INTRODUCTION

The Toft Audio Series ATB is the creation of Malcolm Toft, the founder of console manufacturer Trident Audio Developments in 1972. Prior to that, Malcolm was a recording engineer. His credits include the David Bowie ‘Space Oddity’ album, three albums with T-Rex and James Taylor’s first album. He was also involved with the mixing of the Beatles ‘Hey Jude’ single at Trident Recording Studios in 1968. Trident Audio Developments became an acclaimed manufacturer of recording consoles. Artists who have recorded hits on a Trident console include: Stevie Wonder, Herbie Hancock, Rod Stewart, Queen, David Bowie and Elton John. More recently, Dire Straits, Coldplay and Oasis have added their name to the list. Radiohead has in fact, recorded all of their albums from OK Computer onwards on an MTA console. Malcolm sold Trident in 1988 but continued to make consoles under the MTA (Malcolm Toft Associates) banner until just a few years ago. It is this pedigree that is continued with his new range under the Toft Audio Designs marque.

The Series ATB is an extremely versatile and sophisticated 8 bus console in a compact frame. It has been designed with today’s DAW user in mind and offers extremely high audio quality and features never before found in a console in its price range. These features include an optional digital I/O card which provides the eight subgroup sends and returns as either ADAT optical or firewire and the master left/right outputs as firewire or S/PDIF. ASIO drivers are provided as well as MIDI connectivity to complete the versatility of this option.

In a multi-track studio environment the console will perform both tracking and remix functions with consummate ease. Because of the channel monitor and direct output facilities, recording instruments to tape is simple and of very high quality with little outboard equipment being required. When mixing down, the large number of inputs to the stereo bus (56 on the 16 channel, 72 on the 24 channel and 88 on the 32 channel) makes the job very easy. The large number of auxiliary sends (six) also adds flexibility.

The Series ATB has been designed for easy servicing. The console is constructed from individual circuit boards mounted at right angles to an 8 way front panel. It is therefore only a matter of minutes to remove any channel board from its front panel should a component need replacing. All active circuitry (IC’s etc.) are socketed, again to aid servicing. All passive components (resistors, capacitors etc.) are of conventional types; not surface mount which are difficult to remove and replace. The modules connect to each other via ribbon cables which ensure maximum reliability and freedom from wiring errors.

Connections to the console are via the rear panel where the cables can be conveniently hidden from view, which is again a feature normally only found in consoles costing considerably more. The console is fitted with extremely accurate 12 segment bar graph displays on the groups and master left/right outputs and high quality illuminated VU meters operate in parallel with the master left/right bar graphs.

By carefully following the installation procedures detailed in the following pages, your Series ATB console will give years of reliable service and professional audio quality.
SERIES ATB REAR PANEL - INPUT SECTION

SERIES ATB REAR PANEL - OUTPUT SECTION
INPUT MODULE  General Description

The Series ATB Input Module is an extremely sophisticated and flexible channel that can be used for recording, mixing and monitoring multi-track recordings. It will accept the signal from a low impedance balanced microphone, high or low level balanced line input, or even the output from a musical instrument.

The signal can be shaped via the extremely musical four band equaliser section that allows precise control over the audio spectrum. Boost and cut of 15dB is provided by centre detent controls and the two sweep frequency ranges overlap to increase the flexibility of the equaliser section. An 80Hz (high pass) filter is also incorporated which can be switched in or out of circuit. The equaliser is extremely useful in both recording and mixing modes. The equaliser can also be switched from the input channel to the separate monitor channel incorporated into each input module.

Six auxiliary sends are provided. Aux 1 is permanently pre-fade while auxes 3-6 can be switched pre or post the channel fader. Auxes 5-6 can also be selected between the channel or monitor path, greatly adding to the flexibility of the module.

