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BARCLAYCARD VISA

Access

An independent UK company designing, manufacturing and selling radio communication technology
Partners A. Wood M. P. Telkman

WOOD & DOUGLAS

QUALITY RADIO KITS

Amateur Product Profile

1984

The Wood & Douglas Partnership is an independent British company that has progressed over the past seven years from humble part-time beginnings to it's current professional capacity. The initial product range for the VHF/UHF communication spectrum was devoted to the radio amateur market and was entirely in kit form.

The all important design considerations of normal production techniques are greatly magnified when applied to kit manufacture and distribution. The product could be assembled by all manner of technical ability and therefore must be precisely designed to guarantee reproducibility.

The obvious high quality of these kit products led to an increase in demand from the professional market for a parallel range capable of meeting a much more exacting requirement such as MPT specification.

Wood & Douglas now offer the OEM market a unique facility for designing professional high quality communication products from minimum customer specification. Our reputation has made it unnecessary to advertise our capabilities with the commercial market, such is the constant demand.

The current production facility at Aldermaston occupies 2000 square feet on two floors. Product assembly is by local part-time staff. There are full-time staff for design, test, managing and administrative functions. The partners are from Ministry backgrounds and are therefore familiar with professional practices and techniques. The facilities in terms of test equipment and expertise are outstanding for such a young organisation.

The Company's unique facility for designing professional high quality communication products has guaranteed a steady increase in business over our full-time trading period. The increased awareness of the OEM market to radio as a medium can only enhance our reputation and capabilities in the years to come.

CONTENTS

KIT AND MODULE PRICE LIST

Package Prices

		Kit
1. 500mW TV Transmit	(70FM05T4 + TVM1 + BPF433)	35.00
2. 500mW TV Transceive	(As 1 above plus TVUP2 + PSI 433)	60.00
3. 10W TV Transmit	(As 1 above plus 70FM10 + BDX35)	65.00
4. 10W TV Transceive	(As 2 above plus 70FM10 + BDX35)	90.00
5. 70cms 500mW FM Transceive	(70'T4 + 70'R5 + SSR1 + BPF)	75.00
6. 70cms 10W FM Transceive	(As 5 above plus 70FM10)	105.00
7. 2M Linear/Pre-amp 10W	(144PA4/S + 144LIN10B)	40.00
8. 2M Linear/Pre-amp 25W	(144PA4/S + 144LIN25B)	42.00
9. 70cms Synthesised 10W Transceive	(R5+SY+AX+MOD+SSR+70FM10)	150.00
10. 2M Synthesised 10W Transceive	(R5+SY+SY2T+SSR+144FM10A)	120.00
11. 2M Crystal Controlled 10W Transceiver	(R5+T3+BPF+144FM10+SSR)	85.00
12. 70cms Linear/Pre-amp	(70LIN10+70PA2/S)	45.00

70cms EQUIPMENT

	CODE	ASSEMBLED	KIT
Transceiver Kits and Accessories			
FM Transmitter (0.5W)	70FM05T4	48.00	28.75
FM Receiver (with PIN RF c/o)	70FM05R5	65.40	45.80
Transmitter 6 Channel Adaptor	70MC06T	21.30	14.25
Receiver 6 Channel Adaptor	70MC06R	25.20	17.90
Synthesiser (2 PCB's)	70SY25B	88.00	62.25
Synthesiser Transmit Amp	A-X3U-06F	34.15	22.10
Synthesiser Modulator	MOD 1	8.95	5.50
Bandpass Filter	BPF 433	6.50	3.30
PIN RF Switch	PSI 433	7.55	5.35
Converter (2M or 10M i.f.)	70RX2/2	27.10	20.10
TV Products			
Receiver Converter (Ch 36 Output)	TVUP2	27.50	22.80
Pattern Generator (Mains PSU)	TVPG1	42.25	36.50
TV Modulator (For Transmission)	TVM1	9.85	5.75
Ch 36 Modulator (For TV Injection)	TVMOD1	9.80	5.50
Power Amplifiers (FM/CW Use			
50mW to 500mW	70FM1	18.45	12.80
500mW to 3W	70FM3	23.45	17.80
500mW to 10W	70FM10	41.45	33.45
3W to 10W	70FM3/10	23.95	18.30
10W to 40W	70FM40	65.10	52.35
Combined Power Amp/Pre-Amp (Auto Changeover)	70PA/FM10	56.60	40.15
Linears			
500mW to 3W (Straight amp, no changeover)	70LIN3/LT	27.90	19.90
3W to 10W (Auto Changeover)	70LIN3/10E	41.05	30.15
1W to 7W (Auto Changeover)	70LIN10	44.25	32.50
Pre-Amplifiers			
Bipolar Miniature (13dB)	70PA2	8.10	6.50
MOSFET Miniature (14dB)	70PA3	9.65	7.50
RF Switched (30W)	70PA2/S	24.25	15.25
GaAs FET (16dB)	70PA5	20.10	12.80
6M EQUIPMENT			
Converter (2M i.f.)	6RX2	28.40	20.80

2M EQUIPMENT

Transceiver Kits and Accessories			
FM Transmitter (1.5W)	144FM2T3	39.35	26.30
FM Receiver (with PIN RF Changeover)	144FM2R5	65.50	47.20
Synthesiser (2 PCB's)	144SY25B	78.75	60.05
Synthesiser Multi/Amp (1.5W O/P)	SY2T	27.80	20.65
Bandpass Filter	BPF 144	6.50	3.30
PIN RF Switch	PSI 144	7.55	5.35
Power Amplifiers (FM/CW Use)			
1.5W to 10W (No Changeover)	144FM10A	24.15	18.50
1.5W to 10W (Auto-Changeover)	144FM10B	36.11	26.25
Linears			
1.5W to 10W (SSB/FM) (Auto Changeover)	144LIN10B	38.40	28.50
2.5W to 25W (SSB/FM) (Auto " ")	144LIN25B	40.25	29.95
1.0W to 25W (SSB/FM) (Auto " ")	144LIN25C	44.25	32.95
Pre-Amplifiers			
Low Noise, Miniature	144PA3	8.60	7.40
Low Noise, Improved Performance	144PA4	12.86	8.40
Low Noise, RF Switched, Full Changeover	144PA4/S	24.30	15.30
GENERAL ACCESSORIES			
Toneburst	TB2	6.70	4.25
Piptone	PT3	7.50	4.45
Kaytone	PTK3	8.75	6.05
Relayed Kaytone	PTK4R	12.70	8.20
Regulator (12V, low differential)	REG1	6.95	4.40
Solid State Supply Switch	SSR1	5.85	3.70
Microphone Pre-Amplifier	MPA2	6.10	3.50
Reflectometer	SWR1	6.35	5.35
CW Filter	CWF1	8.55	5.80
TVI Filter (Boxed)	HPF1	5.95	-
FM TV MODULES			
50mW 420MHz Source (Video Input)	UFM01	26.95	19.80
50MHz i.f. Processor	VIDIF	54.25	38.95
Varactor Multiplier (Boxed)	WDV400/1200	63.95	-
	(MD05T	41.55	31.50
	(BPF384	6.50	3.30
	(4FM2R5	65.95	47.75
	(4FM2T3	43.75	30.70
The following are still	(4PA4	12.86	8.40
available, for further	(4PA4/S	24.30	15.30
details please contact	(DISP 1/2	24.95	18.00
our sales department.	(PROSCAN	26.95	17.30
	(SLF1	9.80	7.85
	(BE1	4.80	3.50
	(144LIN10A	34.10	26.08

The above prices include VAT at the current rate. Please add 75p for postage and handling to your total order. Delivery is from stock whenever possible but please allow 28 days. Any delay will be notified.

