doing something stupid.
Get used to it - everyone does. Write it off to experience. And most of us will do it to a few multimeters over the years.....(thankfully, modern DMMS are cheap...)

So.....thats enuff for one post. Will continue later if I get any positive feedback. Its late at night here in OZ, still have customer jobs to do. You don't, you do it for enjoyment - don't forget that.
Its important. If it starts to stress you, walk away.
There is always tomorrow. Or next week. You have your modern rice burner box to use on air, so don't worry to much.

REMEMBER - its only a hobby.....its only a hobby...its only a hobby...

73 de VK3BFA Andrew.

Part II
REMEMBER - its only a hobby, its only a hobby.

Re: What's inside WD-40 - and a bit of a RANT.

WD40 is a general purpose HOUSEHOLD Lubricant(?) that should NOT be used on electronic equipment. Its uses are to help free up seized bolts, water dispersant, spraying on garden tools to prevent (some) corrosion, and as a degreaser. Kills weeds too, but thats an unauthorised use. Thats its majority use. Its main constituent is kerosene (I thinks, not 100% sure). Its cheap, readily available - and thats why its in such widespread use. I use it for that reason, a can lives on the lathe, another can in the garden shed. Every now and then, theres a "get 200ml FREE" offer - worthwhile.

It is useful as a spray lubricant during lathe operations to provide SOME lubrication, clear chips, and SOME cooling. USELESS as a drilling/tapping lubricant except for aluminium. There are better products available, but not as cheap, or convenient. Its also useful as a cleaner/degreaser when stoning milling machine etc tables. Cause its cheap and readily available. Easy to clean up afterwards. DO NOT use as a rust preventative on chucks, ways etc, it doesnt work.

Electronics - here in Australia, products from the CRC corporation are my choice - they are a rare product in that they live up to the claims on the can. This is based on over 30 years working in the service industry.
No university degree, or exhaustive technical investigation, just experience - the main one being jobs dont come back with "cleaner/lubricant" related problems.

For radio -
CRC 226 as a general purpose lubricant and pot denoiser.
CRC CO (contact cleaner) to clean out dirty pots before using 226. Also used on rubber keypads on remote controls, strips off the years of finger grease which is the main reason they fail.

CRC Switch Cleaner/Lubricant is a truly EXCELLENT product, suitable for general purpose and HV switches.

DO NOT use as a bearing lubricant, ie in brass/bronze bushes typically used in our radios fans. get some Sintered Bronze lubricant, the one I use is German, called "SINTERLAGER OL" - a 20ml squeeze bottle will last for ever. Available from TV service component suppliers.

ALL products, irrespective of brand, should be used sparingly. Too much will act as a dust magnet, make problems down the track. For the "average" amateur, a can of 226 will last years, or lose its internal gas pressure before you run it out. Same for Switch Cleaner/Lubricant, even here - I need a new can, not cause the can is empty, but for the aforementioned reason.

SHAKE THE CAN BEFORE YOU USE IT. Prime it by spraying into a cloth (oh, ok - the floor will do...can join the solder blobs...)

So. There. End of minor RANT. In all certainty, I have hit someones hot buttons and they will disagree. So be it, all I can go by is my own practical experience.

BTW - use the supplied plastic tube to get it to where you want it, its what its for. And when a can runs out, keep the tube - they DO tend to get lost in toolboxes.....

73 de VK3BFA Andrew.

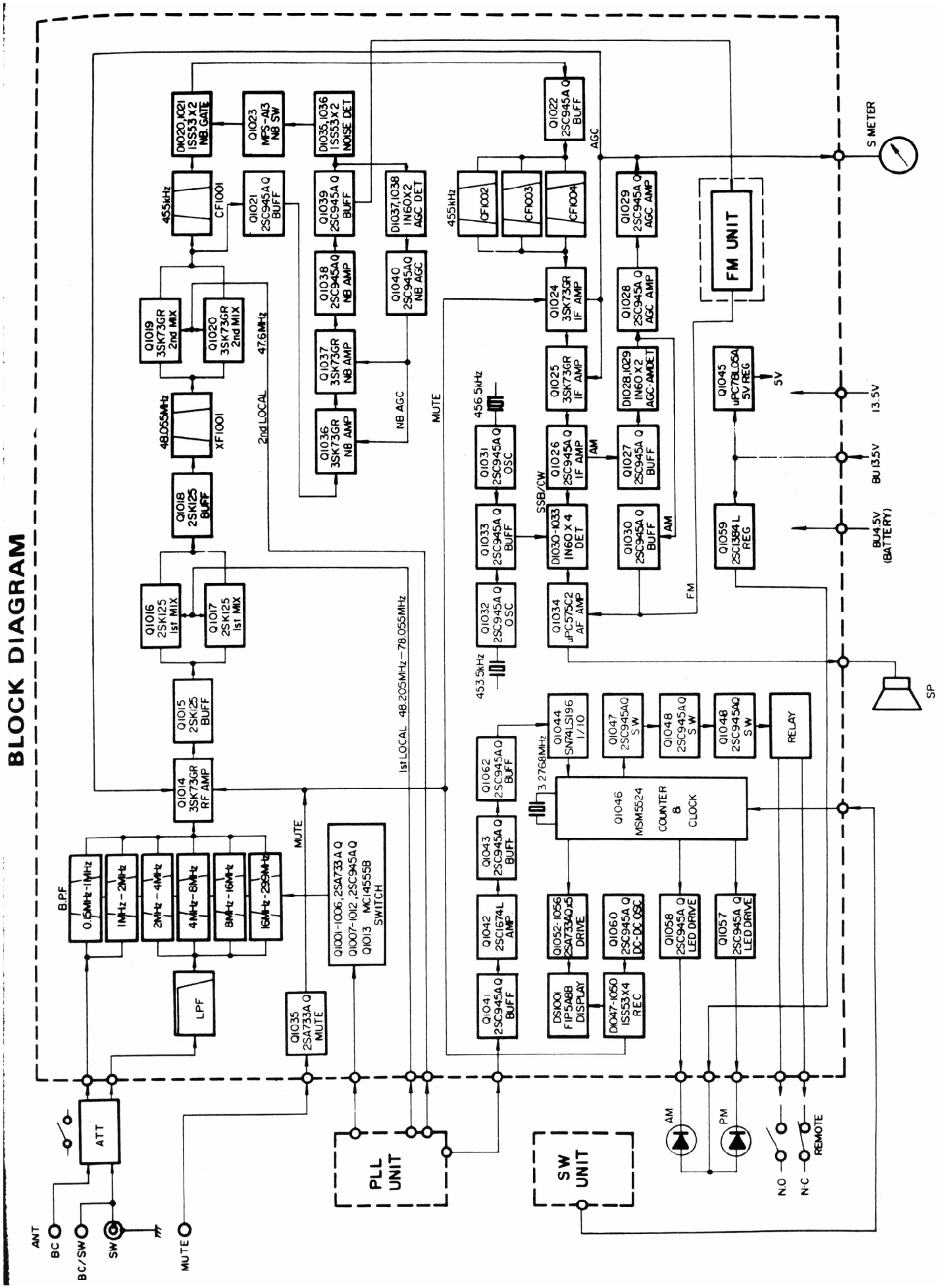
Re: [] Philosophical RANT about old radios...