Each module incorporates a monitor section which is used to monitor a replay channel from a multi-track recording device. This is in effect a separate signal path which ultimately feeds the master remix outputs. By making the equaliser and auxiliary sends 5-6 available to this path, this becomes an extremely versatile feature of the console. When monitoring the output of a multi-track recorder or DAW, it is possible to create a monitor mix with equalisation and reverb effects completely independent from the channel. These effects would also remain when the recording is played back through the same monitor section.

When the console is used for mixing purposes, the monitor section functions as an additional line input return to the stereo mix busses, again with the ability to route the equalisation and auxiliary sends 5-6 through the monitor section. This effectively doubles the number of inputs available on remix. As there are also eight dedicated stereo effects returns and 8 monitor returns on the sub group section, at mixdown a 16 channel Series ATB becomes a 56 input mixer whilst a 24 channel becomes a 72 input mixer and a 32 channel becomes an 88 input mixer.
The input channel is provided with a stereo, non-destructive after fade listen system (AFL). By depressing this button, it is possible to hear the selected signal in isolation (or mixed with other selected AFL signals). This signal follows the position of the channel pan control so that the signal can be monitored with the stereo perspective intact. As it is a monitor function only, the AFL can be depressed when recording or mixing without it harming the signal path. It is however, possible to change the function of the switch on a channel by channel basis so that the signal becomes a mono, pre-fade source (PFL). This is useful if the console is used in a live sound application where a simple check to see if a channel is ‘live’ is required without having to push up the fader. By removing the base panel of the mixer and accessing the individual channel PCB’S, it will be possible to see a push button switch mounted approximately halfway down the circuit board. When the button is depressed (factory default setting) the signal is in AFL mode. If the button is not depressed, the signal from that channel will become PFL.

Centre detent pan controls are provided for both the channel and monitor sections for accurate placement of signals in the stereo spectrum. The channel path is provided with a green LED which illuminates when the signal reaches -20dB at the channel output and a red LED which illuminates when the signal reaches +10dB at the channel output. These are extremely useful features and provide a constant indication that a signal is present in the module (green LED), and that signal peak is being reached (red LED).

Routing to the multi-track groups is achieved by means of pushbuttons located beside the channel fader. These are arranged in pairs and work in conjunction with the pan control so that if for example groups 1-2 are selected and the pan control is in the mid position, the signal will be fed to groups 1 and 2 in equal amounts. If however the pan control is positioned fully anti-clockwise (left) the signal will only feed group 1. If the pan control is positioned fully clockwise (right), the signal will only feed group 2.

A high quality, 100mm metal bodied fader is provided which gives precise and smooth control of the channel level.

Reference to the Input module signal flow diagram will help to give a better understanding of the way in which the signal is routed from the input to the group output.
SUBMASTER MODULE  General Description

The Submaster section of the console greatly enhances the flexibility of the Series ATB console and as a consequence, provides a number of different functions.

Each Submaster channel provides a method of adjusting the output level of each of the 8 subgroup outputs via a 100mm high quality fader. The level is also indicated by a high quality 12 segment bar graph display.

The submaster also provides a method of monitoring and panning the subgroup output on the control room speakers. By using these controls it is possible to build up a monitor mix of the recorded tracks and any that are about to be recorded. To enhance this facility, level controls for auxiliary sends 5 and 6 are included on each submaster section making it possible to send a headphone mix from the subgroups together with reverb or echo effects. Auxiliary send 5 can also be switched pre or post the submaster monitor level control, making it usable as either a headphone feed (in ‘pre’ mode), or a reverb send (in ‘post’ mode).

A balanced line level input is provided on the rear panel behind the submaster section so that the replay from an 8 track DAW system can be connected to the submaster section. Individual ‘TAPE’ switches make it possible to select either the send to the DAW or its output onto the monitoring system. The bar graph metering and auxiliary sends follow this switch so that they automatically switch over according to the position of the ‘TAPE’ switch. By this method it is very easy to build a monitor mix while tracking instruments on a DAW.