*** THESE PRICES ARE VALID UNTIL 31st DECEMBER 1984 ***

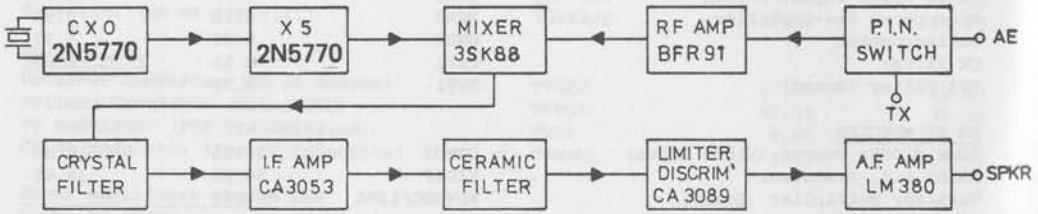
70cms FM TRANSCEIVER SYSTEM

This transceiver system was the first kit that we produced and has now sold in excess of 500 in the UK alone. It is a simple, economical means of 'getting on 70' without sacrificing performance. The addition of the synthesiser, introduced in April 1981, makes the complete transceiver a truly versatile, cost effective alternative to almost any ready built 'black box' system. In low budget, commercial applications the 70cms RF boards, with only minor modifications, can be re-tuned anywhere within the 400 - 500MHz range. Alternatively, we can offer industrial users a variety of boards desiged to a much higher specification.

The present 70cms design range incorporates the 70FM05R5 FM Receiver, the 70FM05T4 Transmitter, the 70SY25B Synthesiser, the 70MC06R Multi-Channel Receiver Adaptor and the 70MC06T Multi-Channel Transmitter Adaptor boards. Brief details of the receiver and transmitter are given below. A separate sheet, 'Multi-Channel Operation on 70cms', details the synthesiser and the two adaptor boards.

70FM05R5 FM Receiver

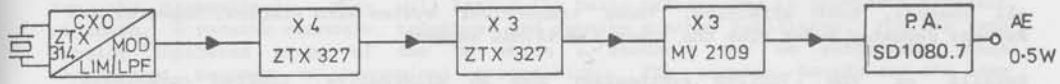
The Mk.V receiver board was introduced in April 1981 and supersedes all previous issues. As a result of sales experience, it incorporates a number of modifications which give it a much improved performance. It is intended for single channel use and therefore, will accept only one crystal. However, multi-channel operation can be achieved by the addition of either the 70SY25B synthesiser or the 70MC06R receiver adaptor.



Sensitivity	:	0.3uV for 12dB SINAD (typical) @ 3KHz deviation, 1KHz modulation.
AF Output	:	1 to 1.5W into 8ohm.
Power Supply	:	12V negative earth, 60-70mA at minimum volume. (The current can be reduced by using the BE1 Economiser, please ask for details).
Crystal	:	84MHz, HC18/U series resonant as used in the Pye PF1.
IF Bandwidth	:	15KHz (25KHz spacing) as standard (50KHz spacing to order) 10.7MHz, 8 pole crystal filter with 90dB stopband.
Squelch	:	Noise operated external to CA3089/KB4420B.
Overall Size	:	1.5" width x 6.05" length x 0.75" height.

70FM05T4 FM Transmitter

The Mk.IV transmitter is a 500mW nominal output exciter strip with audio modulator and toneburst input. This is also a single channel module which can be extended in capability by adding either the synthesiser or the associated multi-channel adaptor.



Output	:	500mW nominal (+27dBm) @ 12V.
Mic. Input	:	High impedance (typically 82K) 2.5mV basic sensitivity.
Power Supply	:	12V negative earth @ 150-160mA. (CXO is stabilised down to 10.5V).
Crystal	:	12MHz, HC18/U 30pF parallel resonant as used in the Pye PF1.
Audio Section	:	Limiter and low-pass filter; Separate input point for toneburst; Microphone gain and deviation are preset adjustable.
Spectrum	:	Spurious outputs will be typically 40dB down on the wanted signal; Where this is considered to be too high the BPF433 can be added; The addition of any of the power amplifiers will also reduce the unwanted outputs.
Overall Size	:	1.2" width x 6.05" length x 0.55" above and 0.6" below the PCB.

Kits consist of the PCB and component parts. To construct a transceiver, you will also require a pair of crystals, microphone (preferably high impedance dynamic), speaker, volume and squelch controls, and a single pole changeover relay or the SSR1 relay board for T/R switching. A suitable case is also required. Many extras can be added to the two transceiver boards to increase the system power and sensitivity and to provide frequency scanning and toneburst facilities.

Whilst these boards are well designed and reproducible they represent a considerable undertaking for an inexperienced constructor. Access to a frequency counter is required for correct alignment. Anyone in doubt as to their ability can save considerable heartache and expense by purchasing ready assembled and tested modules.

MULTI CHANNEL OPERATION ON 70cms

The 70SY25B was introduced in April 1981 to greatly enhance the capability of the basic 70cms transceiver. A separate sheet '70cms Transceiver System' gives details of the 70FM05R5 receiver and the 70FM05T4 transmitter boards.

The truly versatile combination of the transmitter, receiver and synthesiser makes an all channel, cost effective, 70cms transceiver system with Simplex, Repeater and Reverse Repeater modes plus the lower 432-433MHz segment.

Details of the 70SY25B synthesiser and an alternative, limited capability, multi-channel facility are outlined below.

70SY25B 70cms Synthesiser

This module generates synthesised output frequencies to cover the ranges 432-432.975 MHz and 433-435.475MHz in 25KHz steps although it operates at one-third of the output frequency i.e. 140-145MHz. The synthesiser has an additional output, offset by 10.7MHz to cater for the receiver local oscillator signal. Only minor modifications are needed to interface the synthesiser to the 70FM05R5 receiver and 70FM05T4 transmitter boards. The printed circuit boards are the same size as those used in the 2M version and use the same control logic. Channel numbers are selected by bcd thumbwheel switches.

Coverage	:	432 - 432.975 (Low) 433 - 435.475 (Simplex 00 - 99) - All in 25KHz steps 433 - 433.475 (Repeater 00 - 19) Frequency selection is by 8 data lines, i.e. channel number in bcd form. Thumbwheels are not supplied - refer to components list. Mode selection is by 2 bits giving 10 bit bcd total control.
Outputs	:	One-third final frequency, i.e. 140-145Mhz in 8.3333KHz steps using VHF VCO. Output level typically 20mW (+13dBm) on transmit, 4mW (+6dBm) on receive. Both ports are separately buffered. Spurious outputs typically better than 60dB below the desired outputs.
Toneburst	:	Crystal controlled - automatic on repeater (or if needed, on reverse repeater for Region 1 use).
Power	:	12V nominal @ 55mA. The logic board includes the REG1 regulator circuit; MOSFET and Bipolar devices for the VCO; Conventional double-sided PCB's.
Overall Size	:	Logic board 4.2 x 3.15. VCO board 3.6 x 2.1. (NB: These both fit standard diecast box sizes - refer to spare parts list).

An alternative to buying the 70FM05T4 transmitter for use with the synthesiser is to purchase the A-X3U-06F module. This is a shortened UHF transmitter designed specifically for the 70SY25B. It accepts the 20mW (nominal) signal at 144MHz and multiplies this to the 70cms band at a 500mW level. The board measures 4.0" x 1.2" and has the BPF433 bandpass filter included at the output. Current consumption is approximately 120mA. The A-X3U-06F can also be used to convert a typical 2M transceiver, such as the FT221R, which has a low power output suitable for transverters, into a low-cost VFO controlled 70cms exciter. This is readily achieved by using a simple matching pad to link the units.

The 70SY25B has no modulation facilities since the 70FM05T4 modulator strip, on conversion, is usually adapted for this purpose. If the A-X3U-06F is used then the MOD1 unit can be added to give the correct audio level for the synthesiser. This will then provide an LED modulation indicator. The MOD1 PCB measures 2.5" x 1.2" and consumes very little current.

A budget kit package, coded Package No: 9, which includes the 70FM05R5, 70SY25B, A-X3U-06F, MOD1 and SSR1 can be supplied at a little more than half the cost of an equivalent 'black box' system.