Andrew, I have been trained in similar fashion from 68 up and liscenced in 80 and been on the air with a TS-830 since at least 1984 maybe earlier, I don't remember now.
I've believe you brought out a very valid set of points.
Things I learned way back in my high school days.
Been bit more than once and damaged and repaired a few ruined multimeters due to stupidity.

You've summed up my thoughts I've expressed to others time and time again and like you I differed with others on technical questions and seen some bad injuries the results of others mistakes.
You sum it up well. The modern day manual is not written for the average person. These books seem to be something more like they are written for keeping lawyers in check because they can say hey we told them already in writing.
To much can sometimes be just as bad.
I think its partly because of how the way the industry changed the way things were made since the 1970's.

Again: Don't rush things, it is only a hobby ! Tomorrow will be another day and you had time to think it over, so you fix it then in half the time you need now.

73, Wim PA0PGA



CIRCUIT DESCRIPTION

COUNTER AND CLOCK CIRCUITS

The PLL circuit output is amplified by Q29 ~ Q32 (2SC1815(Y)) in the RX unit then is fed to Q33 (SN74LS196N) where it is divided by ten. The divider output is fed to Clock and Counter IC MSM5524, which provides a display output that is reduced in frequency by 455 kHz with respect to its input.

The master oscillator for the Clock and Counter oscillates at 3.2768 MHz. The display circuit operates on +11 V DC, which is created by a DC-DC converter.

The FUNCTION switch has four positions: FREQUENCY display, CLOCK display, TIMER ON, and TIMER OFF. Each time the HOUR switch is depressed increments the clock display by one minute; continuously depressing the MIN. switch continuously increments the minutes digit of the clock, while the hours digit is left unchanged. Depressing the HOUR and MIN. switches at the same time resets clock display to "1 hour 0 minute 0 second", and releasing both switches restarts clock operation.

When the FUNCTION switch is placed in the ON or OFF position, pressing the HOUR and MIN. switches at the same time resets the clock to "0.00".

To preset the timer, first preset the desired ON time (or OFF time), then set the TIMER switch to ON. This will turn off (or on) the power to the unit. (When the preset ON time (or OFF time) is reached, the power to the unit is again turned ON (or OFF). At this time, the POWER switch may be placed either ON or OFF position. A relay contact output interlocked with this timer operation is available at the REMOTE terminal.

[MSM5524]

- **Maximum Ratings**

Rating	Symbol	Condition	Value	Unit
DC Supply Voltage	V_{DD}	Ta = 25°C	−0.3~7	V
Input Voltage	V_I	Ta = 25°C	−0.3~VDD	V
Storage Temperature Range	Tstg	—	−55~+125	°C

- **Electrical Characteristics**

Rating	Symbol		Condition	Value	Unit
DC Supply Voltage	V_{DD}	Counter	—	4.75~7	V
		Clock	—	4~7	V
Crystal Frequency	f		—	3.2768	MHz
Operating Temperature Range	Top		—	−35~+85	°C

- **Maximum operating frequency**

Rating	Symbol	Condition	Min.	Typ.	Max.	Unit
Count frequency (F_{IN})	f	V_{DD} = 4.75 V_I = 1Vp-p	3	—	—	MHz

Table 1 MSM5524

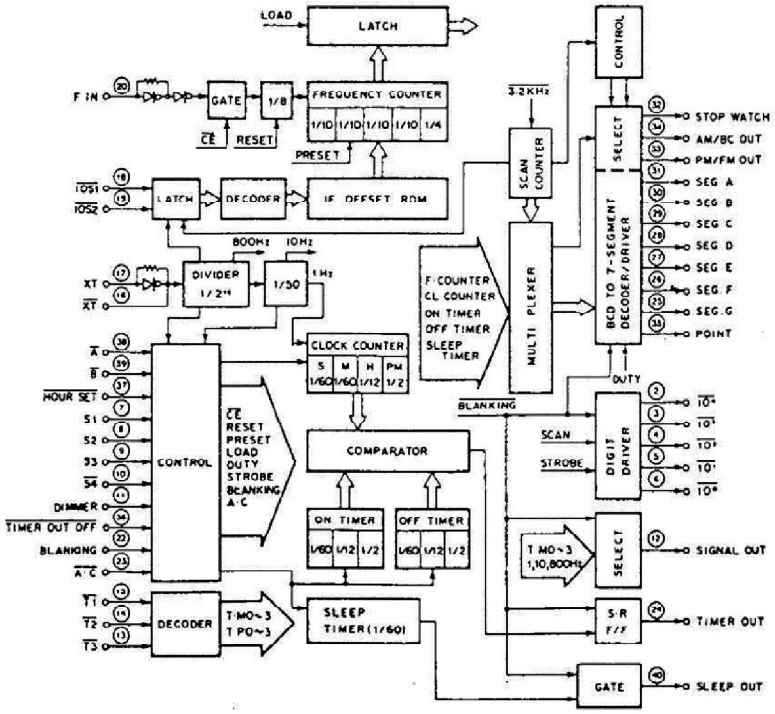


Fig. 2 MSM5524

CIRCUIT DESCRIPTION

MSM5524

The equivalent circuit and electrical characteristics of the MSM5524 are shown in Table 1 and Figure 2 respectively.

1. Display Drive Output

The display drive output dynamically drives a five-digit common-anode display element. Segment outputs are present at pins 25 ~ 31, while digit outputs are present at pins 2 ~ 6. The active state of each segment (H) and digit (L) requires an output current of 1 mA and 2 mA respectively, which are supplied by drive transistors Q35 ~ Q39 (2SA1015(Y)). Function display outputs are assigned to each pin as follows:

Pin 35: Point
Pin 34: AM and BC
Pin 33: PM and FM
Pin 32: Stop watch

These operation-mode display elements are driven by transistors Q42 and 43 (2SC1815).

