DRN-16 Drone
OPERATION GUIDE

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This guide describes how to operate a drone using control blocks and sub-blocks. It is also possible to operate a drone from a graphics plate. Please refer to the *Graphics Plate Operation Guide* for additional instructions.

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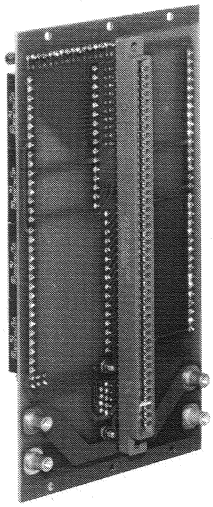
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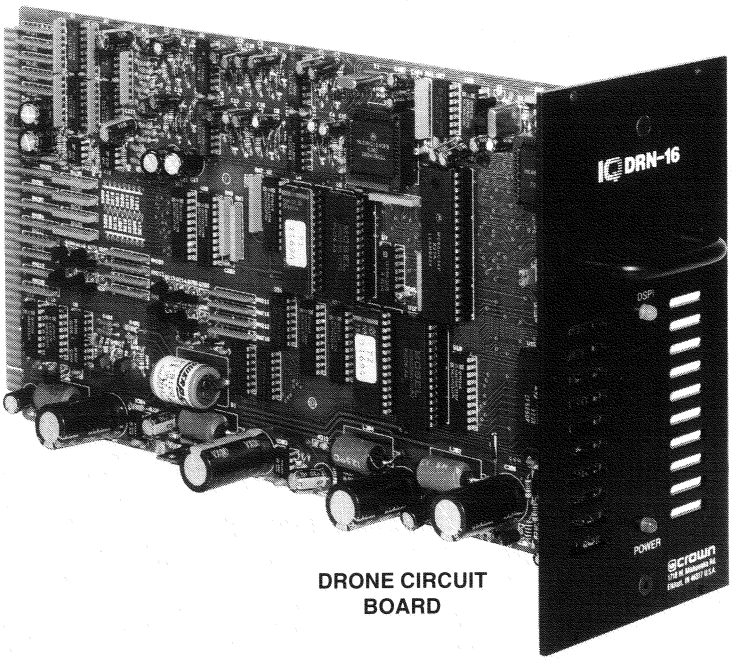
1 The Drone

A military drone is a sophisticated unmanned aircraft that is flown completely by remote control. An *IQ System DRN-16* drone is a card that plugs into a Crown card cage enabling an unmanned audio system to function automatically or, if human control is desired, be controlled from a remote location.

The idea behind the drone is simple—connect common switches and potentiometers to a drone and teach the drone what to do with them. For example, connect a pot to a drone analog input and use it to control an audio input or output level. Because you set the maximum and minimum value of each level control, you can limit the range and make them safe for inexperienced people to use.



DRONE T-BOARD



DRONE CIRCUIT BOARD

A pot or switch can be connected to one of its 16 analog or logic inputs to control virtually any function of any IQ component in an *IQ System*. And because you can link more than one function to a single input, you can make system wide changes with the mere flip of a switch. With a drone you can design a custom audio system that is tailored to the singular needs of the user, complete with the specific controls and functions they require in the locations that are most convenient for them.

1.1 The Drone Algo Pack

The on-board intelligence of the drone is controlled by the algo pack in its dual microprocessors. The drone algo pack contains a single *algo*, the "drone *algo*," which controls all of its various features. These features are summarized below:

- **Aux (Logic) Input Commands:** Assign a command or *algo* setting of any number of IQ components to one or more logic inputs. For example, a single switch connected to a logic input can be used to turn on/off both channels of an amplifier (equipped with an *IQ–P.I.P.*) and it can be used to turn on/off the input compressor *algo* in an IQ mixer/multiplexer. If desired, you can change the settings of every IQ component in the system with the flip of one switch!
- **Analog Input Commands:** Assign a command or *algo* setting of any number of IQ components to one or more analog inputs. For example, the same

volume control (pot) can be used to adjust the output of an amplifier (equipped with an *IQ–P.I.P.*) and the threshold setting of an input compressor *algo* in an IQ mixer/multiplexer.

- ❑ **Binary Input Commands:** Combine logic inputs together to receive binary codes, greatly expanding the number of possible commands they can receive. For example, combine eight logic inputs to receive 8-bit commands. That's 256 different commands! All sixteen logic inputs can be grouped to receive 16-bit commands (32,768 possible commands). There can be up to four groups (Channel A, B, C and D).
- ❑ **Aux (Logic) Output Commands:** The logic outputs can be used to drive a variety of loads such as L.E.D.s, logic inputs and relays. The logic output commands cause them to respond to a number of IQ conditions. For example, a logic output can be commanded to turn on an L.E.D. whenever the input level of an IQ components goes above a predetermined level. The logic outputs can be grouped together (like the logic inputs) for binary communication. They can also be used to turn on control voltage to the analog inputs to enable or disable them.
- ❑ **Paralyze Commands:** Disable one or more logic or analog inputs with the paralyze commands when you need to temporarily freeze them while responding to a higher priority input or system condition.

1.2 Drone Hardware Features

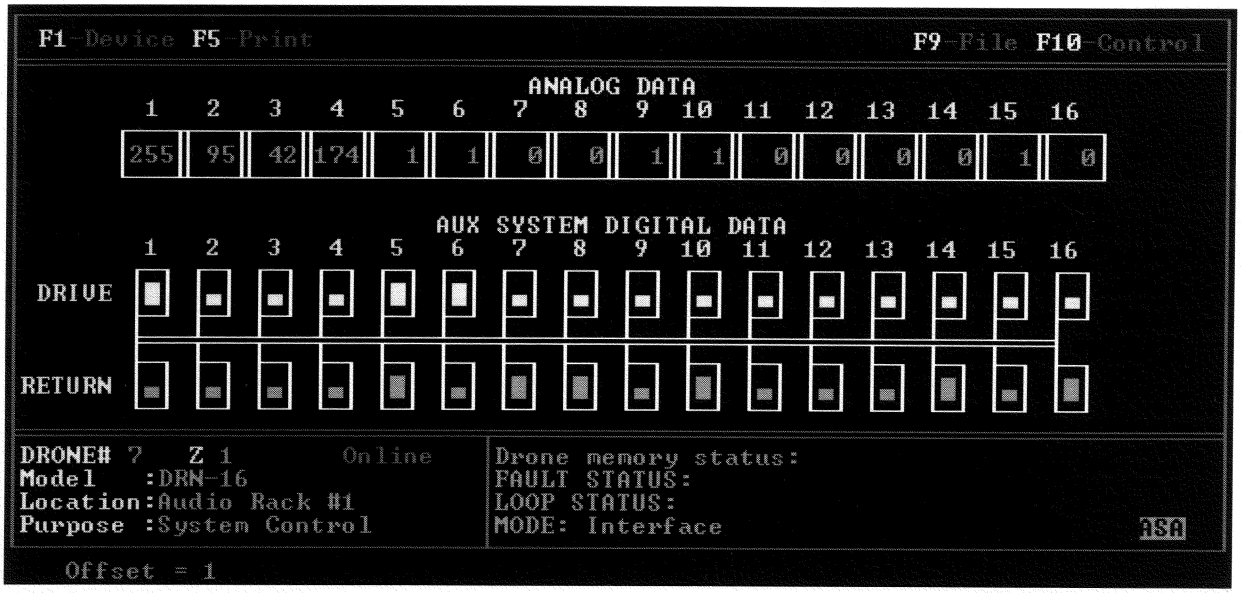
- ❑ 16 analog inputs. 4 are balanced, have microphone preamps and phantom power. 12 are unbalanced inputs.
- ❑ 4 analog outputs that can drive a 600-ohm load to +18 dBm. (The actual output level is influenced by input scaling resistors.)
- ❑ 16 unbalanced high impedance logic inputs.
- ❑ 16 unbalanced logic outputs.
- ❑ 2 Crown Bus ports (zone 1 and zone 2).
- ❑ RS232/422 serial port for connection to a host computer.
- ❑ DSPI (Data Signal Presence Indicator) verifies that the drone is properly connected to a Crown Bus and is able to both send and receive IQ commands.
- ❑ Battery backup is provided to retain all drone memory settings for up to 30 days after power down (when the battery is fully charged). The battery is charged during normal operation.
- ❑ Dual, parallel processing microprocessors are faster than a host computer.