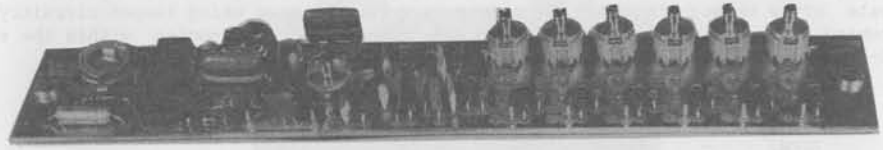
70MC06R / 70MC06T Multi Channel Adaptors

These boards can be bought separately, the 70MC06R for the receiver and the 70MC06T for the transmitter. They will extend the basic transceiver to provide 6 transmit channels, 6 receive channels, toneburst and receive scanner facilities. For the less densley populated areas of the UK where 6 channels may be sufficient, this arrangement becomes an economical proposition. The adaptor boards are the same length as the transmitter and receiver PCB's i.e.
6.05", and are approximately 1.1" wide.

The complete 6 channel system (70FM05R5, 70FM05T4, 70MC06R and 70MC06T) can be supplied as a package.

NB: It should be noted that 70MC06R and 70MC06T boards will be discontinued should demand fall following the introduction of the 70SY25B synthesiser.

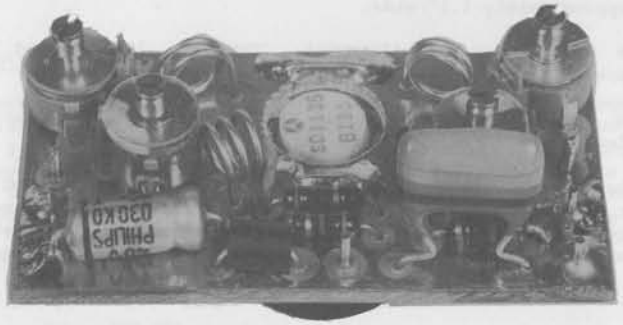
Whilst these boards are well designed and reproducible they represent a considerable undertaking for an inexperienced constructor. Access to a frequency counter is required for correct alignment. Anyone in doubt as to their ability can save considerable heartache and expense by purchasing ready assembled and tested modules.



70CMS ACCESSORIES

The popularity of our 70cms FM transceiver has led to a demand for add on modules to increase the communication capability. These products will also find application with current generation imported equipment and the older ex-PMR mobiles.

Power Amplifiers



A range of boards configured for class C operation are available to provide output levels of 1W through to 40W. The modules are very compact using lumped circuitry for matching. The boards will re-tune for commercial frequencies within the range 380-470MHz with only minor modification.

70FM1	-	50mW	to	500mW	(1" x 1.75")
70FM3	-	500mW	to	3W	(1" x 1.75")
70FM3/10	-	3W	to	10W	(1" x 1.75")
70FM10	-	500mW	to	10W	(1" x 2.75")
70FM40	-	10W	to	40W	(3" x 5.50")

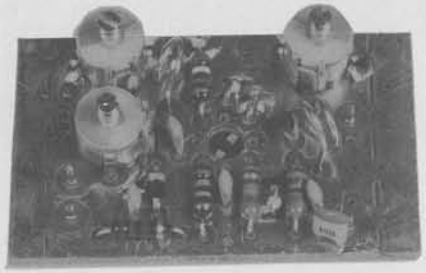
Power levels up to 10W can be passed through the 70FM05R5 front end PIN assembly providing BA379 diodes are fitted in the receiver. The 70FM40 has a low pass filter as part of the assembly. Amplifiers up to the 10W level employ the device cooling stud for mounting purposes. The 70FM10 can be series modulated for TV applications using the TVM1 and an external pass transistor, ask for details.

Pre-Amplifiers

While not claiming to be 'state of the art' our pre-amps are as near as a home constructor could hope to achieve without access to sophisticated test equipment. Every endeavour is made to use the latest devices to yield a cost effective performance.

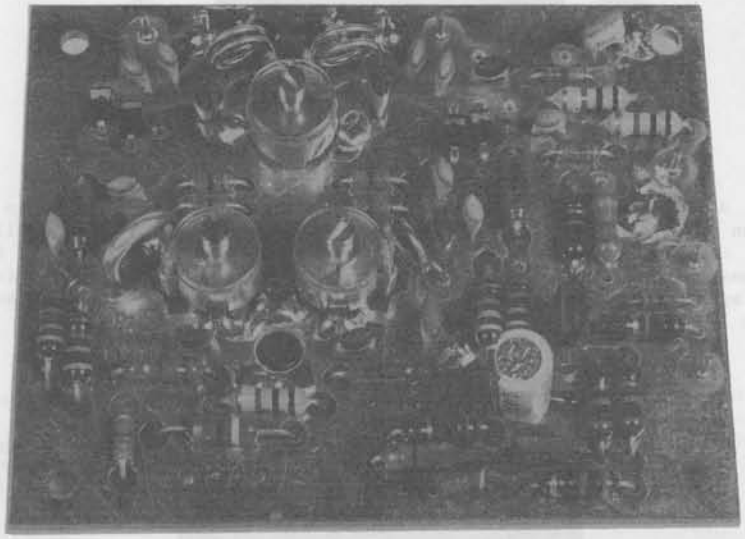
70PA2 - A basic bipolar low noise pre-amp giving typically 12-14dB gain and with the NE219 device a noise figure of under 2dB. The board has two input diodes for protection from transient r.f. signals. Board size 1.25" x 1.0".

70PA3 - A MOSFET amplifier dimensioned on the 144PA3 PCB. The gain is slightly higher than the 70PA2, 16dB typical but noise figure slightly worse, typically 2.5dB. The input circuitry has a PIN diode protection circuit to de-sense the front end during transmit periods or possibly as an r.f. gain control during receive mode. There is space for a line choke to allow masthead power supply via the co-ax. Board size 1.4" x 1.1".



70PA5 - A dual gate GaAs MESFET pre-amp using a 3SK112 or similar device. The noise figure will be typically 1.8dB and gain 16dB. These values could be improved by experienced constructors with minor changes to the board. Our usual input PIN protection circuit and post amplifier attenuator/line feed facilities are fitted as standard. This board is currently the best we offer for 70cms. Board size 2.6" x 1.2"

70PA2/S - The 70PA2 circuitry with two PIN switches and r.f. sensing provides a compact remote assembly for masthead or mobile applications where there is no room for the pre-amp in the rig. The board will handle up to 30W of through power with an insertion loss of 0.8dB typically. The changeover can be manually initiated or automatically by r.f. down to 50mW input power. There is a 'hang time' constant for SSB operation to delay changeover. Masthead coax feed facilities are standard on the PCB requiring the addition of a single choke. If the d.c. supply is disconnected the board is 'straight through' in both receive and transmit. See Sept 83 Practical Wireless for a review of this PCB. Board size 2.3" x 1.8".



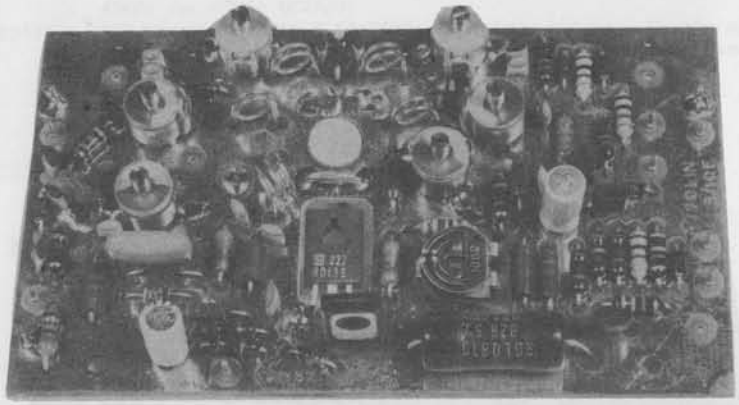
Linears

Three linears are available to date, with ATV or SSB applications in mind.

