INSTRUCTION MANUAL

FOR USE WITH 16K OR 48K ZX SPECTRUM COMPUTERS

TURBO INTRODUCTION

Congratulations on your purchase of the RAM TURBO interface for your ZX Spectrum. You will soon appreciate how much more your TURBO can do for you compared to any other Spectrum interface on the market.

Your TURBO interface enables you to connect one or two joysticks to your ZX Spectrum, including the latest Quickshot II Rapid Fire types. You will now be able to play any of the increasing number of ROM cartridge software games that are now widely available at low cost. Just plug in the cartridge – and instant game – NO waiting. Your RAM TURBO has a full expansion bus at the rear of the unit enabling the connection of many peripherals such as speech synthesisers, rom packs, printers etc.

The RAM TURBO is ideally suited for connecting CURRAH MICRO SPEECH or any of the Centronics printer interfaces available from your local dealer.

CONNECTION

WARNING. The RAM TURBO is fitted with a unique power protection device that is designed to prevent installation whilst power is connected to your Spectrum. ANY device or peripheral connected to a Spectrum whilst power is connected will most certainly cause expensive damage to your Spectrum. You will not have time to switch off or disconnect! DAMAGE will be caused instantaneously.

To connect your TURBO, first remove the power plug from the rear of the Spectrum. Insert your TURBO into the rear expansion connector of your Spectrum. There is a small locating 'KEY' in the

TURBO connector – this mates with a cut-out in the rear expansion bus of the Spectrum. Carefully align the two and push firmly together. Connect your joystick(sl. Any standard joystick fitted with a 9-pin D plug will work with your TURBO. You may confidently plug in and unplug your joysticks whilst the Spectrum is switched on. TURBO supports the latest Quickshot II Rapid Fire joysticks without any modification.

Please note that if a software game already has rapid firing as a standard feature, you should not use a "Rapid Fire" joystick in rapid fire mode – the firing will work SLOWER! Use standard mode instead.

With your TURBO correctly connected, you can now connect your power plugs through the "Spectrum Protect Adaptor" in the end of the TURBO and you can now safely switch on.

NOTE. Do not remove any interfaces or peripherals whilst power is connected to your Spectrum. Serious damage will occur as previously stated!

ROM SOFTWARE

ROM cartridges plug into a socket beneath a hinged flap on top of the TURBO. This flap protects the socket beneath when the cartridge port is not in use. Cartridges should be plugged in with the title facing forward towards the computer. Again do not plug in your ROM cartridge whilst the computer is switched on.

When you switch on, the ROM software will immediately begin to run. This may be a very useful feature for young children who are too impatient to wait for a lengthy game tape to load (or adults for that matter). Follow the instructions on the screen, or in the instructions with each cartridge. Look after your cartridges carefully – they can be damaged and most definitely cannot be repaired. Where instructions refer to joystick No. 1, this is the right-hand joystick on your TURBO.

JOYSTICK PROGRAMMING

Unlike the standard Interface 2, TURBO will respond to a number of joystick protocols or commands. As interface 2 compatible, the two joysticks appear as numbers 0-9, as if they were keyboard depressions.

KEY	JOYSTICK2 (RIGHT)	KEY	JOYSTICK1 (LEFT)
1	Left	6	Left
2	Right	7	Right
3	Down	8	Down
4	Up	9	Up
5	Fire	0	Fire

These can be read from Basic using IN KEYS, but this function will read only one key. It will not recognise joystick diagonals, i.e. UP-RIGHT. An alternative is to use the IN port instruction either via Basic (LET A = IN 61438) or machine code by loading BC register with the correct data and using op code IN C,A.

IN 63486 READS	JOYSTICK 2	&	IN 61438 READS	JOYSTICK 1	
BIT 0	Left	(1)	BIT 0	Fire	(1)
BIT 1	Right	(2)	BIT I	Up	(2)
BIT 2	Down	(4)	BIT 2	Down	(4)
BIT 3	Up	(8)	BIT 3	Right	(8)
BIT 4	Fire	(16)	BIT 4	Left	(16)

KEMPSTON COMPATIBLE

Amazing! TURBO will automatically respond to Kempston protocol totally transparently! If you wish to play a game that has Kempston joystick interface option, just connect your joystick into the right-hand socket and select Kempston mode from the instructions in the software (e.g. press '4' for Kempston or '3' for Keyboard).

You can read the Kempston port directly from Basic using IN 31.
i.e. 10 LET A = IN31;:PRINT A
      20 GOTO 10
      IN 31
      1 Right   2 Left   4 Down   8 Up   16 Fire

PROTEK COMPATIBLE (CURSOR KEYS)

Amazing! Your TURBO is also capable of becoming a PROTEK compatible interface! Because of design considerations it is not possible to make this mode totally automatic. To select PROTEK mode first switch off your computer. Connect your joystick to the left hand socket on TURBO. Press the "fire button" on your joystick and keeping it depressed, switch on your computer. As soon as the Spectrum screen clears, you can release the fire button. Your TURBO is now PROTEK compatible. You should note which games require cursor key compatible operation or PROTEK only operation because if you forget to set PROTEK mode at switch on, you will have to switch off and re-load your software, which can be a lengthy process.

To check Protek/cursor compatible mode use the following guide. (Simulated key press as per standard interface 2 mode.)

BASIC LOCATIONS TO READ

Left	5	IN 63486	BIT 4	(16)	Down	6	IN 61438	BIT 4	(16)
Right	8	IN 61438	BIT 2	(4)	Fire	5	IN 61438	BIT 0	(1)
Up	7	IN 61438	BIT 3	(8)					

Note: Kempston and Protek protocols work simultaneously.

Should you have any query or difficulty, please contact your local dealer from whom you purchased this unit or direct with the manufacturers.

RAM ELECTRONICS (FLEET) LTD. reserve the right to alter these specifications without notice.