1.3 About this Operation Guide...

This *Operation Guide* describes how to use IQ software to control and monitor a Crown *DRN-16* drone. This *Operation Guide* does not discuss the hardware installation or hardware controls. Please refer to the *Drone Hardware Installation Manual* for those details. Nor does this *Operation Guide* discuss the general features of the IQ software. Please refer to the *User's Manual* for your IQ software for that information. Finally, for details on how to configure or monitor a drone from a graphics plate, please refer to the *Graphics Plate Operation Guide*.

2 The Drone Control Block (for Drone System 1.0)

The drone control block provides the highest level of supervision over a drone. From it you can turn on/off the drone *algo*, individually control each logic output and monitor both logic and analog inputs. The control block is also the gateway into the drone sub-blocks that control the inner workings of the drone *algo*. To switch to the drone control block screen, press [F1] to access the Device menu then press [D]. [↑] [↓] can also be used to select the drone control block screen from the Device menu followed by [Enter↵] to execute the selection. A mouse (🖱) can also be used. The drone control block screen is shown below:



Notice that a single drone control block uses the entire screen, unlike the control blocks of other IQ components that are displayed four per screen. Please refer to the IQ software *User's Manual* for general instruction on how to navigate around a control block screen and how to select and change a control.

In addition to providing manual controls, the drone control block also provides information about the drone and it provides indicators to monitor the status of the drone's analog and logic inputs. A description of these features follows:

2.1 General Information

The drone control block contains an information area at the bottom of the screen. When a roll call is run, the **IQ address** and **zone** number for each drone will be automatically entered into the information areas of an appropriate number of control blocks. The IQ address and zone can also be manually entered or changed by selecting either number and entering a new one, making it possible to configure a system that is not presently connected to the computer. The IQ address is limited to 1-250. The zone is limited to 1-8.

Under the IQ address and zone number is a line for the **Model**, **Location**, and **Purpose**. These lines are provided for you to enter information that will help you identify which drone is controlled by the control block and what its function is.

The phrase "On Line" will be displayed with green letters in the upper right corner of the information area of all drones that are found by the IQ software. This makes it

easy to tell which control blocks are controlling active units and which are not.

The status lines for **drone memory status**, **fault status** and **loop status** in the bottom right information section are reserved for future use and are not functional in Drone System 1.0.

2.2 Controls

Drive (Logic Output):
Because the drone is designed primarily for automation, it seldom needs to be manually controlled from its control block. Once switches and pots have been connected to the drone's inputs and it has been taught what to do with them, it can run itself and most of the *IQ System*. However, there may be times when a logic output must be manually turned on and off from the drone control block.

To turn a logic output on or off, select the output in the "Drive" line under the "Aux System Digital Data" section of the control block. The selected output will change to a light blue color. Press [Spacebar] to toggle the output on and off. When it is on the indicator block will be full height. When it is off it will be half height. *Note: The ASA control must be turned off in order to manually change a logic output setting.*

Tip: The logic output ("Drive") settings can be saved as part of the *dataframe* by pressing [F9] if the ASA control is off.

Tip: To toggle ASA on and off from anywhere on the control block screen, press [Ctrl]+[A]. Or you can select the ASA control and press [Spacebar].

Mode:
The Mode control (located at the bottom of the information section) should be set to "Interface." Do NOT use the "Transponder" setting since it is not operational and is reserved for future use.

ASA:
"ASA" means "Auto-System Algos" and the ASA control serves two purposes. First, it serves as a master control to turn the drone *algo* on and off. Turning ASA off, restores manual-only control. Turning ASA on restores automatic operation. To turn ASA on and off, press [Ctrl]+[A] or select it and press [Spacebar].

The second purpose of the ASA control is to serve as a door or entrance to the sub-block screens where the drone *algo* is configured. To bring up the first sub-block screen, highlight the ASA control and press either [Enter↵] or [↓].

2.3 Indicators

The indicators in the drone control block are only useful when a drone is connected to the system. The indicators can be ignored when configuring a *dataframe* while the drone is off-line or disconnected.

Analog Data:
The relative input voltage level (AC or DC) of each analog input is displayed under the "Analog Data" section at the top of the drone control block. The analog data indicators have a range from 0 to 255. 255 represents the maximum input of 10 volts. *Note: The sensitivity of the analog inputs can be changed with resistor substitution. See the Drone Hardware Installation Manual for details.*

AUX System Digital Data:
The status of both the logic inputs and outputs are displayed under the "Aux System Digital Data" heading. The first line, labelled "Drive", shows which outputs are being driven with an output signal. When one of the 16 outputs has been turned on (either by the drone *algo* or manually), the indicator will be displayed at full height. If the output is turned off, the indicator will be displayed at half height.

The second line, labelled "Return", shows which logic inputs have data returning to them. If a logic high is sensed at a logic input, the indicator will display at full height. If a logic low is detected it will display at half height.

2.4 Control Block "Hot Keys"

Several keyboard shortcuts are available to make it easier to work with the drone control block and sub-blocks. These keyboard shortcuts or "hot keys" are listed below. They are functional only from the drone control block (not the sub-blocks).

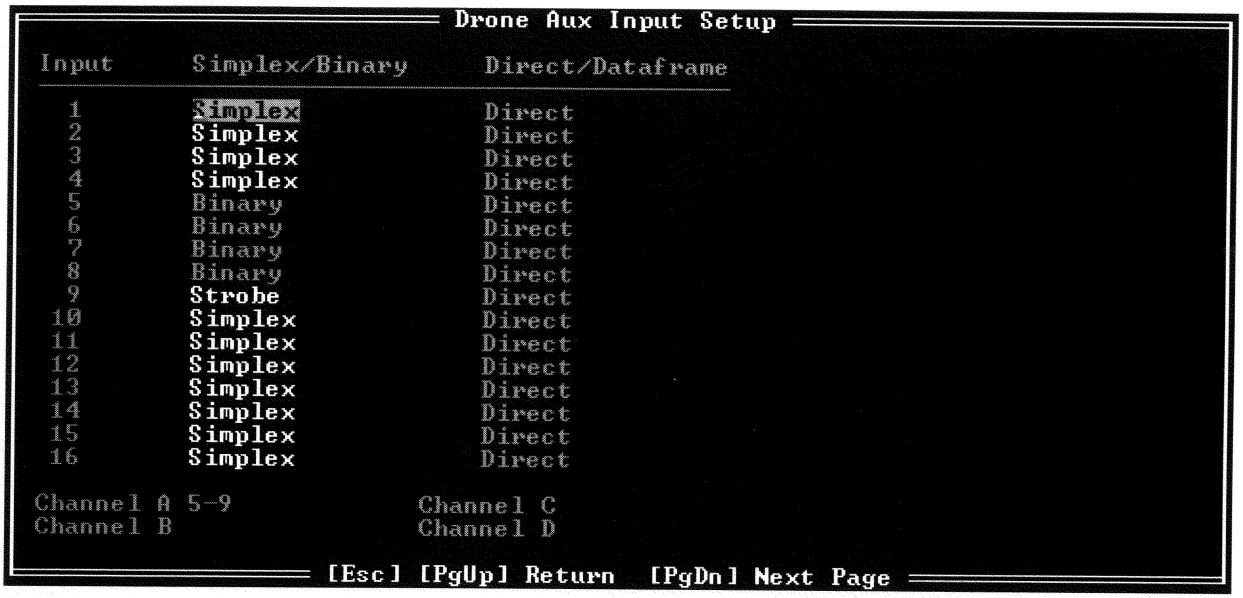
- Alt+F2 Jump to the 1st sub-block screen (Drone Aux Input Setup)
- Alt+F3 Jump to the 2nd sub-block screen (Aux Input Commands)
- Alt+F4 Jump to the 3rd sub-block screen (Analog Input Commands)
- Alt+F6 Jump to the 4th sub-block screen (Binary Input Commands)
- Alt+F7 Jump to the 5th sub-block screen (Aux Output Commands)
- Alt+F8 Jump to the 6th sub-block screen (Paralyze Commands)

Note: The above "hot keys" allow you to jump only to the specific sub-block screen listed. After using a jump "hot key," you must return to the control block before jumping to a different sub-block screen.