70LIN3/LT - A 500mW to 3W linear as successfully used in the ATV1/2 ATV transmitters. The module can be used to follow low level ATV transmitters or perhaps to buffer a free running oscillator at UHF for FM TV applications. Changing the device for a TP3095 will allow Band IV operation. Board size 3.0" x 1.1".

70LIN10 - This module is based on our popular 70LIN3/10E PCB which incorporates not only a well designed linear amplifier stage but also a temperature compensated bias network and full r.f. changeover facility. The PIN diode circuitry allows a straight through path during receive periods or when the power supply is disconnected making the unit failsafe to accidental damage. If you wish to use it for SSB transmissions the internal 'hang-time' will be advantagous as will the hard switching capability. Just apply 1.5W of drive for 10W output or 1W for typically 7W output!

70LIN3/10E - A fully r.f. sensed 3W to 10W linear designed specifically for the ATV1/2. The board has a full PIN c/o assembly allowing 'straight through' operation in receive mode or with the power supply disconnected. The sensing is either automatic down to a 50mW input level or via manual overide terminals. There is an SSB 'hang time' constant. The outstanding feature of this board is the very precise thermal tracking of the PA device quiescent current with temperature negating any chance of thermal run-away. For ATV there is a waveform demodulator allowing oscilloscope inspection of the video envelope. This is a complex board requiring careful electronic and mechanical assembly. It measures 3.6" x 2.1".



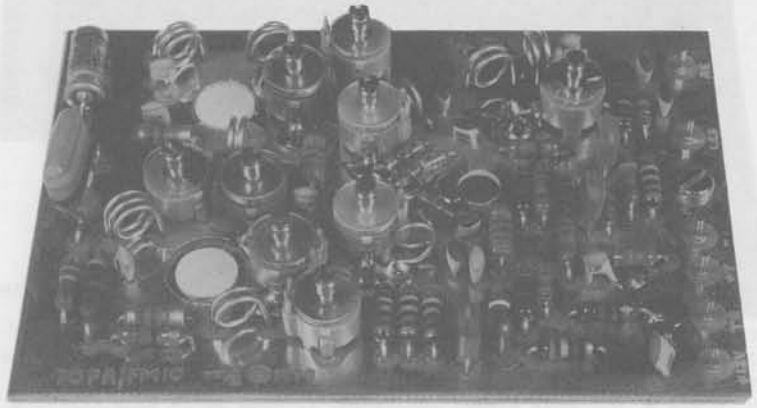
70cms General Accessories

BPF433 - A discrete component bandpass filter for use up to 20W power level. Insertion loss typically 1.2dB. Board size 1.75" x 1.0".

PSI 433 - A single section PIN switch for switching up to 20W. This replaces conventional mechanical relays with a fast acting, smaller assembly. Insertion loss will be 0.5dB typically and isolation 16-20dB. Board size 0.9" x 1.25".

70RX2/2 - A receive down converter to 10M or 2M of the 432-434MHz section of 70cms. The addition of the second oscillator crystal (not supplied as standard in the kit, but available from us) will increase the coverage to 436MHz, so allowing OSCAR output monitoring. Conventional circuitry will yield a conversion gain of typically 25dB and a 2dB noise figure. Board size 3.5" x 1.75".

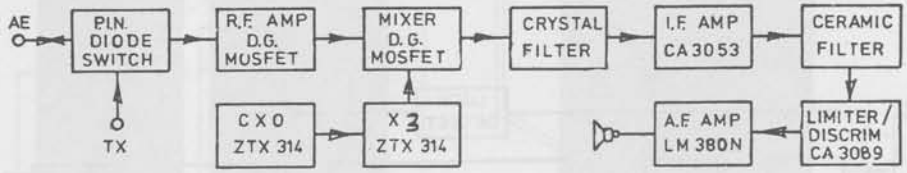
70PA/FM10 - A combined version of the 70FM10, 70PA2 and PSI433 boards with r.f. sensing and manual c/o overide. It represents a considerable saving in time and money from using the board discretely in the same configuration. The assembly is 'stand alone' and could be used with drive levels up to 1W as detailed in the kit notes. Board size 3.1" x 2.1".



2M FM Transceiver System

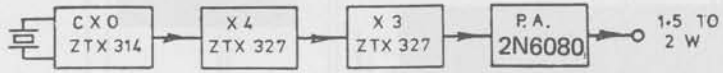
Our very popular 2M system can be built up as required. The basic transmit and receive boards can be used independently and at a later date the 144SY25B can be added to give all channel coverage at 2M. For those who wish to buy the whole system outright we can supply a package of 144SY25B, SY2T and 144FM2R at a cost saving price. The SY2T is a shortened transmitter especially for synthesiser use and has no modulator included. The RF circuitry is the same as the 144FM2T. The system can be added to at a later date by our range of power amplifiers, pre-amplifiers etc.

FM Receiver Single channel, single conversion superhet with PIN c/o.



Sensitivity	:	0.3uV for 12dB SINAD @ 3KHz deviation, 1KHz modulation.
A.F. Output	:	1 to 1.5W into 8R
Bandwidth	:	15KHz @ 10.7MHz (for 25KHz channel spacing)
Squelch	:	Noise operated (external to CA3089)
Crystals	:	45MHz (or 67MHz HC25/U)
Power Supply	:	12V negative earth @ 60-70mA at minimum volume. On the single channel system this can be reduced using the BE1 economiser, (please ask for details).
Size	:	1.5" x 6.05" Overall Height 0.75"

FM Transmitter Single channel, varicap FM modulator.

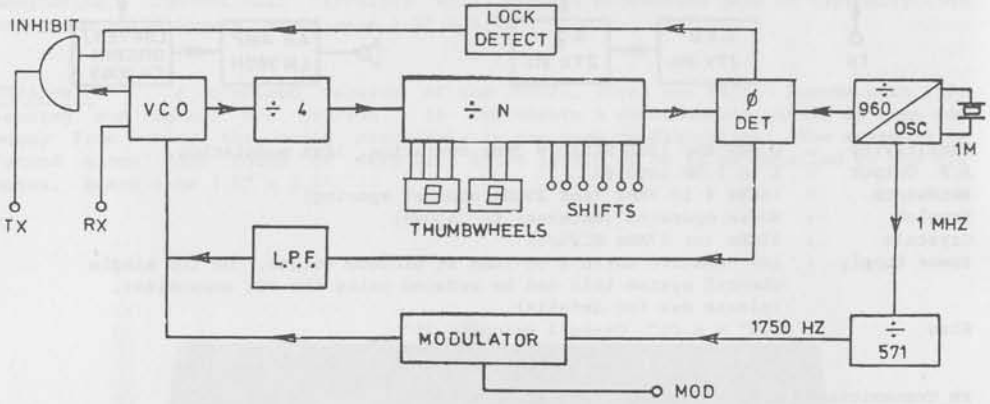


Output	:	1.5W to 2.0W.
Mic Input	:	82K, 2.5mV basic sensitivity, gain adjustable. (High impedance dynamic mic. is preferred).
Crystals	:	12MHz Range (TR2200 etc.)
A.F. Stage	:	Includes limiter and low pass filter, mic gain and deviation adjustable.
Spectrum	:	Spurious outputs 40dB below 1.5W.
Power Supply	:	12V negative earth @ 300mA. CXO stabilised to 10.5V.
Size	:	1.2" x 5.45" Height limits are xtal and PA stud.