Input			DISPLAY SELECT	MODE
S_1	S_2	S_3		
H	H	H	Clock	Clock Timer
L	H	H	Sleep • Timer	
H	L	H	ON • Timer	
L	L	H	OFF • Timer	
H	H	L	AM	Radio Frequency Counter Frequency Counter
L	H	L	FM	
H	L	L	SW	
L	L	L	Frequency Counter	

H: V_{DD} level or open. L: ground level.

Table 2 Function of indicator selection terminal

Code	$\overline{A}$	$\overline{B}$	Function
CLOCK	L	L	Resets to AM 1 : 00 (00^S).
	H	L	Advances the "minute", maintains the "minutes" and counts the "seconds"
	L	H	Advances the "hours", maintains the "minutes" and counts the "seconds"
	H	H	Normal operation
ON TIMER	L	L	Resets to AM 0 :00.
	H	L	Advances the "minutes" and maintains the "hours"
	L	H	Advances the "hours" and maintains the "minutes"
	H	H	Maintains the timer-ON time. When the timer-ON time is reached, pin 24 turns ON
OFF TIMER	L	L	Reset to AM 0 : 00.
	H	L	Advances the "minutes" and maintains the "hours".
	L	H	Advances the "hours" and maintains the "minutes".
	H	H	Maintains the timer-OFF time. When the timer-OFF time is reached, pin 24 turns OFF

Dropping $\overline{A}$ or $\overline{B}$ to "L" advances one digit. When the $\overline{A}$ or $\overline{B}$ is kept at "L" for more than 1.6 seconds, the digit advances continuously at a speed of 10 Hz.

Table 3 Function chart of input $\overline{A}$, $\overline{B}$

2. Time Correction

Pins 38 ($\overline{A}$) and 39 ($\overline{B}$) accept time setting inputs which are active at "L" level. Placing these terminals to "L" level permits the functions shown in Table 3 in accordance with the mode selected from Table 2.

Each time the time correction button is depressed increments the clock display by one hour or minute.

When the button is depressed for more than 1.6 second, the clock display is continuously incremented at a rate of 10 Hz.

3. Other Pin Functions

a. Pin 23 $\overline{AC}$

All clear input. Initial clear is accomplished by grounding this terminal through capacitor C198 (0.047 μF) when the power to the unit is turned ON.

b. Pin 22 BLANKING

Input logic of this pin is active at level "H".

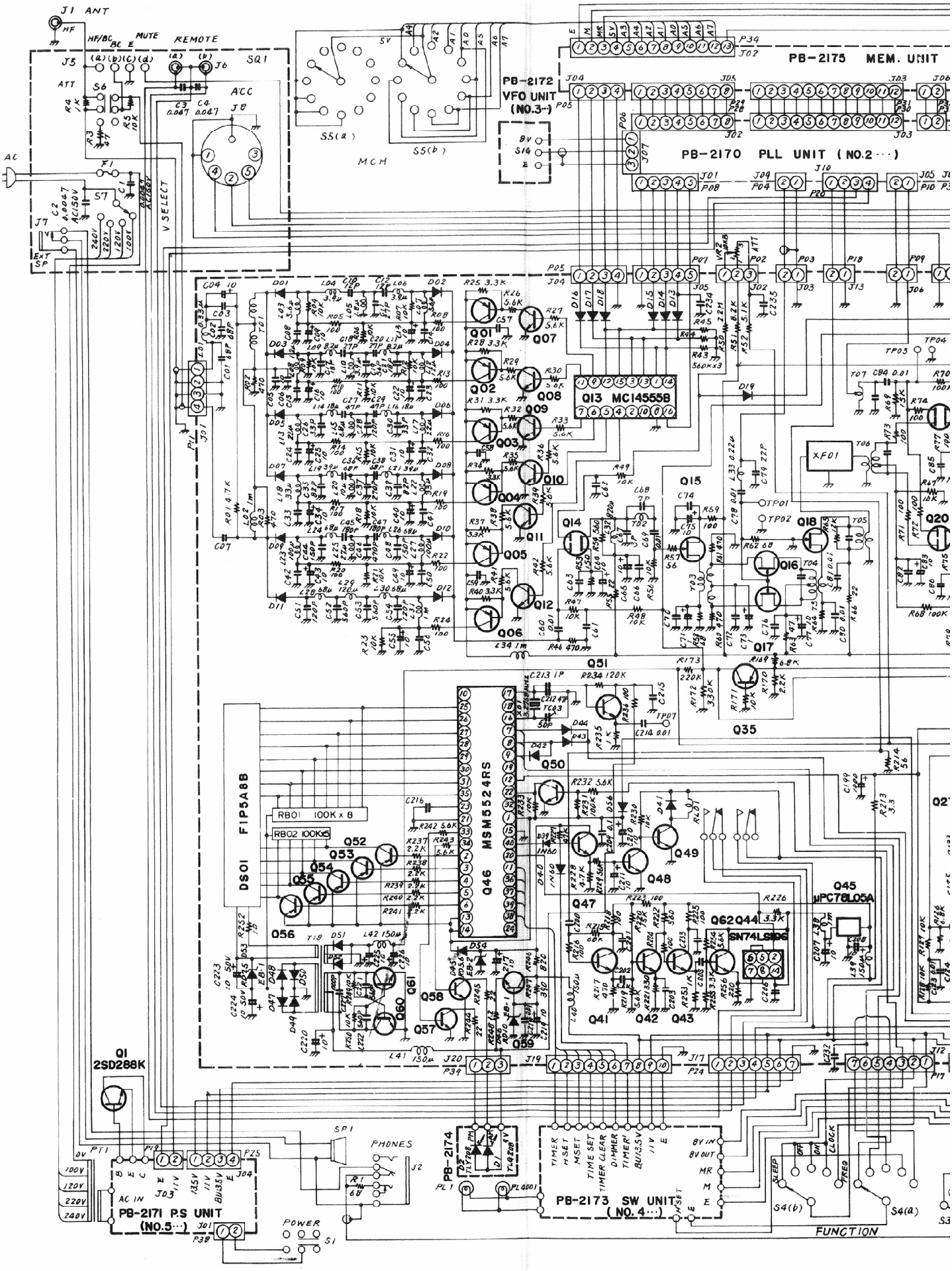
When this pin is set to "H", all the outputs except the timer and sleep outputs are inhibited. It is usually set to "L".