- Ctrl+F Flush (remove) all commands stored in the drone *algo*.
- Ctrl+A Toggle the ASA control on and off.

3 *Algo* Control

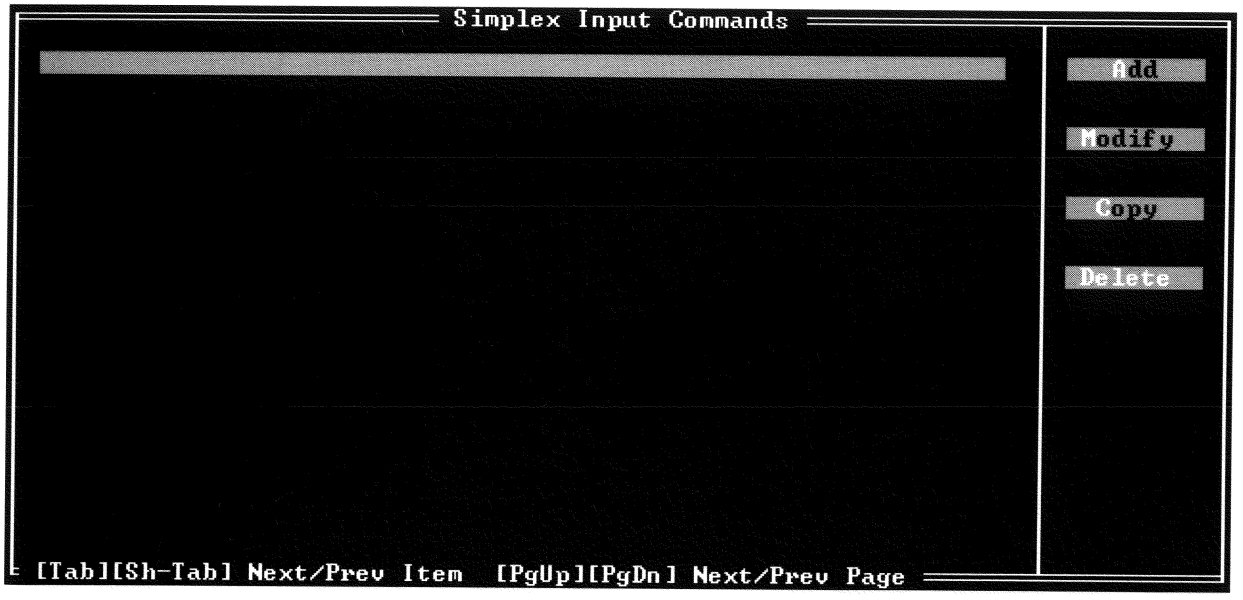
The real power of the drone lies in its algo pack containing the drone *algo* that controls its behavior when the ASA control is turned on. The drone *algo* is configured from sub-block screens or from a graphics plate. This operation guide describes only sub-blocks. See the *Graphics Plate Operation Guide* for further details. To switch to the sub-block screens, select the ASA control in the control block screen and press either Enter ↵ or ↓. The first drone sub-block screen is shown below:



A description of the drone sub-block command screens and their associated controls are described next.

3.1 Using Command Sub-block Screens

From the Drone Aux Input Setup screen (shown above) press PgDn to advance to the first command sub-block screen (shown below):

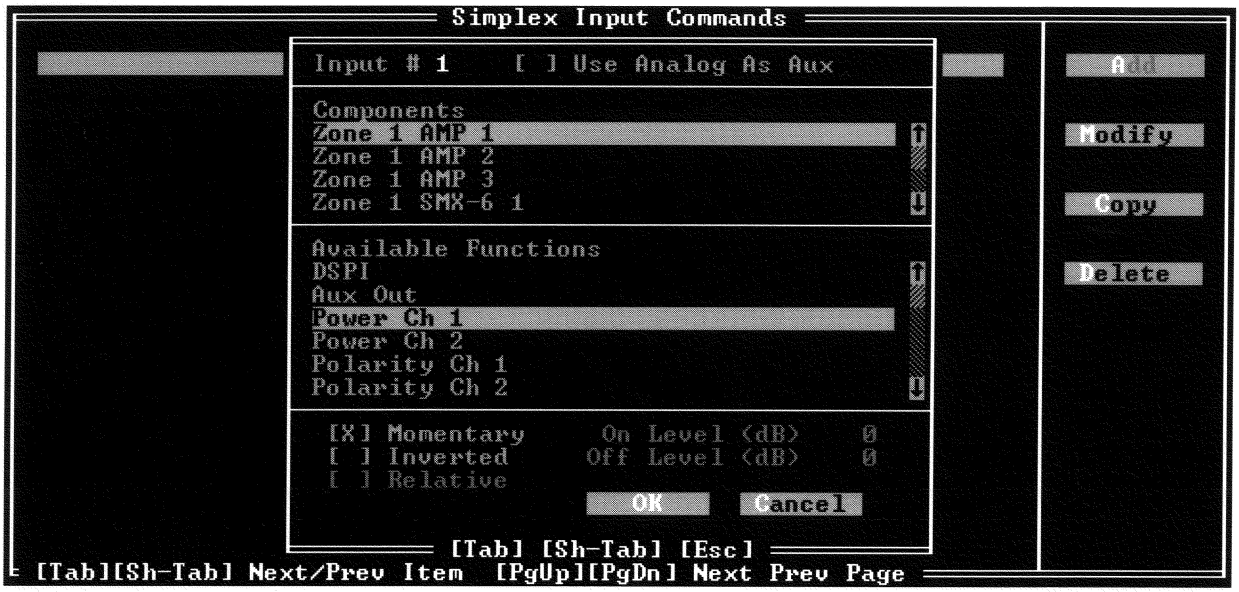


There are five command sub-block screens with the following titles:

1 Simplex Input Commands (pages 10-13)
2 Analog Input Commands (pages 16-18)
3 Binary Input Commands (pages 14-16)
4 Aux Output Commands (pages 18-19)
5 Paralyze Commands (pages 20-21)

To move from one screen to the next, press PgDn PgUp. To select a control or item in a list, press Tab, Shift+Tab or use the mouse.

Each drone command sub-block has four buttons: Add, Modify, Copy and Delete. Use ← → to switch between the command list on the left and the buttons on the right. To select a button, use ↑ ↓ or press Alt and the first letter of the button (example, press Alt+A to select the Add button). Select **Add** when you want to assign a new command to an input. For example, select Add to assign the amplifier "All Power Off" command to a switch connected to logic Input 1. Selecting Add summons a dialog box to prompt you for the assignment information.



After you have finished configuring the command assignment for the selected input, press the **OK** button and it will be added to the command list of its parent command sub-block. Press **Cancel** if you want to exit without making changes.

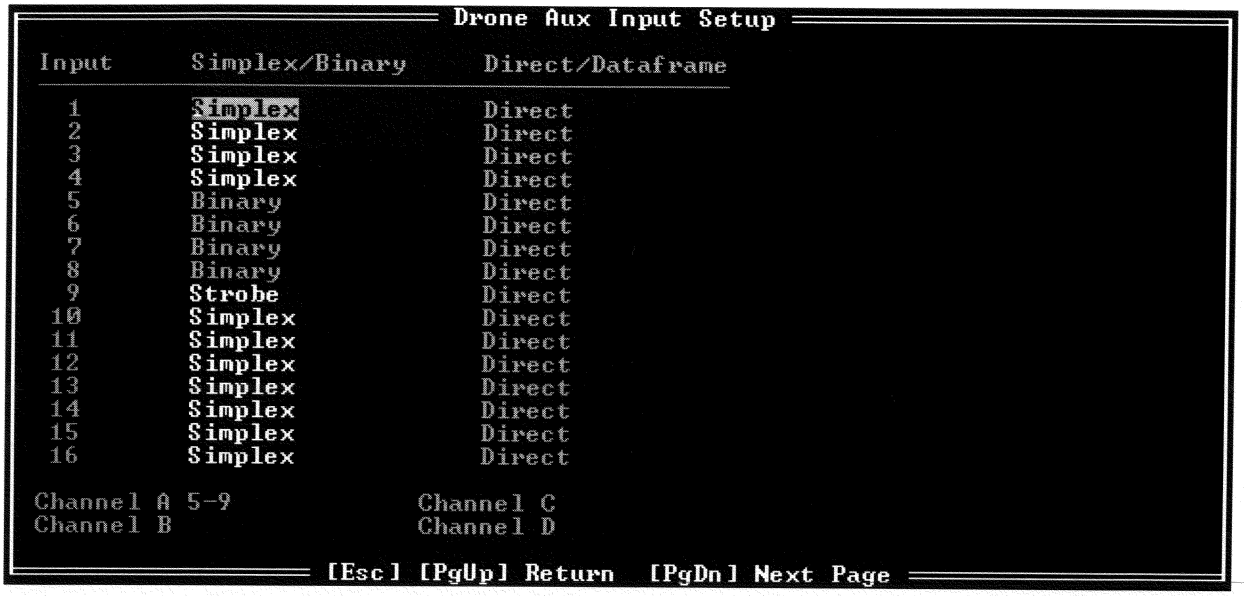
It is possible to make changes to commands that you have already assigned (added) to an input by using the **Modify** button. First, select the command assignment you want to modify. This is done by pressing Tab until the input command list is highlighted and using the ↑ ↓ or mouse to select the desired command assignment from the list. Then press the Modify button to summon the command assignment dialog box. Make any changes you want and then press the OK button.