2M Synthesiser

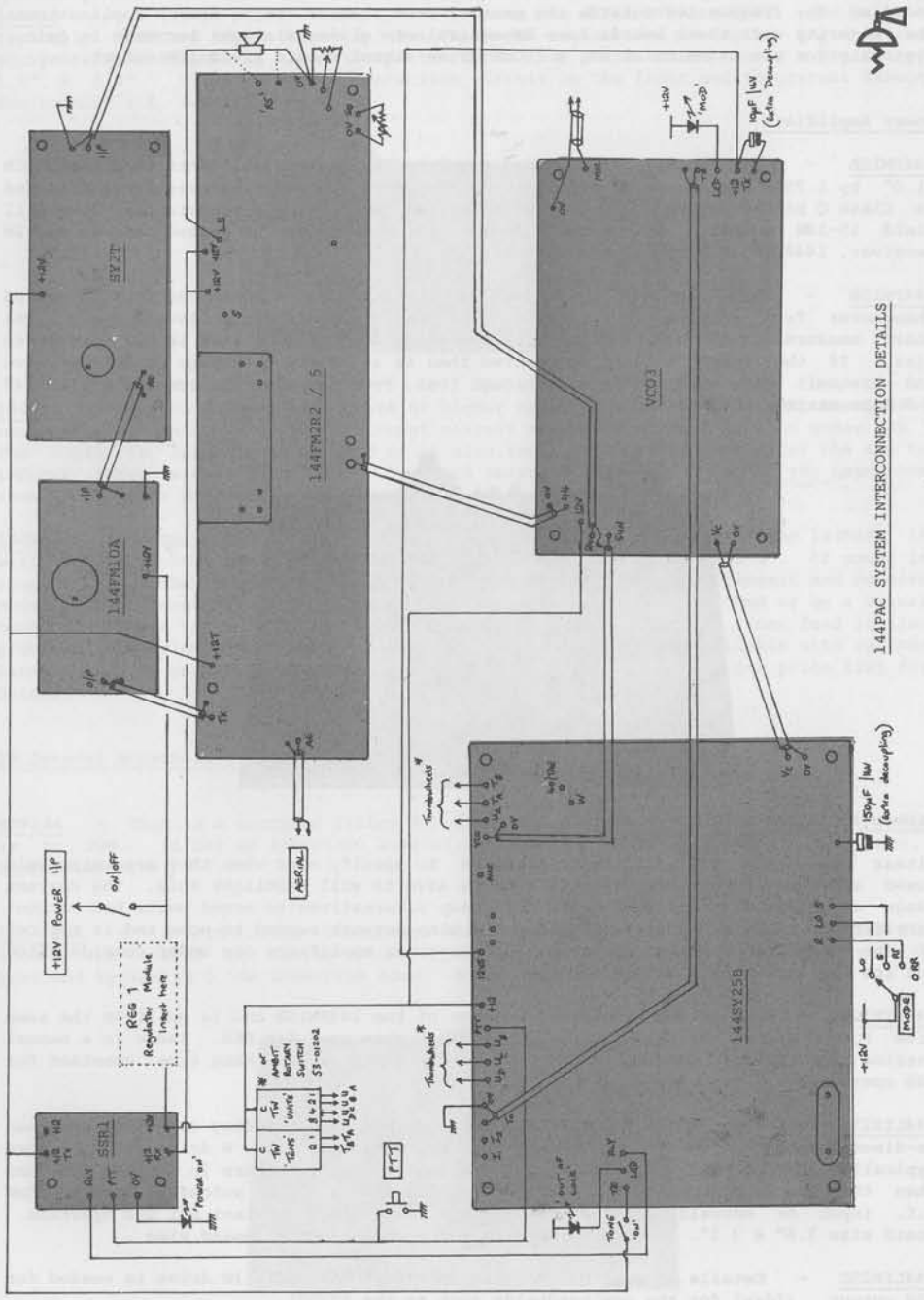
144SY25B - A new version of the very popular 144SY25. This has much simplified control logic not only for frequency but also for mode. This simplifies interfacing to a scanner. The board is plated through to ease construction and there are buffered outputs at either 12MHz or 6MHz available for transmit multiplication. Other features include crystal controlled toneburst, out-of-lock inhibit, full band coverage and ±600KHz repeater shift.

The synthesiser interfaces with our current 144FM2TR transceiver system. It will also adapt to any other commercial equipment using 12-24MHz transmit and 45MHz receive crystal frequencies (e.g. TR2200 etc.)



Features

Coverage	:	144-146MHz
Output Frequencies	:	24MHz transmit, 45MHz receive, (also 12MHz & 6MHz on TX)
Channel Spacing	:	25KHz @ 144MHz
Offsets	:	±600KHz repeater
Facilities	:	Modulator, crystal controlled toneburst, out of lock inhibit, bcd encoding in channel number (e.g. thumbwheels).
Technology	:	CMOS, LSTTL on two double sided PCB's.
Power	:	12V @ 100mA
Size	:	Digital board 4" x 3.5" VCO Modulator 2" x 3.5"



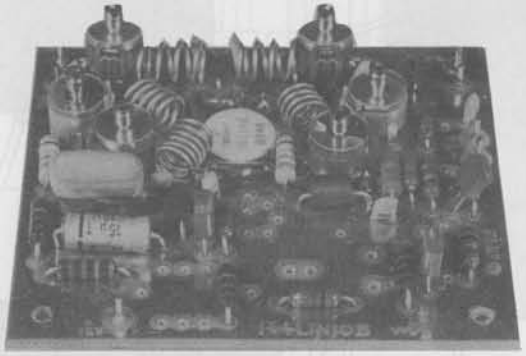
2M ACCESSORIES

The following are available to increase the potential of our 144MHz transceiver system and also any other similar equipment. In many cases the circuitry can be modified for frequencies outside the amateur band such as PMR or marine applications. The majority of these boards have 4M equivalents giving a slight increase in gain. Typically for the 144FM10A at 4M, a 200mW drive signal should yield 10W output.

Power Amplifiers

144FM10A - A 10W nominal output board requiring 1-2W of drive. This is a small PCB (1.0" by 1.75") and uses a single device. The board has no changeover facilities and is Class C biased for FM use only. With typical current issue transistors, 1.5W will yield 15-18W output. The output from this module can be passed through our 2M receiver, 144FM2R, PIN changeover assembly.

144FM10B - This contains the 144FM10A circuitry and also automatic r.f. sensed changeover from receive to transmit. The same drive and output levels apply. The board measures 2.4" by 2.1" and fits the small diecast as listed in our components list. If the board is left un-powered then it is straight through in both receive and transmit mode with negligible through loss. Power supply requirements are 12-14V @ 3 Amps maximum.



Linear Amplifiers

Linear amplifiers are difficult products to specify even when they are being sold boxed and ready to go. Reading the Rad Com adverts will highlight this. The current range of linears in kit form represent cheap alternatives to boxed units but without sacrificing quality. The 144LIN25B has a bias network second to none and is typical of the standard we set ourselves. Higher power amplifiers are under consideration but for the moment this is the choice:

144LIN10B - This is the linearised version of the 144FM10B and is built on the same size PCB. Output is linear to 10W nominal when used for SSB. There is a manual overide for the r.f. sensing for very low drive levels and a 'hang time' constant for SSB operation.

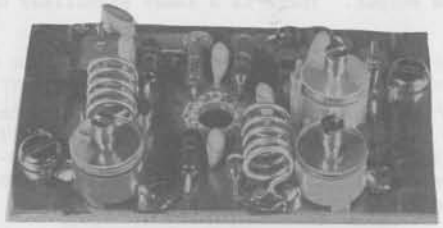
144LIN25B - The 70LIN3/10E PCB with the accurate bias tracking circuitry has been re-dimensioned for 2M use. This board now requires 2-3 W drive at 2M to give typically 25W output. The 'straight through' facility occurs in receive mode and when the PSU is disconnected. The r.f. sensing can be either automatic down to 50mW r.f. input or manually enabled. There is a 'hang time' constant for SSB opertion. Board size 3.6" x 2.1". See 70cms details for a photograph of board size

144LIN25C - Details as per the 'B' version except that only 1W drive is needed for 25W output. (Ideal for the new handhelds such as the FT290).

Pre-Amplifiers

There are now three available.