A further useful feature is that the balanced line level inputs connected to the submaster ‘MONITOR RETURNS’ are also connected to the ‘LINE INPUT’ jacks of channels 1-8. This means that when you want to mix from the DAW on channels with equalisation and more auxiliary sends, selecting ‘LINE’ input on channels 1-8 will automatically connect the DAW outputs to these channels.

Each of the 8 submaster channels is also provided with a ‘SOLO’ push button. This makes it possible to listen to the signal on any selected submaster in isolation and in stereo, depending on the position of the submaster ‘PAN’ control.
Since the ‘SOLO’ function is a ‘post fader’ signal, its volume will be dependent on the position of the Submaster ‘MON LEVEL’ control. This makes it possible to solo a number of Submaster channels and create a balanced mix of the soloed signals.

A separate facility on each Submaster channel is the inclusion of a stereo Effects Return section located directly above the 12 segment bar graph meters. Individual jack inputs are provided on the rear panel behind the Submaster section and are wired in stereo. This therefore adds another 16 input capability to the console in remix mode. An effects return level control (which adjusts both left and right inputs simultaneously) is combined with a balance control which makes it possible to attenuate either of the left or right signals in relation to each other. In the centre position the signals will be of equal strength, but when the balance control is turned anti-clockwise (left) the right signal is attenuated by a varying degree and when the balance control is turned clockwise (right), the left signal is attenuated by a varying degree. This allows for adjustment if the stereo signal connected is not equally matched.

A final facility included only on the first 6 Submaster sections, is a master control for each of the balanced auxiliary sends. This makes it possible to adjust the overall level of signal being sent, to either a reverb (or other such signal processing device), or a headphone amplifier if the auxiliary sends are being used as a headphone cue (or foldback) system.

Reference to the Submaster module signal flow diagram will help to give a better understanding of the way in which the signal is routed.
MASTER SECTION General Description

The Master section of the ATB console contains all of the controls that affect the overall functionality of the console.

An accurately matched 100mm stereo fader controls the level of the master stereo balanced outputs.

A comprehensive talkback system is provided which incorporates a high quality electret microphone and amplifier with a continuously variable level control. The signal can be routed to either the 8 subgroups and master left/right outputs for 'slate' announcements (so that the title of a song can be recorded at the beginning), or to the auxiliary sends so that the engineer can communicate with the musicians when they are in a separate room. When the 'TALK TO GROUPS' button is used, the monitor signal is dimmed by 25db to avoid feedback in the control monitor speakers.

Above the talkback section is the master monitor level control for the control room speakers. This is a very important control as without this turned up, it will not be possible to hear any signal on the control room monitor speakers. Coupled with this control is a 'MONO' push button which combines the left/right monitor signals so that it is possible to check mono compatibility. It should be noted that the mono facility is purely a monitor function and does not affect the main stereo left/right output which remains as a true stereo image. A very useful further facility in this section is the provision of an 'ALT MONITOR' push button which routes the monitor signal to a second set of output jacks on the rear of the master section so that an alternative monitor system can be set up. This makes it possible to listen to the signal on (for example), a different set of monitor speakers so that comparisons can be made.

A pair of very accurate 12 segment bar graph meters indicate the signal being sent from the master left/right stereo outputs. As an extremely useful additional feature to these electronic meters, a pair of conventional moving coil VU meters are provided which read in parallel with the bar graph meters. This makes it possible to compare the signal measured on the two different types of meters. By their nature, bar graph meters such as the ones fitted to to the Series ATB console, respond very quickly to signal peak and therefore are useful when used on instruments with complex dynamic waveforms such as pianos etc.
This type of meter will therefore greatly assist the engineer when it comes to avoiding distortion during recording. However, when used on less complex waveforms generated by an electric guitar for example, it is possible to under record the instrument using a bar graph display as they will sometimes react too much to the peak amplitudes of the signal and not the average amplitude. They will however, generally result in a better use of the available dynamic range of the recording medium. An analogue meter such as the conventional V.U. meter also fitted to the Series ATB console, responds mostly to the average level of the programme, so can therefore be considered more useful when recording instruments such as an electric guitar. The combination of electronic bar graph and analogue metering therefore provides the user with the best of both worlds.