There is a shortcut that can help speed the entry of repetitious command assignments. Use the **Copy** button to copy an existing command assignment. The command assignment dialog box will appear so you can make changes before the copied command assignment is accepted.

Finally, command assignments can be deleted from the Aux Input Commands list by first selecting the command assignment and then using the **Delete** button.

3.2 AUX (Logic) Input Setup

The logic (AUX) inputs can be used in one of two modes: simplex or binary. This is set in the first drone sub-block screen, titled Drone Aux Input Setup (shown below).



To switch a logic input between simplex and binary, select the input with ↑ ↓ and press Spacebar. Notice that binary inputs are grouped together into "channels." The groups are labelled Channel A through D and a minimum of four consecutive inputs (3 binary and 1 strobe) are required to form a binary channel. The last input of every binary channel must be used as a strobe to signal when binary codes should be read by the drone. Turning on the strobe input signals that it is time to read the inputs in the binary channel. The strobe must then cycle through another on/off cycle before the channel will be read again.

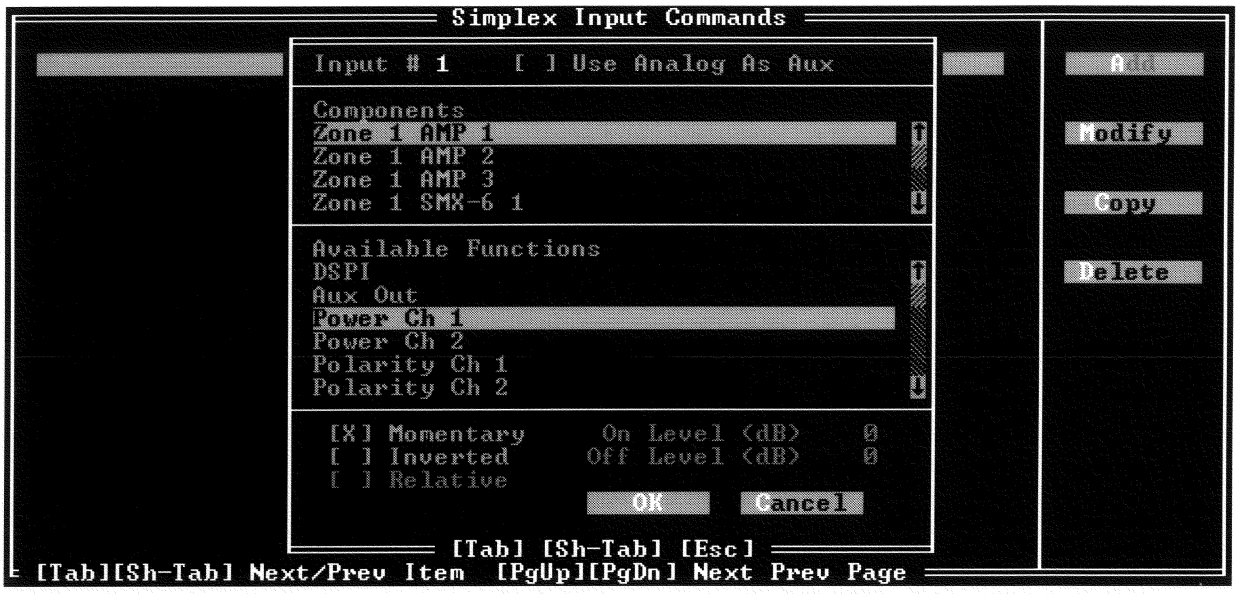
IMPORTANT: Each input can only be used in one mode at time. When an input has been set for binary operation, it cannot be used in simplex mode. Also, a binary input can be grouped into only one channel at a time—it cannot be used in two channels at the same time.

In simplex mode each input is monitored separately to see if it is on or off. The commands assigned to each input are sent as dictated by its on/off status. In binary mode the inputs are monitored as a group and their on/off states are added to create a binary code. The commands assigned to a binary code are sent only when a strobe signal is received and the on/off state of all inputs in the binary group combine to equal the code. This allows many more controls to be connected to the inputs because of the many possible combinations of on/off states. Binary mode is useful when you need to connect more controls to a drone than it has inputs or when you need to receive a digital signal.

3.2.1 Simplex Mode

In simplex mode, a logic input is treated as a stand-alone signal. Each simplex input acts as a simple on/off switch to interface to the "hard switches" or controls of the outside world. If all 16 logic inputs are set to simplex mode, then up to 16 different controls can be connected to the drone, one to each input. *Note: It is also possible to use analog inputs as simplex logic inputs. This makes it possible to have a total of 32 logic controls. This will be explained later.* For example, an on/off switch connected to one input can be used to signal that all amplifiers need to be turned on or off. A second one can be used to turn on the Auto Level *algo* of an *SMX-6*. A third one can be used to make system wide changes to several IQ components, etc.

To assign one or more commands to a simplex logic input, first use PgDn PgUp to advance to the command sub-block screen titled "Simplex Input Commands." Then select the **Add** button. The following dialog box will appear:



Only one command can be assigned to an input at a time with the command dialog box but you can assign as many commands as you want to an input by repeating the steps described next and assigning additional commands to the same input.

Enter the desired **input number** at the top. You will need to press Tab or click on it (🖱) to select it. The command to the right of the input number labelled **Use Analog As AUX** tells the drone to use an analog input instead of a logic input. (Analog inputs can be used as logic inputs.) If an analog input is used, it will be numbered after the logic inputs. In the example above, analog input #1 would be listed as logic input #17. If all the analog inputs are used as logic inputs it expands the number of logic inputs to 32 (16 logic inputs plus 16 analog "logic" inputs).

Components:

The Components list contains a list of the available IQ components. All a component needs to be included in the list is a control block. The component does not have to be on-line to appear in the list. By including off-line components it is possible to preconfigure a drone before it is connected to an actual *IQ System*. Press Tab or use 🖱 to select the Components list, then use ↑ ↓ or 🖱 to select the IQ component to which you want to send a command.

Available Functions:
The Available Functions list contains a list of the available commands for the selected IQ component. Press Tab or use to select the Available Functions list, then use ↑ ↓ or to select the command you want to send.

After you have finished assigning a command from the function list to the selected input it is possible to go back and (using the Add button again) to assign additional commands to the same input. In this way, the flip of a single switch can send a number of different commands to one or more IQ components. **IMPORTANT: Commands are executed in the order that they are added to an input.** Carefully plan the order that you want the commands to be executed before you add them to an input or else you may have to delete and reenter them later.