144PA3 - A very popular small pre-amp using the 3SK88/BF981 MOSFET. The gain is typically 20dB and noise figure 2-3dB. The board is intended to improve any existing equipment where space is tight inside the case. The board can be cut to a minimum of 1.4" x 1.1". There is a PIN protection circuit on the front end to prevent damage due to high r.f. levels.



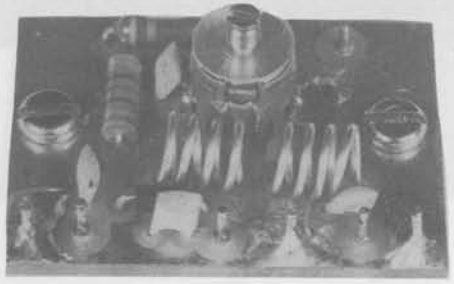
144PA4 - Due to demand for a board of higher specification than the PA3, the 144PA4 was evolved. This has a low loss input circuit to reduce noise figure to under 2dB. The board is larger than the PA3 as it also includes an attenuator after the amp to improve large signal handling. The board measures 2.9" x 1.25" so if you have room then it is to be prefered to the 144PA3.

144PA4/S - Again due to demand this is an r.f. switched version of the 144PA4. It will handle through powers up to 30W. The board is larger, 2.9" x 2.2". If power is removed from the module then it becomes straight through in transmit and receive mode. The changeover can be fully r.f. controlled down to 50mW or by a manual overide. There is an SSB 'hang time' delay. The facility for d.c. coax feed is also provided requiring one additional choke. The 144PA4/S is available with various linears as a package price with a saving in overall cost. See price list for details.

2M General Accessories

BPF144 - This is a bandpass filter for 2M using discrete components and will handle up to 20W. It has an insertion loss of 1dB and can be re-tuned over a wide range. Board size 1.75" x 1.0".

PSI 144 - A PIN diode changeover module to replace mechanical relays. The PIN diodes are biased on during transmit periods to give 26dB isolation to the receive port and typically 0.5dB insertion loss. Board size 0.9" x 1.3".



GENERAL ACCESSORIES

TB2 Toneburst

A CMOS RC oscillator giving a gated audio burst for 500mS when triggered by a positive line such as a transmitter power supply. The audio tone is adjustable over the range 1700 - 1800Hz. The tone can be enabled continuously or inhibited with further control lines. There is a preset adjustable output at microphone level and also an unbuffered CMOS output. There is a zener stabiliser on the PCB. Board size 1.5" x 1.5".

PT3 Piptone

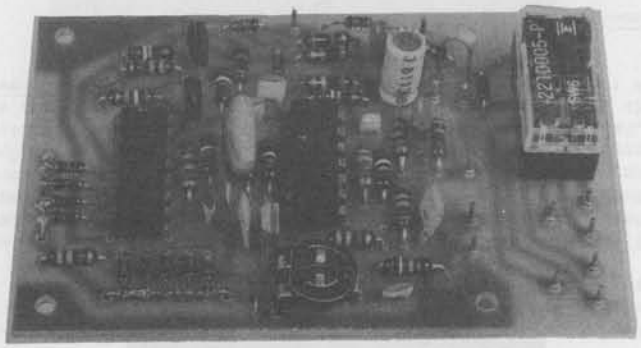
A CMOS controlled audio burst generator for end of transmission indication. The tone frequency is nominally 1KHz and lasts for 300mS. The board fits in series with the PTT line on the rig. It is disabled when the power supply (9-14V) is disconnected. There is an LED driver to indicate the tone presence. The module can be fitted inside or outside the rig and measures 2.1" x 1.25".

PTK3 Kaytone

Similar in function to a piptone, the PTK3 generates a morse character instead of a single audio burst at transmission end. The character is selectable up to nine bits in length via the on-card diode matrix. The popular choice is 'K' for amateur applications. By fitting all the diodes the board reverts back to being a piptone. Adjustable output level, LED driver and power supply disable details are as the PT3. The module measures 2.5" x 2.0".

PTK4-R Kaytone

A version of the PTK3 having a relay output interface for driving multi-function changeover lines on typical CB equipment. The relay can also help on some amateur rigs where a very low switching threshold is needed. Board size 3.0" x 2.0".

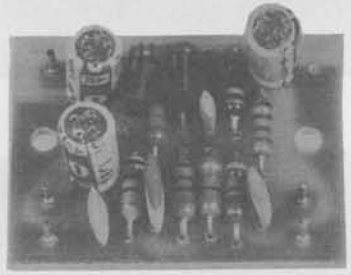


REG1 Regulator

This regulator module requires a very low differential voltage to stabilise. Typically a 12V input would be held to 11.7V at low current consumption. This is ideal for mobile equipment where the highest possible power supply voltage is needed to ensure reliable operation. Most manufactured 'three-legged' regulators would need 2-3V differential to achieve the same stabilisation. This module is recommended for the 144SY25B synthesiser. Maximum current 1.5A. Maximum input voltage 15V. Board size 2.1" x 1.1".

MPA2 Microphone Pre-Amp

The latest generation of our popular audio pre-amplifier giving 16dB gain and slight audio pre-emphasis. The output is buffered allowing greater tolerance of load impedance. The board is small, 1.25" x 1.0", and consumes only minimal of current so allowing 9-14V battery operation.



SWR1 Reflectometer

A printed directional coupler having a 50R through line and two 120R sensing lines. The Schottky diode detectors on each sensing line give a simultaneous indication of forward and reflected power. The board was originally dimensioned for 70cms but is useable at 2M and, providing the power is kept low, at 23cms also. The kit does not include meters or hardware, just the sensing element. Board size 4.0" x 1.25".

CWF1 CW Filter

A four stage fixed centre frequency audio filter. Each stage is centred on 750Hz and in cascade they give bandwidths of 180, 110, 90, 80Hz. Power supply is tolerant between 6-30V. The board will fit in the audio line of a rig either at high or medium impedance levels. Board size 4.4" x 1.5".

HPF1 TVI Filter

A boxed ready to use high pass filter. The coils are printed striplines giving a 3dB breakpoint at 450MHz and typically better than 60dB attenuation below 400MHz. Ripple across the TV band is under 2dB. The module also has a capacitive braid breaker included and mating Belling Lee connectors.

SSR1 Solid State Switch

This module should not be confused with a PIN RF switch. It performs a power supply changeover function initiated by taking a terminal to ground as a normal PTT line would do. The 'receive' and 'transmit' lines will carry up to 1A. There is an input for a synthesiser 'out of lock' inhibit line to disable the transmit power line if the synthesiser loop has gone erratic. Board size 1.2" x 0.9".

4M & 6M PRODUCTS

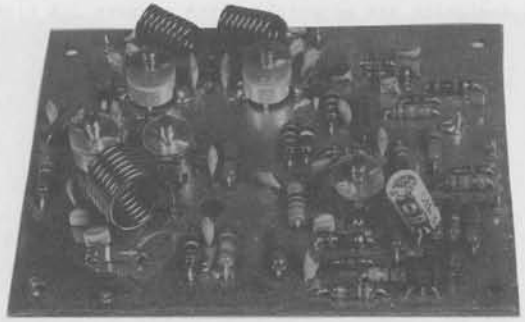
As mentioned elsewhere in the data sheets many of our standard PCB's for 2M and 70cms can be re-dimensioned electrically for other frequencies. Typical applications are for 4M and 6M.

4FM2T/R and 6FM2T/R

The 2M NBFM Transceiver boards will re-tune to give slightly improved receive sensitivity and 2W typical power out. All other factors remain the same except receive crystal computation which is simply final frequency required less 10.7MHz in a series resonant loading, HC25/U holder.

4PA4 and 4PA4/S

The equivalent 2M PCB's (144PA4 and 144PA4/S) give slightly higher gain (18dB typical) at 4M. Noise figure is little changed. These PCB's have not as yet been checked at 6M but will be, should the demand arise.



Power Amplifiers and Linears

All the 2M boards can be modified. Typically at 4M the 144LIN10B requires 200mW for 10W output.

