forget to weather proof the transverter by using car gasket sealing compound around all screws and in between lids and boxes. Be very careful to weather proof all connectors used as even a slight amount of moisture in 23cm cables can increase losses quite markedly. By having the transverter at the top, you can feed 144MHz signals up the coax with only a fraction of the loss. You will be amazed that even 2½W at mast head and a decent receiver in the transverter will give you good results with a high gain aerial. Having played with many aerials on the band, my own experience is that four 23 element Tonnas on a Tonna frame with a power divider seems to be the best antenna, unless you can put up a large dish.

Running QRO

Although phenonenal DX has been worked by many amateurs with only a few hundred mW at the mast head, there is of course a great advantage in running high power. It is not so much that you need the high power to have the contact itself, but it will help you to be heard if you beam, or another station's beam heading, is well off the direct inter-station line. Almost all stations are using 2C39 valve pa's, or their slightly better 3CX100A5 equivalent. In a well designed cavity tuned circuit, up to 13dB gain can be achieved, although more usually the average gain experienced will be around 10dB. It is unusual to have two valves in series, one as amplifier, while the second is working as a high power PA running at perhaps 50 to 100W PEP output. You will have to make a choice between running a very stable 60W whcih hardly drifts with time, or perhaps 100W, in which case you will have to have easy access to cavity tuning, as they will need retuning as the PA gets hot. I use an extremely powerful fan which blasts much cold air through the entire linear to keep valves cool, and with power set at 60W maximum the PA only requires retuning once or twice a year, rather than every five minutes! Some superb design for very high output linears on 23cm have been published in magazines such as *VHF Communications,* one design giving up to 200 W from two 2C39s running in parallel, whilst another design employs a ring of six which gives at least 400W output, as used by G4GLN and others.

Changeover warning

I should give a word of warning about the use of coaxial relays on 23cm. A high quality relay which might give 50 or 60dB isolation between TX and RX ports on 2M may give only 25dB on 23cm. Some pre-amplifiers are quite likely to blow up if the wrong type of relay is used, and many amateurs hunt for weeks to find a really good relay with 'N' type sockets, and which shorts the RX socket when on transmit. Another useful hint concerns the switching of GaAsFETS. For these to last as long as possible without noise figure degradation, the main gates should be biased slightly negative. If DC power is applied to both the relay and the GaAsFET on receive, the GaAsFET should have a time delay built into its power supply so that only a very small DC voltage appears on it until the relay couples the input circuit correctly. This avoids instability caused by an open circuit as the relay is going over and, once a device takes off, it may continue to oscillate. You may find an entire mast head pre-amp installation working perfectly when you test it in the shack, but the slightly different capacities or inductances in the cabling and antennas may cause a problem when you put everything at mast head. Make sure you check it out completely before you take your ladders away.

Finally, whilst on the subject of equipment, you should get to know your nearest microwave enthusiast before you start fitting pre-amps at the mast head, for in some areas there are various harmonics of UHF TV transmiters, or even specialised radar equipment which can give great problems to some types of pre-amp especially if their input coupling circuit is too wide in bandwidth. It is often better to sacrifice a small amount of noise figure for the sake of stability and a tighter bandwidth.

Conclusions

In comparing 2M with 23cm in 1983 it is fascinating that many microwave QSOs are at considerable distances on SSB, whereas most average 2M ones tend to be more local. This is partly due to the fact that there are far fewer amateurs who are active on 23cm, and therefore you have to look further a field for QSOs, and partly because the average 23cm addict is more likely to have a aerial system with a typical gain of 20dBi. Don't be put off 23cm if you hear no activity; you may have to get used to finding out where it is. As there are more beacons on 23cm than 2M, it is usually easier to ascertain band conditions. There is very little FM activity on 23cm as opposed to 2M, although quite a number of mobile experiments on SSB and FM have been made. You can be sure that you will get a tremendous welcome on 23cm, and technical expertise is easy to find on the band. Interference is minimal, for both household devices and car ignition have hardly any microwave output, and only occasionally do I pick up ignition from an incredibly badly suppressed passing "banger". Thermostats should not give trouble, and because general interference is so low into the aerial, you will almost certainly be able to pick up solar noise, and many amateurs make a point of measuring this in the early morning or at sunset to have a look at the state of the sun. Moon bounce (eme) is very effective, and I have heard some astonishing cassette recordings made by G3WDG in which, using a dish, he received signals at around 20dB above noise bouncing off the moon. I have heard so many stories of amateurs working astonishing DX within a week of starting up on the band, and so I sincerely hope that you will be encouraged to have a go on microwave. Getting going is nowhere near as difficult as you might have thought.

23cm Beacon List

GB3NWK	1296.810	AL51B
GB3BPO	1296.830	AM77J
GB3FRS	1296.850	ZL57J
GB3AND	1296.870	ZL63B
GB3DUN	1296.890	ZL08E
GB3CLE	1296.910	YM48H
GB3MLE	1296.930	ZN32B
GB3EDN	1296.990	YP05G
PA0QHN	1296.990	YP05G
ON5SHF	1296.880	BK39J
DB0JO	1296.854	DL48A
OZ7IGY	1296.930	GP23C
SK6UHG	1296.925	FR29G
DB0VC	1296.920	F051J