The following commands are available for each IQ component:

Amplifier with standard *IQ–P.I.P.* or IQ–P.I.P.BB:
- DSPI—force Data Signal Presence Indicator to stay on
- AUX Out—turn on/off AUX port output
- Power—turn on/off the high voltage supply of each channel
- Polarity—invert/restore the audio signal polarity of each channel
- Mute—mute the audio signal by setting the input attenuator to –50 dB
- Attenuation—set the input attenuation level of each channel
- All Power—turn on/off the high voltage supplies of ALL amplifiers in one zone
- All Mute—mute/unmute the input of ALL amplifiers in one zone
- All DSPI—force the DSPI lights of ALL amplifiers to stay on in one zone

Amplifier with *Smart Amp IQ–P.I.P.* includes all the above commands plus:
- ASA—turn on/off all *algos* in the *Smart Amp* algo pack
- *ODEP* Conservation—enable automatic gain reduction as *ODEP* level rises
- Smooth Output Limiter—enable "smooth" output limiting
- Smooth Output Limiter Threshold—set the point when smooth limiting begins
- Stand By—enable standby mode when no signal present
- Stand By Gate Level—set the point when the high voltage supplies turn on
- Stand By Turn Off Delay—disable turn-on delay while using standby mode
- Fault Error Reporting—show an alert message if a fault occurs
- Fault Error Input Drive Level—set the minimum drive level for a fault
- Report Fault Via AUX—turn on AUX port if a fault occurs
- *IOC* Error Reporting—show an alert message if an *IOC* error persists
- Short Error Reporting—show an alert message if a short is detected
- DSPI Flash—this control is reserved for future use
- Break Detect—disable break detect when not connected to an *IQ System*

MPX-6:
- DSPI—force Data Signal Presence Indicator to stay on
- AUX—turn on/off AUX port output
- Bus—turn on/off the audio Bus output of each channel
- Attenuation—set the attenuation level of each input and channel

SMX-6:
- DSPI—force Data Signal Presence Indicator to stay on
- AUX—turn on/off AUX port output
- Bus—turn on/off the audio Bus output of each channel
- Attenuation—set the attenuation level of each input and channel
- ASA—turn on/off all *algos* in the *SMX-6* algo pack
- Max Gain Tracks Control Block—makes Max Gain of each input equal to the control block gain settings
- Control Block Override—this control is reserved for future use

Max Gain—set the maximum gain for an input and channel
Low Set—set the "closed gate" gain for an input and channel
Gate *Algo*—turn on/off the Gate *algo*
Gate Threshold—set the point when an input gate "opens"
Duck Priority—turn on/off the Duck Priority *algo*
Input Compression—turn on/off the Input Compressor/Limiter *algo*
Input Compression Threshold—set the point when input compression begins
Auto Level—turn on/off the Auto Level *algo*
Auto Level DAOL—set the Desired Average Output Level of each input and channel
Idle Gain—set the initial level for the Auto Level *algo* when a gate "opens"
Output Compression—turn on/off the Output Compressor/Limiter *algo*
Output Compression Threshold—set the point when compression begins
Output Limiter—select which inputs and channels are compressed
Gate Count Master—turn on/off the Gate Count *algo*
Gate Count—turn on/off gate counting for each input
Lock (Attenuation)—locks output Channel 1 and 2 so that attenuation changes to one also affect the other
Lock (Max Gain)—locks output Channel 1 and 2 so that changes to the Max Gain setting of one also affect the other
Lock (Auto Level Threshold)—locks output Channel 1 and 2 so that changes to the Auto Level threshold of one also affect the other

AMB-5:

DSPI—force Data Signal Presence Indicator to stay on
AUX—turn on/off AUX port output
Bus—turn on/off the audio Bus output of each channel
Attenuation—set the attenuation level of each input of Channel 1
ASA—turn on/off all *algos* in the *AMB-5* algo pack
Max Gain Tracks Control Block—makes Max Gain of each input equal to the control block gain settings
Control Block Override—this control is reserved for future use
Max Gain—set the maximum gain for an input of Channel 1
Low Set—set the "closed gate" gain for an input of Channel 1
Gate *Algo*—turn on/off the Gate *algo*
Gate Threshold—set the point when an input gate "opens"
Duck Priority—turn on/off the Duck Priority *algo*
Input Compression—turn on/off the Input Compressor/Limiter *algo*
Input Compression Threshold—set the point when input compression begins
Auto Level—turn on/off the Auto Level *algo*
Auto Level DAOL—set the Desired Average Output Level of each input of Channel 1
Idle Gain—set the initial level for the Auto Level *algo* when a gate "opens"
Output Compression—turn on/off the Output Compressor/Limiter *algo*
Output Compression Threshold—set the point when compression begins
Output Limiter—select which inputs of Channel 1 are compressed
Gate Count Master—turn on/off the Gate Count *algo*
Gate Count—turn on/off gate counting for each input
Ambience—turn on/off the AMB *algo*
Ambience Threshold—set the point when the AMB *algo* will begin to operate

MRX-24, 24S, 12, 12S:

DSPI—force Data Signal Presence Indicator to stay on
AUX—turn on/off AUX port output
Relay—turn on/off each relay

DRN-16:
DSPI—force Data Signal Presence Indicator to stay on
AUX Output—turn on/off each logic output

Equalizer:
Store—store equalizer settings into one of ten presets per channel (A or B)
Recall—recall any stored preset

Momentary:
The Momentary command accommodates a momentary style switch. These are commonly spring-loaded push-buttons which make momentary contact when de-pressed and released. Turn on the Momentary command if you plan to connect a momentary switch to an input.

When turned on, the Momentary command causes the associated command to be sent when the switch is closed and no command to be sent when it the switch is opened. This means that any "off" command (or "on" command if the Inverted command is also turned on) will not be sent when the switch is opened.

Inverted:
The Inverted command causes the "on" and "off" commands to be reversed. The "on" commands will be sent when the switch is "off" and the "off" commands will be sent when the switch is "on."

Relative:
The Relative command is only available when a level function is selected. When the Relative command is turned on, only the On Level is used. When an input is "on", the level for the associated function will go up or down the number of dB specified by the On Level. When an input is "off", the level for the associated function will go down the same number of dB.

On/Off Level:
The On and Off Levels are only available when a level function is selected. The values entered are the levels the function will use when the input is "on" and "off", respectively.

3.2.2 Binary Mode

The difference between simplex and binary modes was introduced at the beginning of Section 3.2. Let's briefly review: Binary inputs are grouped and their on/off states added to create a binary code so that many possible signals can be received with just a few inputs. It is possible to have up to four different binary groups (called channels) and each input can be in only one group at a time. The groups are labelled Channel A through D and a minimum of four consecutive inputs (3 binary and 1 strobe) are required to form a binary channel. The last input of every binary channel must be used as a strobe. Turning on the strobe input tells the drone it is time to read the inputs in the binary channel. The strobe must then cycle through another off/on cycle before the channel will be read again. The decimal value of each input in a binary channel is listed below.

Input	Decimal Value
1	1
2	2
3	4
4	8
5	16
6	32
7	64
8	128
9	256
10	512
11	1024
12	2048
13	4096
14	8192
15	16384

Please note: Although it is physically possible to have up to 32,768 different binary codes (32,768 different binary input combinations), the maximum number of binary codes that can actually be used in a system is determined by the memory management system in the drone. At the time of this writing, systems have been installed which use over 800 binary codes. Please contact our Technical Support Group (800-342-6939 or 219-294-8200) if you require over 800 binary codes in your system.

Note: Only 15 inputs are listed above because the strobe input is not assigned a value. This limits the total number of inputs that will be used to compute a binary code to 15 even if all 16 inputs are grouped into a single binary channel.