6RX2 6M to 2M Converter

The assembly uses a little issued PCB, originally designed for 2M to 10M conversion. At the lower 6M frequency it yields the following features:

* 36dB Conversion gain
* 2MHz Bandwidth
* -60dB Skirt attenuation (44MHz and 60MHz)
* Small size 3.5" x 4.0"
* PIN diode input protection circuit (42dB range)
* RF gain control using separate PIN circuitry (38dB range)
* Facilities for a buffered local oscillator output for transverter applications.

A very useful PCB for 6M monitoring and should this band become generally available a specification and facility list to lead the market, as existing users will already testify.

MICROWAVE COMPONENTS

MD05T Microwave Drive Source - A 0.5W source on 384MHz suitable for multiplying and mixing to the microwave bands from 1152MHz upward. The unit has built-in modulation facilities for PM/FSK/CW.

Specification

Output Power	:	500mW nominal into 50R.
Input Power	:	+12V @ 150mA (CXO stabilised at 10.5V).
Source Crystal	:	96MHz or 94.666MHz HC18/U depending on application. (Please state which required when ordering).
Modulation	:	(1) A1 (CW) ground to transmit, driver stage keying.
	:	(2) F3 (ØM) at 96MHz.
	:	(3) F1 (FSK) direct on crystal using a varicap diode.
Audio Section	:	Microphone input has a basic sensitivity of 2.5mV and an impedance of 82K. The audio section includes limiting amplifier and low pass filter. The microphone gain and deviation are adjustable with presets. A high impedance dynamic mic. is preferred.
Spectral Purity	:	Spurious outputs are typically -40dB on the 0.5W output. This can be improved to better than -50dB using the BPF384.
Size	:	1.8" x 4.2". Height 0.55" above board and 0.60" below board.

The power output level can be increased to typically 40W maximum using any combination of our standard power amplifiers all of which will retune for 384MHz without modification (70FM1 , 70FM40). This higher power level is more suitable for varactor multiplication. A varactor multiplier for 23cms operation is currently under design and should be ready for issue in late May 1984 as a finalised product.

No matter what power level you finally anticipate the BPF384 bandpass filter should be added to the MD05T output to give a more spurious free signal, typically -50dBc.

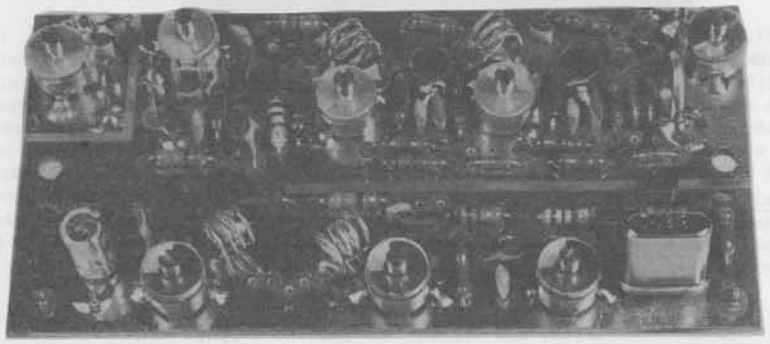
While both these products do not appear regularly in our popular lists they will remain available for the microwave enthusiast. Please enquire with our Aldermaston sales staff for current details and pricing.

AM TV PRODUCTS

TVUP2 Up Converter

The TVUP2 is an ATV receive signal 'transposer' in that it takes the 70cms amateur band and lifts it into the domestic TV band. A 70cms signal would then appear at channel 36 which is a gap frequency between Bands IV and V as used by the broadcasting authorities. Unlike competitor units the TVUP2 is crystal controlled to give more stable operation over the extreme conditions that it could meet from a windswept hilltop to a hot house shack. This will also help when very large signals are received from perhaps a local transmitter or your own monitor where 'pulling' could be encountered. To further ease local monitoring a de-sense input is fitted to reduce the front end sensitivity and therefore reduce converter non-linearities. The mixer output is passed to your TV receiver via a sharp r.f. filter to reduce unwanted outputs. Ths unit is available in kit form, as a modular tested board or fitted internally into the ATV-2.

Features:
* 30dB conversion gain (2 r.f. stages)
* Crystal controlled local oscillator (78MHz)
* ±4.5MHz Bandwidth
* -60dB de-sensing input for local monitoring



TVM1 TV Transmit Modulator

The modulation circuitry of the ATV1/2 is available on this single sided PCB to allow series modulation of any low level (500mW) exciter. The addition of an external pass transisitor will allow up to 2Amps source current for higher power (10W) stages, such as the 70FM10,

Features:
* 250mA source current, (2A with pass transistor)
* Colour or Monochrome BW selection
* Adjustable sync stretching circuitry
* Black level and video gain preset adjustable
* Small size - 3.5" x 1.0"

TVPG1 Pattern Generator

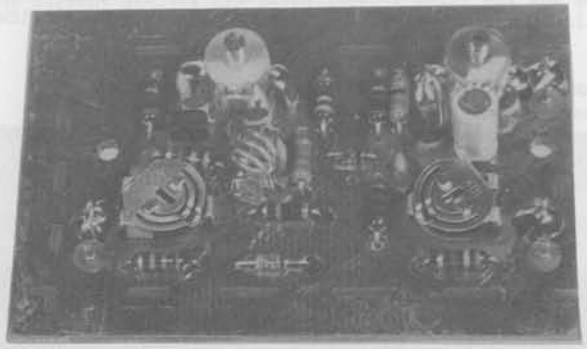
A single PCB pattern generator to give monochrome patterns for either 75R composite video levels or to an r.f. modulator for direct injection into your domestic TV or with re-tuning direct into your TVUP2 Up Converter at 70cms. The board can be powered from mains or dc input. The unit is available in kit or assembled PCB form.

Features:
* Output patterns - Grey Scale
  - Dots
  - Horizontal & Vertical Lines
  - Cross Hatch
* Composite video or r.f. modulator output
* 12V or mains supply
* Crystal controlled waveforms

TVMOD1 Channel 36 Modulator

A well designed, reliable alternative to imported modulators. This module allows any 75R video source to be fed into a standard TV set. The oscillator runs at half final frequency giving a very stable output signal over a wide range.

Features:
* 400 - 600 MHz frequency range
* Zener stabilised, low current consumption supply
* Modulation depth and video gain preset controls
* Small size - 2.5" x 1.75"



The increase in activity in UHF and microwave TV transmission has generated the debate of using either conventional AM systems or the more professional FM techniques. While AM is used and accepted at 70cms it has drawbacks and limitations. The need for linear amplification subsequent to any modulated stage is perhaps the most significant. At 23cms and above the 'cost per watt' of a linear transistor to any respectable power level is difficult to justify for the amateur budget. The use of medium deviation FM as a communication mode removes this problem as any device capable of giving gain can be utilised. The use of high level varacter multipliers also provides a cheap alternate means of providing relatively high orders of power at GHz frequencies.

Transmission is therefore much easier using MDFM but receiving on the first sight is more complex. With AM it is possible to down-convert to any domestic TV set using perhaps conventional narrow band techniques. With FM signals the down-conversion remains the same but the demodulation is quite different . This will involve using a phase lock loop. This method will resolve directly to video which can be displayed on a conventional monitor. It can also be re-modulated in a channel 36 r.f. modulator such as our TVMOD1 to display on a domestic TV set. Not quite as complicated as first thought.