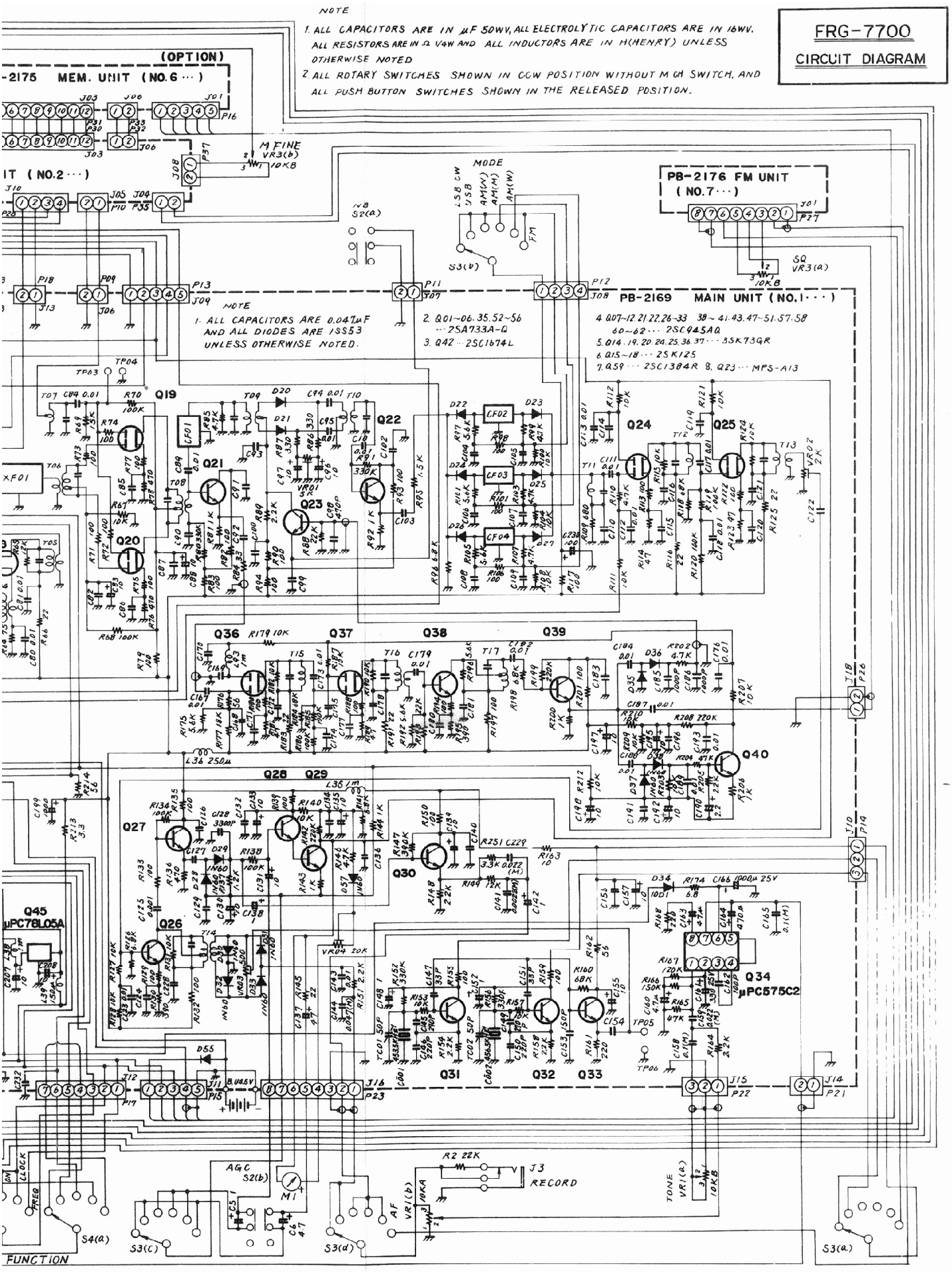
c. Pin 11 DIMMER

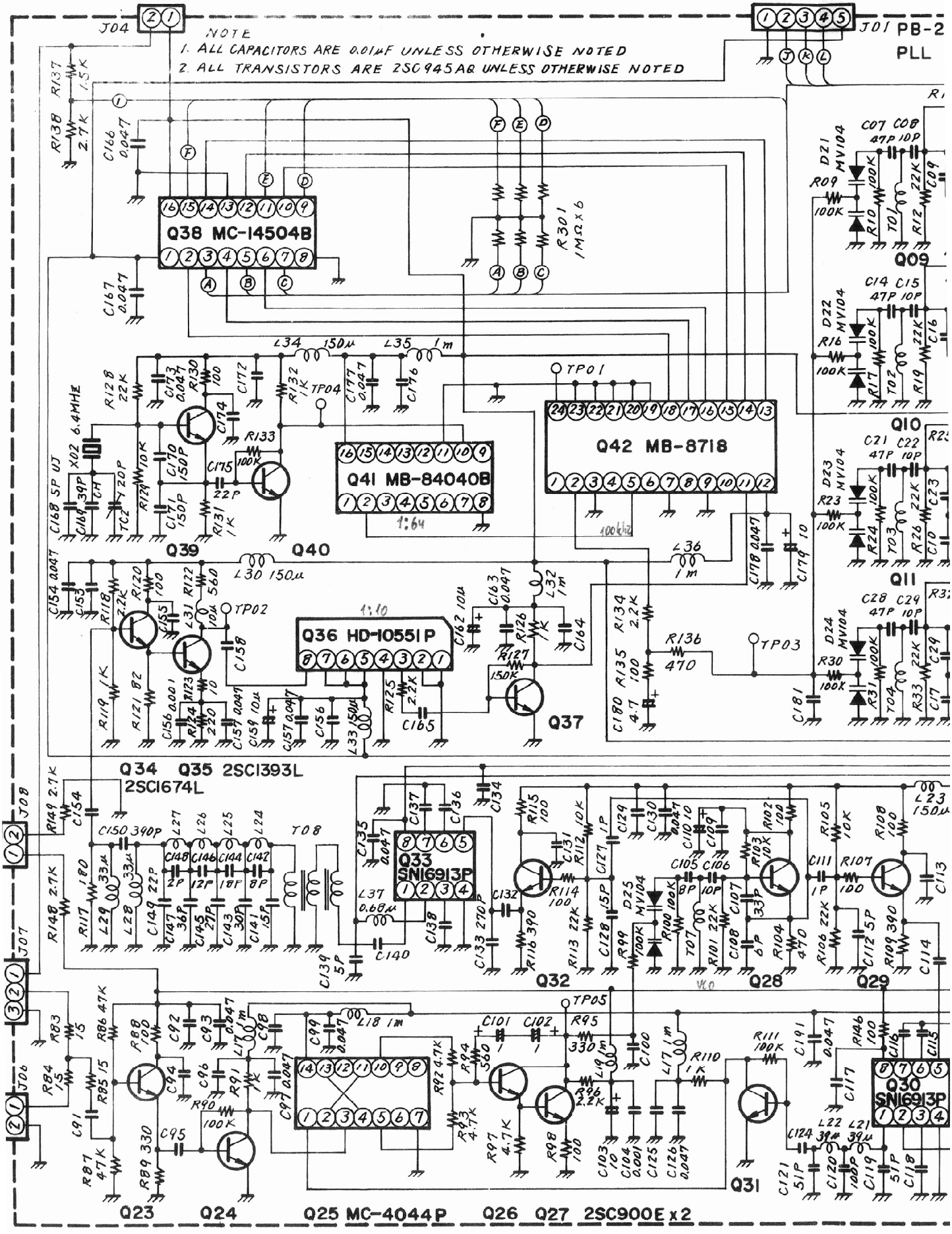
This pin accepts the command signal that causes to reduce display brightness. When this pin is set to "H" (active), the display output pulse width is reduced to one fourth.