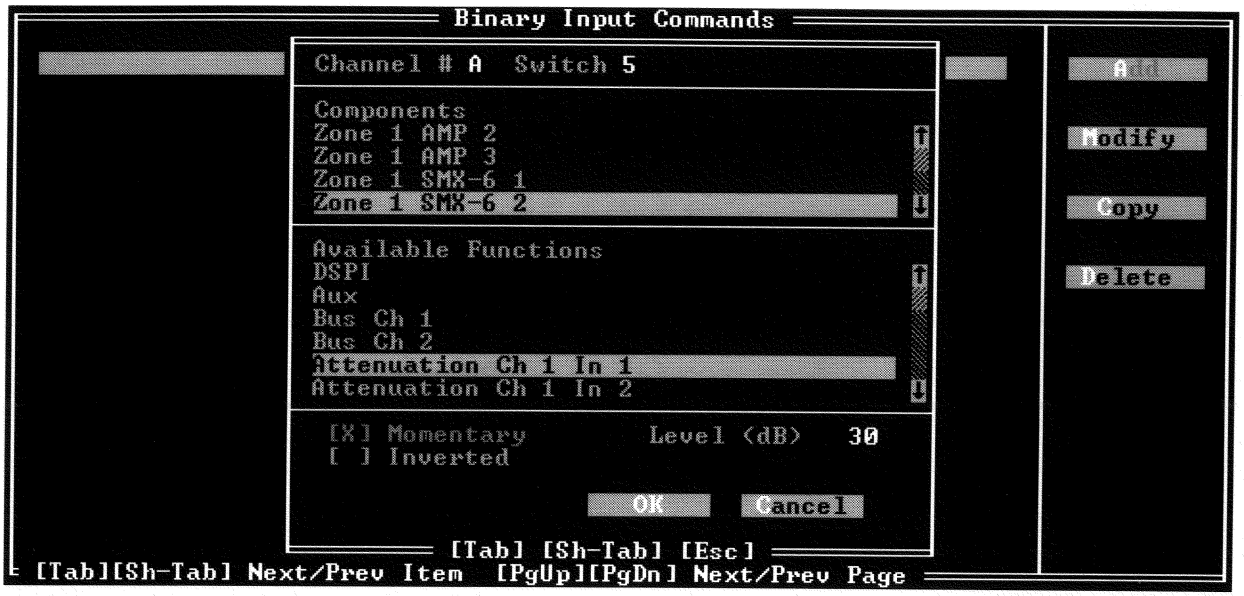
The decimal values always begin with the lowest input number in a binary channel and increase toward the highest number in the channel. For example, if inputs 5–9 are grouped into binary Channel A then Input 5 has a value of 1, Input 6 has a value of 2, Input 7 has a value of 4, Input 8 has a value of 8 and Input 9 will be the strobe.

Fortunately you don't need to understand binary math to assign a command to a binary code because *Turbo* uses familiar decimal numbers for binary codes. You are probably already familiar with this because the IQ address switch on each IQ component also creates a binary code and yet decimal numbers are used for IQ addresses. To determine the decimal value of a binary code, simply add up the decimal values of all the inputs in the binary channel that are turned on. In the preceding example, *Turbo* will read a value of 2 for the binary channel if only Input 6 is turned on. If Inputs 5, 6, 7 and 8 are all on at the same time, the binary code would be 1+2+4+8 or 15.

There are a maximum of 32,768 possible combinations if all 16 logic inputs are grouped into a single binary channel. In this case the highest possible binary code would be 32,767. That means that 32,767 different controls could be connected to a drone at one time! However, other factors limit the total (see the note above).

Note: Although analog inputs can double as simplex logic inputs (see Section 3.2.1), they cannot be used as binary logic inputs.

To assign one or more commands to the binary code of a channel, first use PgDn PgUp to advance to the command sub-block screen titled "Binary Input Commands." Then select the **Add** button. The following dialog box will appear:



Only one command can be assigned to an input at a time with the command dialog box but you can assign as many commands as you want to an input by repeating the steps described next and assigning additional commands to the same input.

Enter the desired **Channel letter** (A, B, C or D) at the top. Then press Tab (or mouse) to select the **Switch number**. Remember that binary mode allows the use of many more switches than there are inputs. The switch number is the same as the binary code number, representing the sum of the values of all the binary inputs that are turned "on" by the switch.

Components:
The Components list contains a list of the available IQ components. All a component needs to be included in the list is a control block. The component does not have to be on-line to appear in the list. By including off-line components it is possible to preconfigure a drone before it is connected to an actual *IQ System*. Press Tab or use mouse to select the Components list, then use ↑ ↓ or mouse to select the IQ component to which you want to send a command.

Available Functions:
The Available Functions list contains a list of the available commands for the selected IQ component. Press Tab or use mouse to select the Available Functions list, then use ↑ ↓ or mouse to select the command you want to send.

After you have assigned a command from the function list to the selected control it is possible to go back and (using the Add button again) assign additional commands to the same control. In this way, the flip of a single switch can send a number of different commands to one or more IQ components. **IMPORTANT: Commands are executed in the order that they are added to an input.** Carefully plan the order that you want the commands to be executed before you add them to an input or else you may have to delete and reenter them later. For example, you may want to mute one input before unmuting another.

Note: The same commands (functions) are available for the binary inputs as the logic inputs. They are listed on pages 11-13.

Momentary:
Unlike simplex inputs, the binary inputs function only as momentary style inputs—only one set of commands ("on" or "off" commands) can be used at a time.

Inverted:
The Inverted command causes all of the "off" commands assigned to a binary switch (rather than "on" commands) to be sent when the strobe signal is received.

Level:
The Level control is only available when a level function is selected. The value entered will be used when the function is activated.

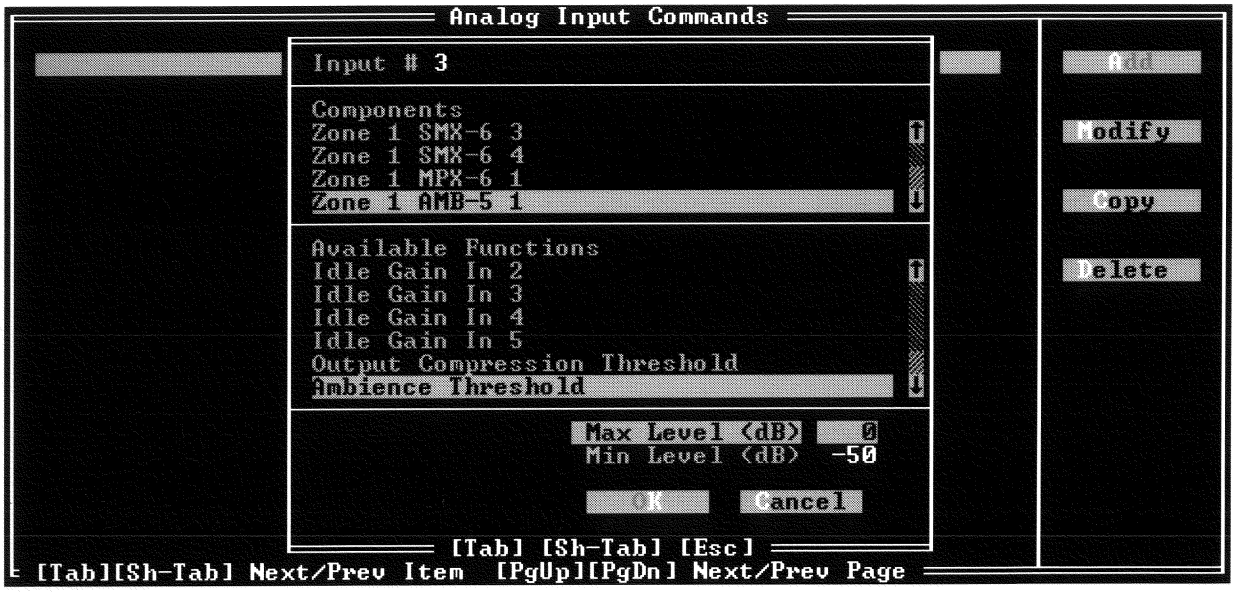
3.3 Analog Input Setup

The analog inputs enable the drone to respond to level controls. A wide variety of commands can be assigned to an analog input just like a logic input.

Note: If desired, analog inputs can be used as simplex logic inputs. This is controlled by the "Use Analog as Aux" command in the AUX Input Commands sub-block screen. See Section 3.2 for more details.

The Analog Input Commands sub-block screen is located between the AUX Input Commands sub-block screen and Binary Input Commands sub-block screen. It is used to assign commands to any of the 16 analog inputs.

To assign one or more commands to an analog input, first use PgDn PgUp to advance to the command sub-block screen titled "Analog Input Commands." Then select the **Add** button. The following dialog box will appear:



Only one command can be assigned to an input at a time with the command dialog box but you can assign as many commands as you want to an input by repeating the steps described next and assigning additional commands to the same input.

Begin by entering the analog **input number** at the top of the command dialog box.

Components:
The Components list contains a list of the available IQ components. All a component needs to be included in the list is a control block. The component does not have to be on-line to appear in the list. By including off-line components it is possible to preconfigure a drone before it is connected to an actual *IQ System*. Press Tab or use to select the Components list, then use ↑ ↓ or to select the IQ component to which you want to send a command.