A headphone jack with a high quality stereo amplifier is provided so that if the engineer wishes to monitor the console only on headphones, they can be connected to the jack socket at the top of the master section. A separate stereo volume control is provided so that the level of the headphones can be adjusted independently.

A stereo master level control is also provided so that the volume of the AFL/PFL system can be adjusted in the control room monitor speakers.

The final facility provided by the master section is the ability to monitor any one of three stereo playback devices. ‘2TK 1 RET’ and ‘2TK 2 RET’ are conventional analogue connections located on the rear of the submaster section so that the playback of a stereo device such as a cd player or output of a computer sound card can be selected to the control room monitor speakers. ‘2TK DIG RET’ is provided for use when the optional digital I/O card is connected. This routes the converted analogue output of a digital playback device connected through the I/O card onto the control room monitor speakers. The bar graph displays will meter the playback level and, when any of the three buttons are depressed, it is no longer possible to listen to the master stereo output from the console. This is to make sure that when listening to an important final mix, nothing else will be monitored. The signal will however still appear at the balanced master output jacks at the rear of the master section and will also be controlled by the stereo master fader. By selecting the appropriate pushbutton, it is therefore possible to listen to a stereo mix after it has been recorded, providing an easy A/B comparison method.

Reference to the Master Section signal flow diagram will help to give a better understanding of the way in which the signal is routed.
Multi-Track Recording Set Up

Make sure that all buttons are up and that all controls are in their default positions, i.e.: centre detent potentiometers such as pan and equaliser boost/cut are in their centre positions, level controls and equaliser frequency sweeps are at minimum (anti-clockwise). The channel fader should be set to minimum.

The output from a balanced microphone should be wired in accordance with the information given in section 2 of this manual and connected to the XLR input at the rear of the appropriate channel. If the microphone requires +48 phantom power, this should be selected by depressing the ‘+48’ red button at the top of the module.

The channel fader should be advanced to the top of its’ travel (maximum) and the mic/line level control (at the top of the module) should be advanced until the green ‘-20’ LED illuminates to a steady state. This will indicate that there is signal present at the module output.

There are two ways to set up the console to record in a multi-track setup. If the console is only being used in conjunction with an 8 track recorder or DAW, the signal can be sent via the ‘Submaster Outputs’ to the inputs of the recorder. The output of the 8 track recorder or DAW should be connected to the ‘Monitor Returns’. If for example, you wish to route to track 5 of the multi-track recorder, depress the appropriate channel button marked ‘5-6’ and turn the channel pan control fully anti-clockwise (left). The signal will now appear at the input of the 8 track recorder or DAW and the subgroup bar graph display will indicate the level being sent to the recorder. To monitor the signal being replayed from the DAW, depress the red ‘TAPE’ button on the appropriate submaster channel, turn up the ‘MON LEVEL’ control on the appropriate submaster channel and the signal will appear on the monitor speakers. The ‘MONITOR MASTER’ control in the Master section must be turned up. Since a lot of DAW’s (and of course tape based recording systems) have automatic input/output monitoring systems such that when a track is set to record the input is monitored through the playback outputs and then automatically switches to playback when the track is not in record, the ‘TAPE’ button can be left depressed and the DAW will provide the necessary monitor switching.

The second way of setting the console up is by using the ‘in-line’ monitoring facility provided on every input. This system is to be favoured when using the console with anything more than an 8 track recording system.

As each input module is provided with a direct output signal derived directly after the channel fader, this can be used to feed the individual tracks of a multi-track recording device. Therefore the ‘DIR O/P’ jack located on the rear panel behind each input should be connected to the appropriate input of the recording device. It should be noted that connecting to the ‘DIR O/P’ jack does not break the signal path of the input module, so all other facilities such as routing and panning to the 8 submaster groups is still possible. This is especially useful since using the direct outputs only allows one signal to be routed to each track. It is therefore necessary to use one of the sub groups only if a mix of a number of channels is required. As the ‘DIR O/P’ jack does not break the signal path from the channel, it is a simple job to connect from this jack directly to the input of the multi-track recorder or DAW.
To monitor the signal being recorded (via the multi-track recorders input/output monitoring system, the recorder’s output should be connected to the balanced ‘MON’ jack located behind each input module. This then connects the signal to the separate monitor section incorporated within each input module.