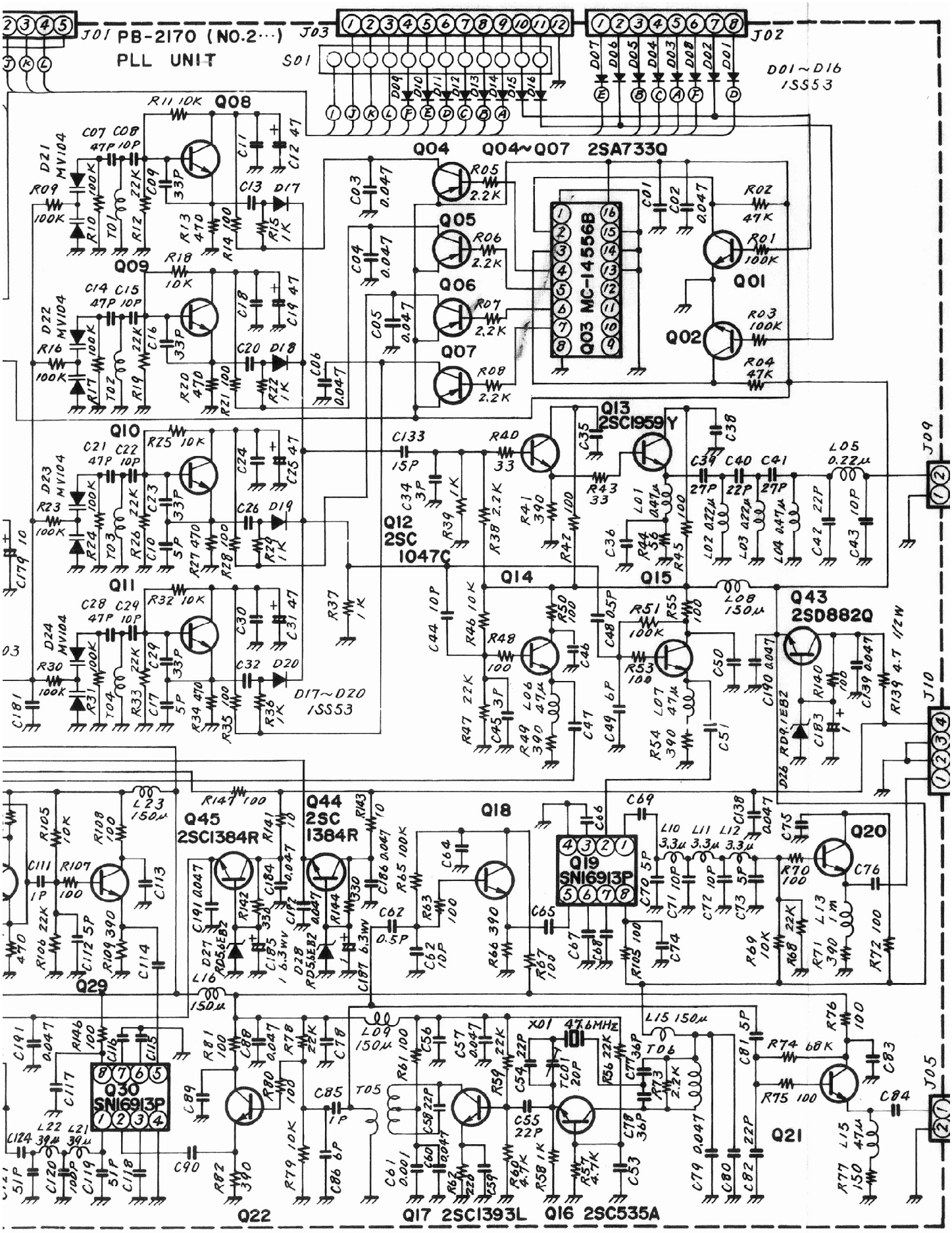
d. Pin 20 FIN

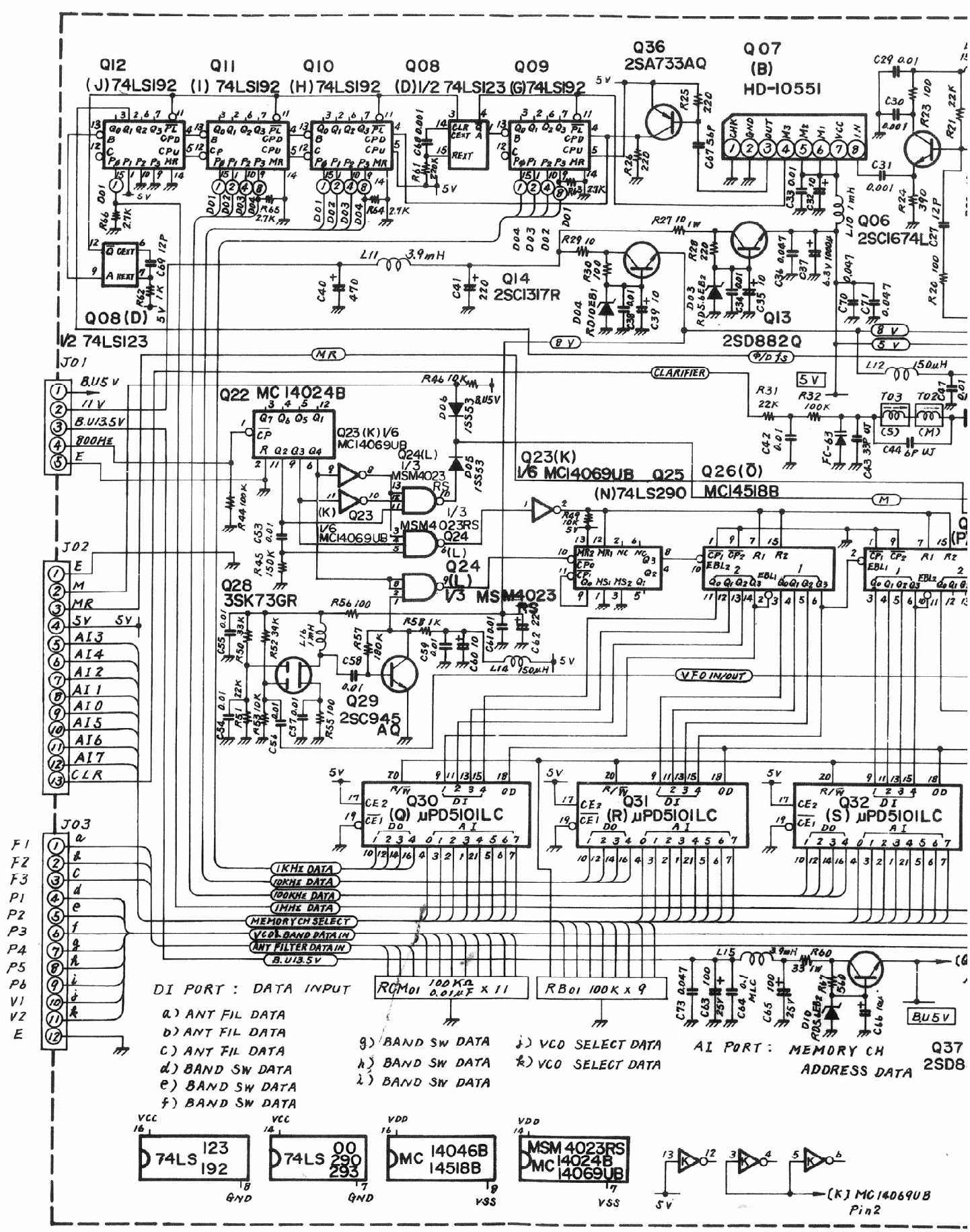
This pin accepts the frequency counter input signal.