Available Functions:
The Available Functions list contains a list of the available commands for the selected IQ component. Press Tab or use to select the Available Functions list, then use ↑ ↓ or to select the command you want to send.

After you have finished assigning a command from the function list to the selected input it is possible to go back and (using the Add button again) to assign additional commands to the same input. In this way, a single level control can control can control more than one function. **IMPORTANT: Commands are executed in the order that they are added to an input.** Carefully plan the order that you want the commands to be executed before you add them to an input or else you may have to delete and reenter them later.

The following "analog" commands are available for each IQ component:

Amplifier with standard *IQ–P.I.P.* or IQ–P.I.P.BB:
- Attenuation—set the input attenuation level of each channel

Amplifier with *Smart Amp IQ–P.I.P.* includes all the above commands plus:
- Smooth Output Limiter Threshold—set the point when smooth limiting begins
- Stand By Gate Level—set the point when the high voltage supplies turn on
- Fault Error Input Drive Level—set the minimum drive level for a fault

MPX-6:
- Attenuation—set the attenuation level of each input and channel

SMX-6:
- Attenuation—set the attenuation level of each input and channel
- Max Gain—set the maximum gain for an input and channel
- Low Set—set the "closed gate" gain for an input and channel
- Gate Threshold—set the point when an input gate "opens"
- Input Compression Threshold—set the point when input compression begins
- Auto Level DAOL—set the Desired Average Output Level of each input and channel
- Idle Gain—set the initial level for the Auto Level *algo* when a gate "opens"
- Output Compression Threshold—set the point when compression begins

AMB-5:
- Attenuation—set the attenuation level of each input of Channel 1
- Max Gain—set the maximum gain for an input of Channel 1
- Low Set—set the "closed gate" gain for an input of Channel 1
- Gate Threshold—set the point when an input gate "opens"
- Input Compression Threshold—set the point when input compression begins
- Auto Level DAOL—set the Desired Average Output Level of each input of Channel 1
- Idle Gain—set the initial level for the Auto Level *algo* when a gate "opens"
- Output Compression Threshold—set the point when compression begins
- Ambience Threshold—set the point when the AMB *algo* will begin to operate

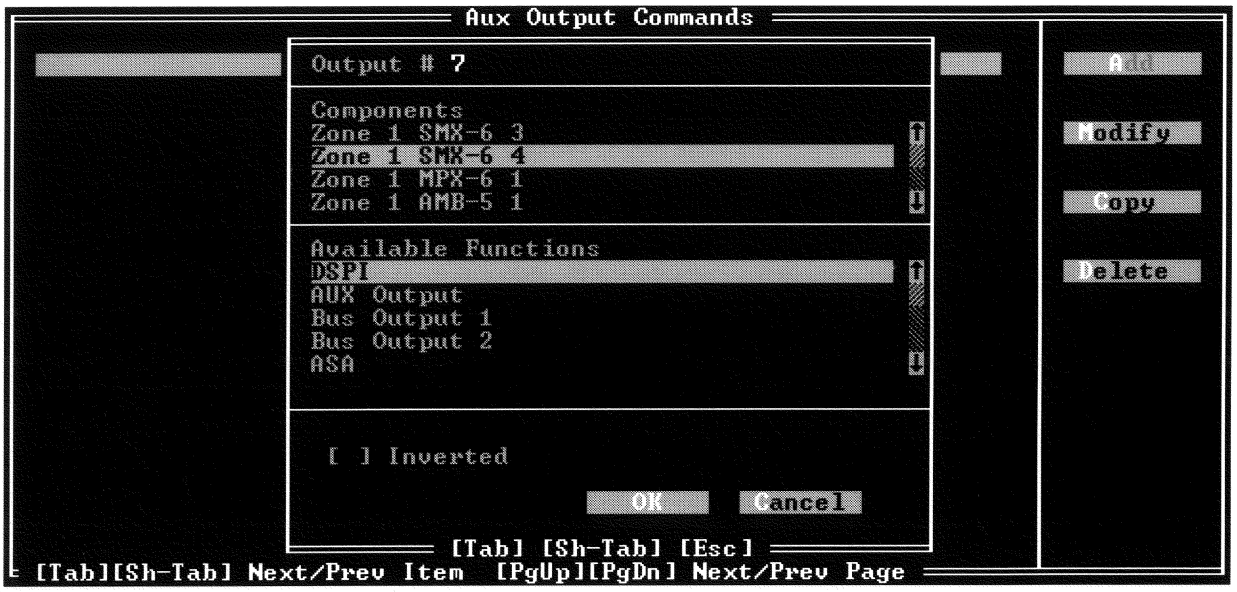
Max/Min Level:
The Max and Min Levels set the range for a level control. The Max Level is the level used by the selected command when the input is turned up to its highest setting. The Min Level is the level used by the selected command when the control at the input is turned down to its lowest setting.

3.4 AUX (Logic) Output Setup

Logic (AUX) outputs are provided to signal other components in the system. These need not be IQ components. They can also be used to provide monitoring capability to a custom control panel. For example, a logic output can be used to drive a "power" LED to indicate on a remote control panel that an amplifier is turned on. A wide variety of things can be monitored by the drone and used to turn a logic input on or off.

The Aux Output Commands sub-block screen is located between the Binary Input Commands sub-block screen and Paralyze Commands sub-block screen. It is used to assign monitor functions to any of the 16 logic (AUX) outputs.

To assign one or more commands to a logic output, first use PgDn PgUp to advance to the command sub-block screen titled "AUX Output Commands." Then select the **Add** button. The following dialog box will appear:



Only one monitor function can be assigned to an output at a time with the command dialog box but you can assign as many functions as you want to an output by repeating the steps described next and assigning additional commands to the same input.

Begin by entering the desired logic (AUX) **output number** at the top of the command dialog box.

Components:
The Components list contains a list of the available IQ components. All a component needs to be included in the list is a control block. The component does not have to be on-line to appear in the list. By including off-line components it is possible to

preconfigure a drone before it is connected to an actual *IQ System*. Press Tab or use to select the Components list, then use ↑ ↓ or to select the IQ component to which you want to monitor.

Available Functions:
The Available Functions list contains a list of the functions that can be monitored for the selected IQ component. Press Tab or use to select the Available Functions list, then use ↑ ↓ or to select the function you want to monitor.

After you have finished linking a function from the list to the selected output it is possible to go back and (using the Add button again) to assign additional functions to the same output. In this way, more than one monitor function can cause the same output to turn on (or off).

The following monitor functions are available for each IQ component:

Amplifier with standard *IQ–P.I.P.* or IQ–P.I.P.BB:
- DSPI—monitor the on/off state of the Data Signal Presence Indicator
- AUX Out—monitor the on/off state of the AUX port output
- Power—monitor the on/off state of the high voltage supply of each channel
- Mute—monitor whether or not the audio signal has been muted
- Polarity—monitor whether or not the polarity of the audio signal of each channel has been inverted

Amplifier with *Smart Amp IQ–P.I.P.* includes all the above commands plus:
- *IOC*—monitor whether or not an *IOC* error occurs
- ASA—monitor the on/off state of the ASA control

MPX-6:
- DSPI—monitor the on/off state of the Data Signal Presence Indicator
- AUX—monitor the on/off state of the AUX port output
- Bus—monitor the on/off state of the audio Bus output of each channel

SMX-6:
- DSPI—monitor the on/off state of the Data Signal Presence Indicator
- AUX—monitor the on/off state of the AUX port output
- Bus—monitor the on/off state of the audio Bus output of each channel
- ASA—monitor the on/off state of the ASA control

AMB-5:
- DSPI—monitor the on/off state of the Data Signal Presence Indicator
- AUX—monitor the on/off state of the AUX port output
- Bus—monitor the on/off state of the audio Bus output of each channel
- ASA—monitor the on/off state of the ASA control

MRX-24, 24S, 12, 12S:
- DSPI—monitor the on/off state of the Data Signal Presence Indicator
- AUX—monitor the on/off state of the AUX port output
- Relay—monitor the on/off state of each relay