By turning up the appropriate ‘MON LEVEL’ control on an input module and adjusting the associated ‘MON PAN’ control, the signal can be listened to and placed anywhere between the left and right control room monitors. This of course is independent of any main channel panning that is taking place. By this means a monitor mix of all 16, 24 or 32 channels can be built up depending on the mixer configuration. The multi-track recorder’s own meters can be used to control the record level and monitor the playback of the signal.

A further very useful feature is the ability to select auxiliary sends 5 and 6 to the monitor circuit by means of the ‘AUX 5-6 TO MON’ push button located next to the monitor level control. This makes it possible to supply a headphone mix to artists during recording (by using for example auxiliary 5 as a headphone feed) and also monitor reverb (or some other processing device) by using (for example) auxiliary 6. In this mode, pressing the ‘PRE’ push button selects the auxiliary send signal either pre or post the monitor level control. It is therefore extremely quick and easy to record and overdub using this section of the console. An ‘EQ TO MON’ push button completes the versatility of this section by making it possible to route the entire four band equaliser onto the monitor section. This makes it possible to add equalisation only on monitor to the track being recorded or playing back, so that it is possible to hear how the mixed track might sound without actually recording it. In this mode, the EQ is now bypassed on the channel section.

By using a combination of the channel direct outputs and the subgroups coupled with the channel and subgroup monitor returns, it is of course possible to record a larger number of tracks than the console has inputs. Therefore the 16 input console can be connected to a 24 track recorder, the 24 input console can be connected to a 32 track recorder and the 32 input console can be connected to a 40 track recorder.

When it is required to use the console to mix down the recorded tracks, it is not necessary to re-cable. By depressing the ‘/P REV’ push button at the top of the input module, the signal connected to the ‘MON’ jack is routed to the channel line input. The signal therefore appears at the main channel fader and can be routed to the stereo mix via the ‘L-R’ push button and panned via the channel pan control. The normal channel facilities such as AFL, equalisation and auxiliary sends can now be used. Whatever was plugged into the channel line input now appears at the monitor section and can also be routed to the stereo mix via the monitor level control and pan. In this way, the number of input channels to the stereo mix is doubled which greatly enhances the versatility of the console.

**Recording With A Microphone**

After routing the signal to the desired output, the channel fader should be put to the top of it’s travel (maximum position) and the ‘INPUT GAIN’ control should be adjusted so that either the input meter of the device that the microphone is being sent to reads an acceptable level or the channel input
level LEDs (situated next to the channel fader), show the signal level. Using these meters, the level should be adjusted until the red LED just illuminates on peaks and the level control should then be brought down so that the red LED is just extinguished.

The phase reverse button located at the top of the module works in conjunction with the mic and line inputs and can be used to reverse the signal phase of either input. Phase differences can occur when two microphones are placed in close proximity (for example when recording acoustic guitar) and causes a cancellation of certain frequencies (usually bass) resulting in a ‘thin’ sound. By using the phase switch, this effect can often be minimised or eliminated altogether. In the line mode, phase errors can often occur due to incorrect phase wiring of a piece of equipment connected to the console. Operation of the phase switch under these circumstances will often solve the problem.

Very often at this stage in the recording process, musicians may require a headphone feed so that they can hear their instrument or a mix of the other musicians. A suitable headphone amplifier should be connected to the auxiliary sends) that is to be used for this purpose. To provide a headphone feed (foldback or cue) signal, it is usual that the signal is taken pre-fader. This is so that if the engineer changes the fader settings during recording, it will not affect the musicians balance. On the ATB console, auxiliary send 1 is designated as a pre-fader send for this purpose. To provide a musicians headphone feed therefore, all that is necessary is to turn the appropriate master auxiliary send level control at the top of the Master Module to just below maximum, and advance the relevant channel module auxiliary send level until the musician is happy with the level.