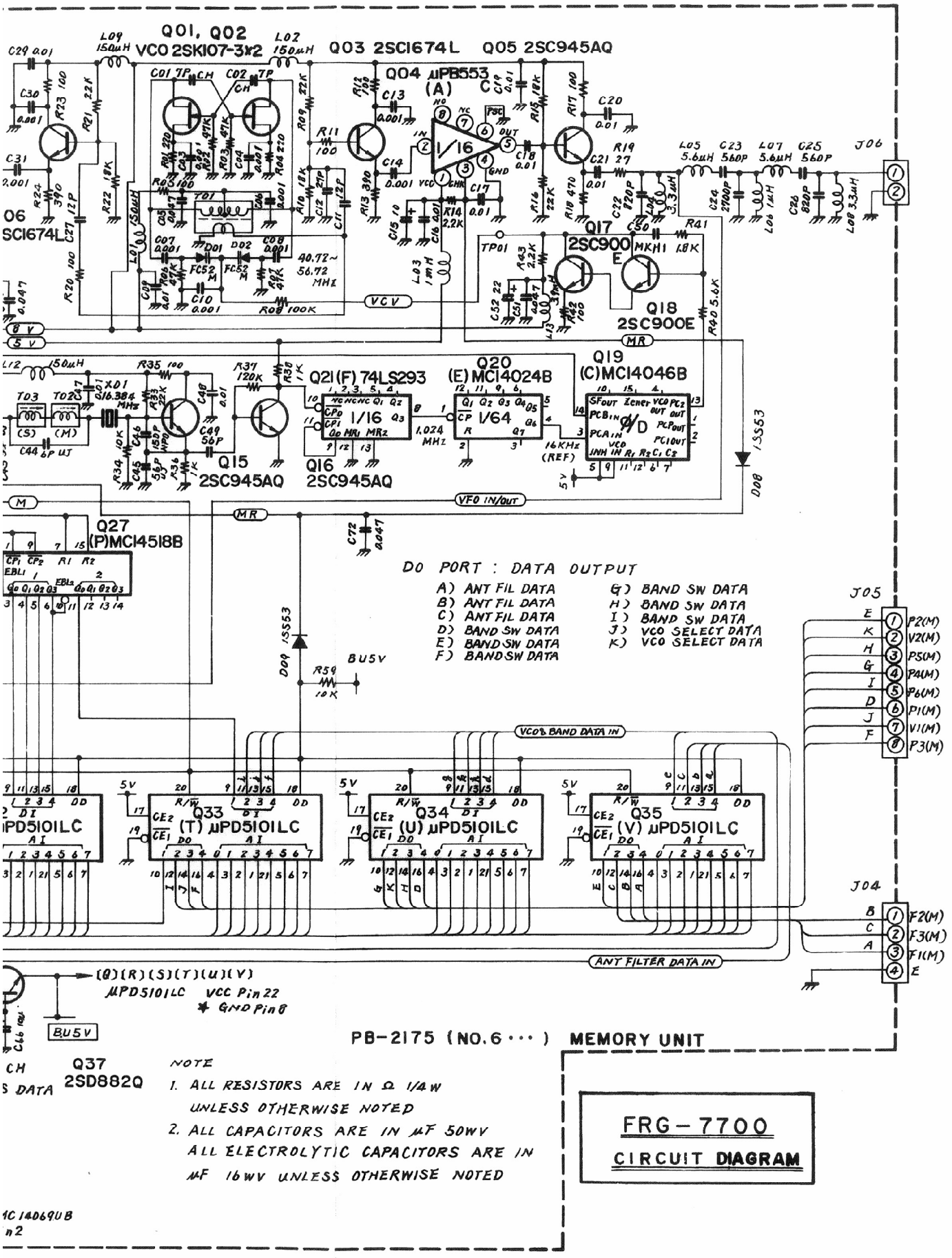


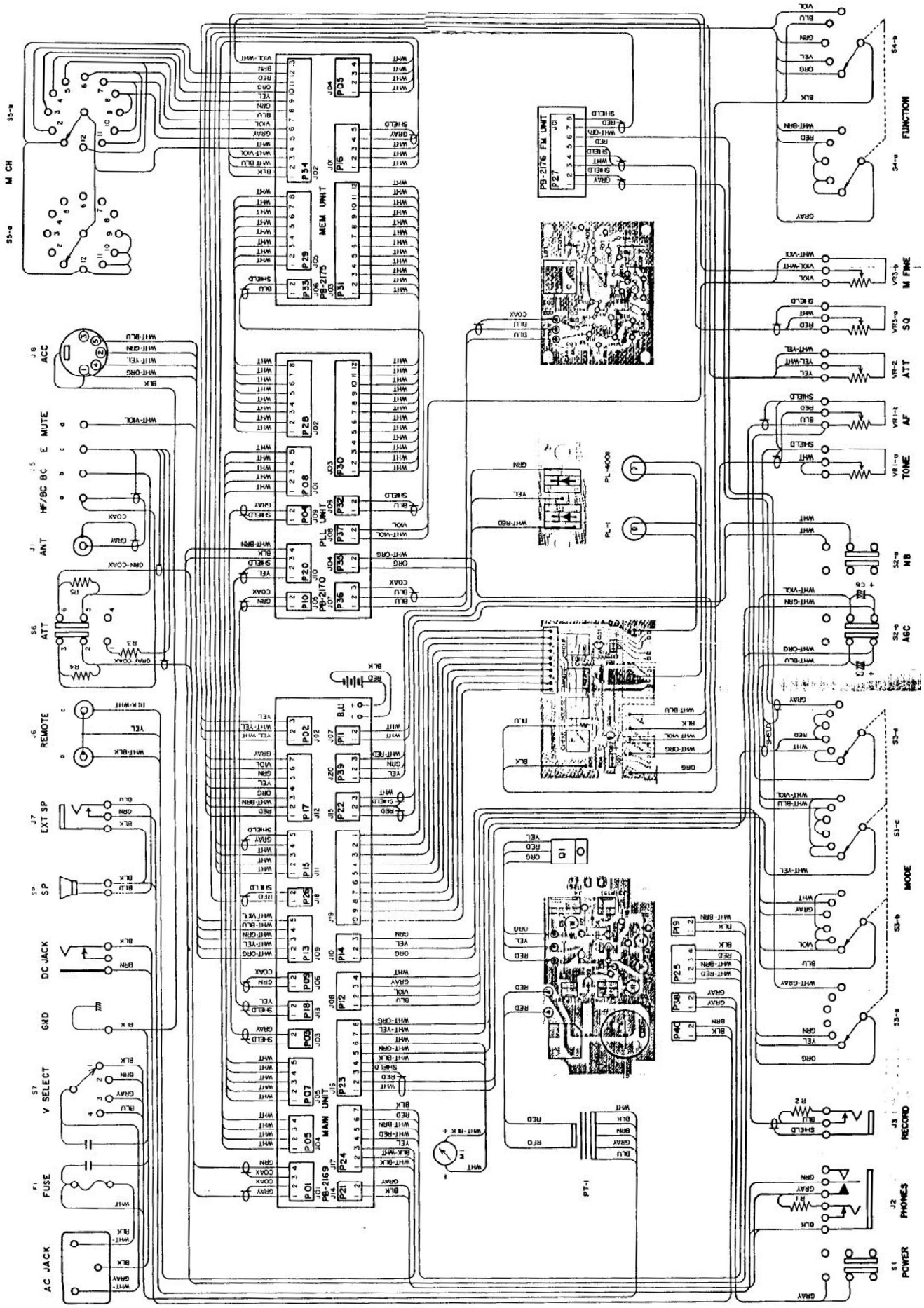












Nostalgia: A pricelist of Yaesu equipment from 1979 in Dutch Guilders ($ =f 2.60)

YANYOSU ELEKTRONIKA B.V. Vergoedingen per 1 Juli 1979 (Incl. B.T.W.)

FT-901 DE	ƒ 3000.--	HF transc.	FT-7B	ƒ 1600.--	HF transc. 100 W in
FT-901 DM	ƒ 3500.--	HF transc.	YC-7B	ƒ 250.--	Dig. displ. voor FT-7B
FM unit	ƒ 100.--		FP-12	ƒ 300.--	PSA max 12 A " "
Mem Unit	ƒ 310.--		FL-110	ƒ 500.--	200 W inpt. HF booster
DC-DC conv	ƒ 130.--		FT-227 R	ƒ 850.--	VHF transc.
SP-901	ƒ 100.--	Speaker	FT-227 RA	ƒ 960.--	VHF transc. m/scan
FC-901	ƒ 500.--	Ant. tuner	FP-4	ƒ 145.--	PSA max 5 A (voor 227)
FTV-901 R	ƒ 1700.--	2m en 70 cm transv.	FT-225 R	ƒ 2030.--	VHF Transc.
FV-901 DM	ƒ 970.--	VFO	FT-225 RD	ƒ 2250.--	VHF transc.