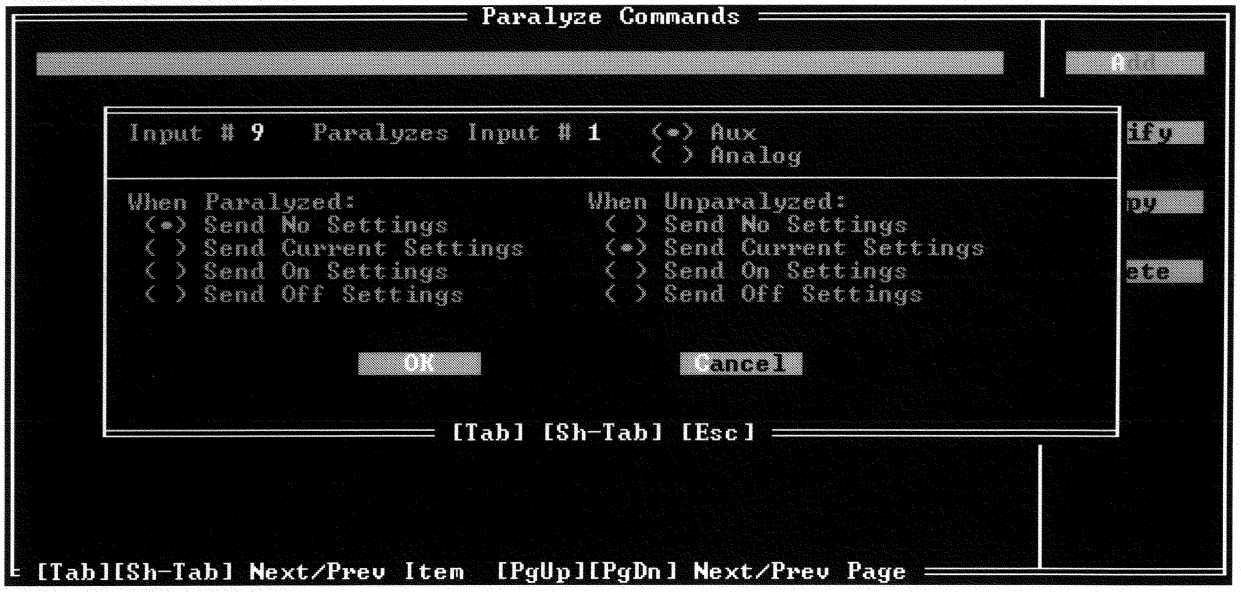
DRN-16:
- AUX Input—monitor the on/off state of each logic input
- Paralyze AUX—monitor whether or not each logic input has been "paralyzed"
- Paralyze Input—monitor whether or not each analog input has been "paralyzed"
- Busy—monitor whether or not the drone is ready to receive new input

Inverted:
The Inverted command causes the logic output to switch "on" when the function being monitored is "off" rather than "on."

3.5 Paralyze Setup

When the drone responds to an input it is sometimes necessary to temporarily ignore other inputs. When inputs are ignored, their operation is said to be "paralyzed." Only logic (AUX) inputs can trigger a paralyze command.

The Paralyze Commands sub-block screen is the last command screen. Use PgDn to advance to it. Then select the **Add** button. The following dialog box will appear:



Only one paralyze assignment can be made at a time with the command dialog box but you can make as many paralyze assignments as you want by repeating the steps described next.

Begin by entering the desired logic (AUX) **input number** in the upper left of the command dialog box. This is the logic input that will cause other inputs to be paralyzed whenever it is "on." Next, enter the **paralyze input number** and specify whether it is a **logic** (AUX) or **analog input**. This is the input that will be paralyzed when the first input is "on." *Note: More than one input can be paralyzed at a time by assigning additional paralyze commands to the same controlling input.*

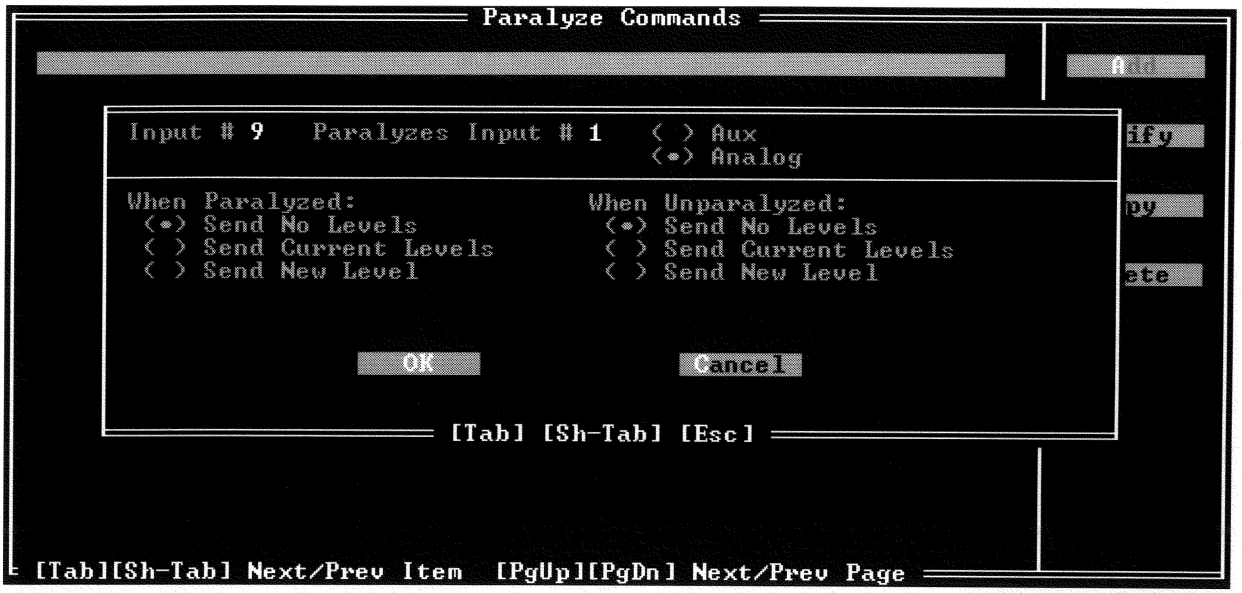
In the example depicted above, logic Input 1 will be paralyzed when logic Input 9 is turned "on." This means that any commands assigned to Input 1 will be ignored until after Input 9 goes "off." When Input 9 goes "off", the commands assigned to Input 1 will be sent (depending upon its on/off state at that time).

If an analog input is selected as the paralyze input instead of a logic (AUX) input, the paralyze dialog box will display different commands. An example is shown on the next page.

When Paralyzed:

You can determine what actions, if any, will be taken when an input is first paralyzed. The choices vary depending upon the type of input selected (AUX or Analog).

AUX Input: You can prevent any commands from being sent by selecting **Send No Settings** or you can force the current settings to be sent by selecting **Send Current Settings**. This latter choice will cause the "on" settings to be sent if the input



happens to be "on" and the "off" settings to be sent if it happens to be "off." You can also force the "on" or "off" settings to be sent regardless of the on/off state of the input by selecting **Send On Settings** or **Send Off Settings**.

Analog Input: You can prevent any levels from being changed by selecting **Send No Levels** or you can force the current level settings to be sent by selecting **Send Current Levels**. You can also send a new level by selecting **Send New Level**. A line will appear below the Send New Level command to prompt you for a desired level. Press Tab to move to it and enter the new level.

When Unparalyzed:
You can determine what actions, will be taken when an input is first unparalyzed. The choices vary depending upon the type of input selected (AUX or Analog).

AUX Input: You can prevent any commands from being sent by selecting **Send No Settings** or you can force the current settings to be sent by selecting **Send Current Settings**. This latter choice will cause the "on" settings to be sent if the input happens to be "on" and the "off" settings to be sent if it happens to be "off." You can also force the "on" or "off" settings to be sent regardless of the on/off state of the input by selecting **Send On Settings** or **Send Off Settings**.

Analog Input: You can prevent any levels from being changed by selecting **Send No Levels** or you can force the current level settings to be sent by selecting **Send Current Levels**. You can also send a new level by selecting **Send New Level**. A line will appear below the Send New Level command to prompt you for a desired level. Press Tab to move to it and enter the new level.

This guide describes how to operate a drone using control blocks and sub-blocks. It is also possible to operate a drone from a graphics plate. Please refer to the *Graphics Plate Operation Guide* for additional instructions.