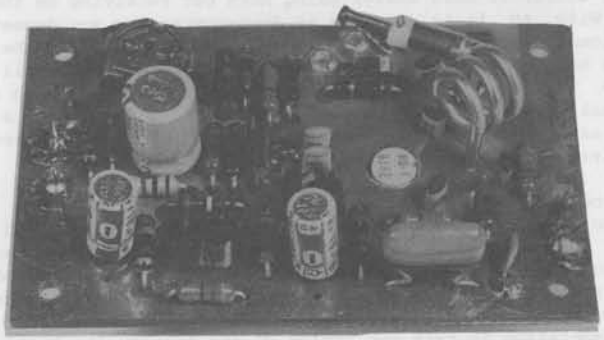
As for sound and colour transmission there are less problems with MDFM. For transmission, the sound can be introduced as a frequency modulated 6MHz oscillator and mixed with the video signal. Colour signals are processed no differently to monochrome. When receiving, the 6MHz sub-carrier is filtered off and a conventional FM demodulator recovers the audio. Colour signals are resolved as standard video outputs with colour burst information intact. The monitor or TV does the processing. To assist experimentation in this new medium we are introducing building block kits. The first two of these are now detailed.

VIDIF Demodulator Strip

The apparently hard part made easy. First of all convert the signals from the frequency you are receiving to approximately 52MHz. This could be the first i.f. at 23cms, or using doppler Gunn oscillators, at 10GHz. Feed this 52MHz signal into the VIDIF where it will be amplified, limited and then demodulated in an NE564 phase lock loop. The recovered signal is then amplified and processed to give two 1V ptp standard video signals with the ability to select positive or negative modulation sense. A 6MHz signal is filtered off for audio detection and the phase lock loop gives an a.f.c. signal for front end tracking. There is also an a.g.c. signal which can be used for 'S' meter applications. Everything you need on a single board measuring 5" x 3". There is a minimum amount of setting up, four coils to adjust and one trimmer capacitor. The video amplifier is fixed value discrete components and needs no aligning. Once adjusted it will not need touching again. The demodulator is exceptionally linear over approximately 15MHz. This board simply works and works well.

UFM01 UHF Power Oscillator

This small module (1.6" x 2.5") gives a free running 50mW signal at 400MHz. The dimensioning of the board is such that sufficient deviation is obtained for direct transmission at 400MHz. This can then be reduced depending on the multiplication factor to final frequency for other bands. There is a minimum video processing circuit to allow direct connection of 1V ptp 75R signals. The board is voltage stabilised to minimise drift. In use the module should be followed by our standard 70LIN3/LT to increase the power to 500mW and then any of our 70FM series amplifiers can be applied to give currently 40W maximum output. For 23cms use, the stability is more than adequate. For higher orders of multiplication some form of frequency lock will be needed. This could take the form of a skeleton VIDIF without the post detector amplifier.



WDV 400/1200 Varacter Tripler

This unit accepts a 10W signal at 70cms and triples the frequency to 23 or 24 cms. The efficiency is typically 60%. The heatsink as fitted is adequate for 10W drive levels but greater input power could be used on a short term basis. (Good quality PTFE trimmers are an essential part of the reliability and performance of this product). Because of the wide final frequency range it will help if you specify output frequency when ordering.

1250DC50 Down Converter

A 24cms ATV downcoverter compatible with existing FMTV Products to be available in May 1984.

COMPONENT SPARES PRICE LIST

March 1984

Genuine branded component spares for our extensive range of kits are listed below. Prices include VAT at the current rate. Please add 75p to the total order except diecast boxes where £1.50 is requested. While stock levels are usually good, please check before ordering when parts are required urgently

Capacitors:

		£ p
Mullard 629 Series Ceramic (63V)	0.01uF (10nF), 0.022uF (22nF)	0.05
Mullard 630 Series Ceramic (100V)	470pF, 820pF, 1000pF, 1200pF,	0.05
	2200pF, 4700pF	0.07
Mullard 632 Series Ceramic (100V)	1p8, 2p2, 2p7, 3p3, 4p7, 5p6, 6p8,	
	10p, 15p, 18p, 22p, 33p, 47p,	0.05
	82p, 100p, 150p, 220p,	0.06
Mullard 352 Series Polyester (250V)	0.01uF, 0.047uF, 0.1uF	0.08
Mullard 808 Series Trimmer (100V)	5pF (grey), 10pF (yellow), 22pF (green)	0.30
Mullard 809 Series Trimmer (300V)	45pF (blue dot) (for 144LIN25)	1.55
PTFE Tubular Trimmer	1.5pF (for UFM01)	1.25
Mullard 015 Series Electrolytic	10uF/25V, 15uF/16V, 150uF/16V	0.12
Tantalum Beads	1uF/35V, 10uF/16V	0.25
PCB Mounting Electrolytic (Vertical)	1uF/35V, 10uF/16V, 100uF/16V	0.08

Resistors:

Carbon Film (⅓ or ¼ Watt)	All kit values only	0.02
Metal Glaze (½ Watt)	All kit values only	0.10
Horizontal Presets	100R, 1K, 10K, 47K, 220K	0.12
Chip Resistors (125mW)	51R, 100R	0.10

Active Devices:

BA379	0.35	:	1N4148	0.03	:	OM335	8.95	:	2N6083	12.30
BA482	0.30	:	LM301	0.35	:	P8002	2.75	:	2N3819	0.35
BB221	0.35	:	LM317LZ	0.70	:	TIL209	0.12	:	3SK88	0.60
BD436	0.70	:	LM380	0.90	:	TP3095	8.95	:	4001	0.25
BDX35	0.93	:	LM741	0.30	:	Zener Diodes	0.12	:	4011	0.35
BF256C	0.45	:	LM3089	1.25	:	ZNA234E	9.78	:	4013	0.65
BF981	1.25	:	MC3357	2.85	:	ZTX108	0.12	:	4017	0.95
BFR34a	1.55	:	MC3359	2.95	:	ZTX314	0.25	:	4028	0.90
BFR91	1.30	:	MRF646	28.40	:	ZTX327	1.25	:	4040	1.05
BFR96	2.90	:	MV2109	0.86	:	ZTX502	0.25	:	4059	6.75
BFY52	0.50	:	MV2111	0.86	:	14568	3.75	:	4081	0.45
BXY35a	24.95	:	MV2114	0.86	:	2N4427	1.55	:	4082	0.30
CA3053	1.05	:	NE21936	3.75	:	2N5770	0.55	:	4093	0.95
HCTR0320	9.85	:	NE564	3.75	:	2N6080	9.63	:	4511	1.30
HP2800	0.90	:	NE592	1.75	:	74LS74	0.45	:	40673/3SK45	0.50
SD1135	10.10	:	SD1136	10.80	:	SD1143	12.90	:	3SK124	4.75
SD1272	15.25	:	SD1433	15.25	:	SD1444	3.20	:	SD1080.7	6.85

Miscellaneous:		£ p
Crystal Filters	(25KHz, 8 pole, 02 outline)	15.50
Ceramic Filters	(CFSH 10.7 M3) (Red dot and Orange dot)	0.45
Cambion Chokes	0.1uH, 0.22uH, 0.47uH, 0.68uH, 2.2uH, 10uH, 22uH	0.40
Crystals	1MHz, 101MHz, 101.5MHz, 94.6666MHz, 96MHz, 78.125MHz	3.95
Crystal Sockets	HC18/U (per pair)	0.25
	HC25/U (per pair)	0.25
Harwin Pins	H2105	0.03
IC Sockets	14 Pin dil	0.14
	16 Pin dil	0.15
	24 Pin dil	0.25
	28 Pin dil	0.30
Neosid Coils	Former	0.20
	Core	0.10
	Pre-Wound	0.40
Cable	RG174 Miniature Co-axial for synthesiser and RF interwiring (per foot)	0.20
Thumbwheels	Miniature 'push-push' types (per pair + end cheeks)	8.75
Diecast Boxes	VCO Size (2.3 x 4.3)	1.95
	Digital Size (4.7 x 3.7)	3.55
	Large size for 144LIN25 + 144PA4/S	4.25
Custom Box	A purpose designed box from tinplate for use with our microwave boards such as the VIDIF.	5.50
Heatsink	For 70LIN3/10E, 144LIN25B etc. Fits onto the digital size diecast.	2.75
Connectors	'N' Type Panel Socket)	1.80
	SO239 Panel Socket) All four hole mounting types	0.98
	BNC Panel Socket)	1.15

UK AGENTS

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