YO-901 P	ƒ 1200.--	Mon. sc. + band scope	memory	ƒ 310.--	voor FT-225 serie
FT-101 ZD	ƒ 2300.--	HF transc.	CPU-2500 RK	ƒ 1240.--	VHF transc.
FL-2100 B	ƒ 1340.--	Lin.	FP-12	ƒ 300.--	PSA voor CPU-2500 RK
FV-101 B	ƒ 300.--	VFO voor FT-101 E	FT-202 R + NC-1	ƒ 490.--	handpr. + NiCad lader
FTV-250	ƒ 700.--	2 m transv. "			
SP-101 B	ƒ 85.--	spkr.	per kanaal	ƒ 20.--	(twee Xtals)
FP-301	ƒ 400.--	PSA max 25 A/13,8 V	YC-500 J	ƒ 600.--	freq. counter ca. 600 MHz
FRG-7	ƒ 800.--	Comm. ontv.	[redacted]	ƒ [redacted]	" "
FRG-7000	ƒ 1350.--	Comm. ontv.	YC-500 E	ƒ 1070.--	" " "
YP-150.--	ƒ 235.--	Dummy ld/wattm.	FF-501 DX	ƒ 85.--	Lo pass HF filter
QTR-24 D	ƒ 93.--	Wereldklok (kwarts)	YH-55	ƒ 35.--	Koptelefoon
RSL-145 M	ƒ 80.--	145 MHz 5/8 kleefv.	FT-101 Z	ƒ 1980.--	
RSL-145 MGP	ƒ 90.--	145 MHz 5/8kl/rad			
RSL-145 GP	ƒ 90.--	145 MHz 5/8 voor mast m/rad			