To provide auxiliary send to a reverberation/echo device, the same procedure as above should be followed, except that it is recommended that auxiliary sends 2-6 are used as they can be selected post fader. This is necessary because unlike headphone feeds, the reverb/echo signal will need to follow the fader level.

Equalisation can now be added to the microphone signal if required and this is done by simply switching the equaliser into circuit by means of the illuminated switch in the equaliser section. The ATB Series equaliser is very comprehensive and consists of four separate bands each offering +/-15dB boost or cut. The high and low sections are of the ‘shelving’ type whilst the two mid sections are of the ‘peaking’ type and all ranges have been chosen for their musical response and character. An 80Hz roll off filter is also incorporated which is particularly useful in eliminating microphone rumble etc.

If it is required to introduce further signal processing such as a limiter compressor etc. into the signal chain, this can be accomplished by connecting the device via the individual ‘INSERT’ jacks on the rear of each input module. The send (input to the device) is connected to the tip of the jack and the return (output of the device) is connected to the ring of the jack. The device should be adjusted so that the required amount of signal processing takes place and care should be taken to make sure that additional gain is not introduced that may cause distortion. If this is the case it may be necessary to adjust the channel module input level control to allow for this.

Once all of the microphone channels have been adjusted in the above fashion, the recording can be
carried out. If line level signals are also to be recorded, the procedure is identical to that above except that a signal is connected to the channel line input jack and the ‘LINE’ button at the top of the module is depressed. It should be noted that when the input level control is in its’ midway position, the line amplification is 0dB. Decreasing the level will attenuate the signal by up to -15dB and increasing it from midway will amplify it by up to 25dB.

Once the recording has been made, it can be played back either via the Submaster section or Monitor sections of the input channels. This is explained in detail in the previous ‘Multi-Track Recording’ section.

**Mixing Down**

Changing from the recording mode to mixing on the Series ATB is very easy to accomplish as a lot of the functions are selectable by push buttons rather than re-patching connections.

If the replay lines from the multi-track recorder have been connected to the ‘LINE’ jacks on each Input module, depressing the ‘LINE’ button at the top of the module will bring the signal through the channel fader. If the replay lines from the multi-track recorder have been connected to the ‘MON’ jack on the rear of the input module (as would be the case when using the channel monitor section for multi-track monitoring), depressing the ‘I/P REV’ button will bring those signals through the input channel via the line input. Any signal that was connected to the line input will now be routed through the channel monitor section.

The input level control at the top of the module should be at it’s midway position and the channel fader advanced until the green -20db illuminates and an appropriate signal level is metered on the master left/right bar graph displays.

To select a channel to mix it is only necessary to depress the ‘L-R’ button on the appropriate channel located next to the channel fader. The channel pan control will position the signal in the stereo image. The channel fader will control the level to the stereo mix which will be metered on both the left and right bar graph displays located in the master section as well as the two analogue meters. The stereo master fader located in the Master Module should be put to the top of it’s travel and the master monitor level control should be adjusted so that the signal from the control room monitor speakers is at the appropriate level. When the final mix has been recorded on one of the two analogue 2 track recorders, or digital recorder that can be connected to the console, replay of the final stereo mix can be made via the ‘2 TK 1 RET’, ‘2 TK 2 RET’, or ‘2 TK DIG RET’ selection buttons on the master module.

When building up the mix, it is important to work with the relationship between the input level control and the channel fader such that the fader is always as close to the top of it’s travel as possible yet still allowing enough in hand to increase gain for solo passages etc. If the fader is operated too low in its travel and the input level control too far advanced, overload/headroom problems are more likely to occur, especially when introducing equalisation.