YE-17 ƒ 35.-- mike m/scan knoppen voor 2500/227RA; YM-25 ƒ 50.-- mike/spkr voor 202 R;
YD-148 ƒ 75.-- tafelmike 500/50 k ohm. YE-7A ƒ 20.-- 600 ohm handmike

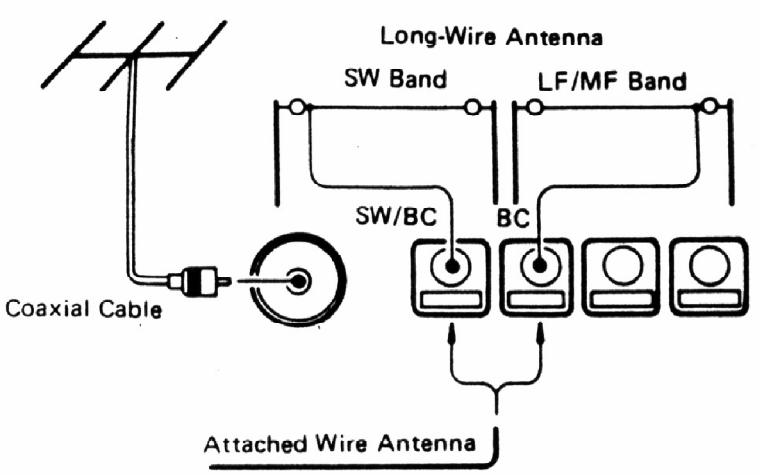
(tussentijdse wijzigingen voorbehouden)

FT-207 R ƒ 750.-- NC-1A ƒ 75.-- (lader voor FT-207) NC-2 ƒ 145.-- snellader en stationnaire voeding voor FT-207 FSP-1 ƒ 35.-- speaker voor de koets.

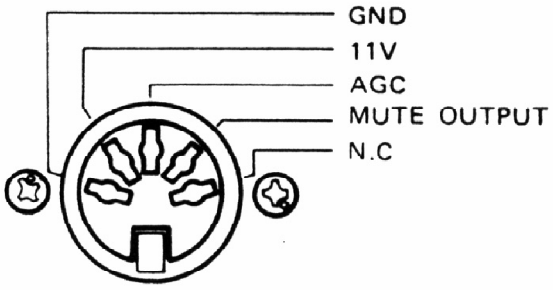
Hello there,

I'm Wim Penders, PA0PGA, writer of the Survival Guides. Altough I have no real education in electronics, I have had a lifelong interest in radio and electronics. The start was as usual: a crystal set out of old parts from a demolished radio, that I build when I was 12, later 1V1 and other tube sets. At the time (fifties), it was quite normal to have a job at age 14, so I took up carpenting, because a job in telecom was out of order. In the Service at age 19 I worked as a Radar operator, and have learned a lot but still had no way to have a education in electronics. After the Service period, I had other preferences: met my lovely wife, and build myself a house, where I still live in. In 1967 I did the exams for my Amateur license and started on 2m with a home-made AM transmitter, a 6CW4 converter and BC-653 as receiver. A year later I did my CW exams and got a "A" license, that I have for 41 years now. In the next years I was very active building all kinds of equipment, I spend almost a year to build a HF transceiver, that covered 80-10m, with a 9 Mhz IF, more or less along the same line as Yaesu used later in the FT-200/Tempo One. (see picture) Later I bought a FT-200, because there was less time to spend on the hobby. We had 2 kids, and they needed time too. Later I was able to turn my hobby into my job by starting in a electronics firm, who did assembling clone IBM computers and had a surplus shop on the side that I managed. It was fun, and I learned a lot about the most different sides of electronics, from military surplus to exotic measurement equipment to the latest in microcomputer developments.

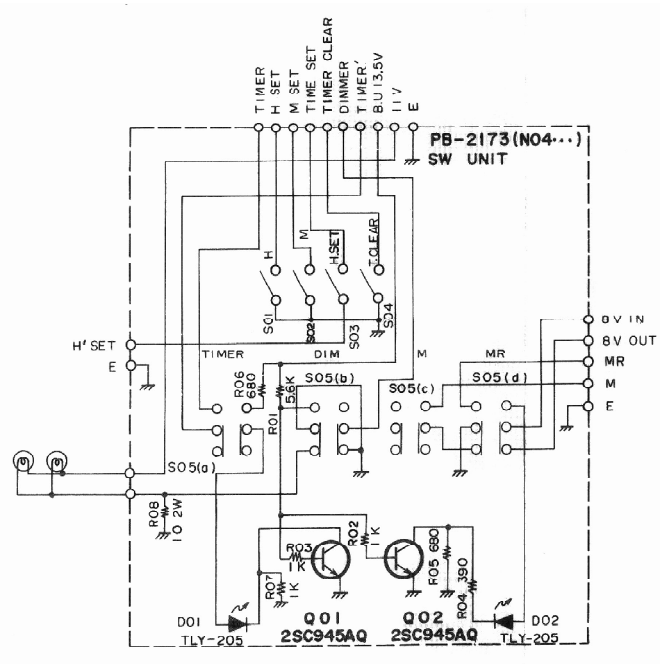
A very interesting job that ended when the firm decided that the future was in homecomputers. It lasted 7 years after that. I am retired now and took up the hobby again. I like to bring old ham radio's back to life again. The Survival Guides are in this line, because I like to share my experience with you: real Hams, that find satisfaction in restoring older Ham sets. Because I am a self-educated Ham, I want to show other Hams, that it is not neccesary to have a degree in electronics to enjoy Ham-Radio today. There is so much information to get from Internet and other sources that you find always a answer for your questions. Joining the Yaesu forums is another source with a lot of very experienced Hams to help you. It's up to you!
I apologise for my poor english, but that is self-educated as well..HI
73' Wim Penders PA0PGA (wpenders-at-home.nl)



Switching Unit and
Connections for the FRG-7700



ACC CONNECTIONS



This is the resurrected FRG-7700 in my shack, good for another 25 years