DTC-100 V6

Introduction

The DTC-100 is a programmable controller for antenna rotators. It can interface with a variety of Rotators including Yaesu, HyGain, Orion 2800, RT4500HD, Alpha SPID, and others using 24-32Vdc or 24Vac motors. The user interface is a full color 5" touch screen display. Antenna rotation can be controlled with a single touch of the LCD, or via standard protocol RS232 (TTL) from various computer programs.

Power-up Screen

Upon initially applying power a "Sign-On" screen will appear. The user has the option to calibrate "CAL", configure "CFG", or jump to the main user screen.

Rear Panel Connections

DTC-100 uses a standard IEC 320 connector block with fuse. A 6 foot 110VAC cord is included with all US shipments.

A pluggable terminal block on the rear panel allows connections for either Yaesu or HyGain rotators. A mating connector has been supplied to facilitate wiring. Be sure to follow the Connection diagram before proceeding. *Optional Terminal Block Adapter cables are available for those not wishing to cut the connector off existing cable*.

Connections to programs such as PST Rotator and HRD are made using an optional USB to RS232TTL adapter (FTDI chip). This generic adapter can be purchased directly from AALogic, or other supply vendors.

- USB-A to 3.5mm audio plug, TXD Tip, RXD Ring, Sleeve GND

Calibration

The Calibration screen can be found by turning the DTC-100 on and pressing “CAL” button on the lower left side of the screen. Upon entry the user is prompted to check Rotator Type. If the desired Rotator is not illuminated (GREEEN), press the desired type (the user will be prompted to check wiring connection before proceeding), then press OK/NEXT button to begin the calibration process. Based on the selection the DTC-100 automatically configures internal circuitry to provide proper power and measurement components for position information display.

Rotator Type Options:

G450DC, G800, G1000, or G2800.

HyGain, 24-30 VAC motor, resistive feedback sensor, Limit switches

HyGain, 24-30 VAC motor, Pulse Position feedback, Limit switches

RT4500HD, 24VDC motor, Pulse Position, NO limit switches

Orion model 2800, Pulse Position feedback, Limit Switches

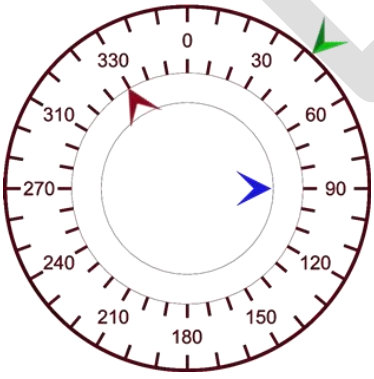
Alpha SPID, 24VDC motor, Pulse Position feedback, NO limit switches

YAESU, G450(DC motor), G800, G1000, G2800

Yaesu rotators use a potentiometer to provide antenna position feedback with a resolution of approximately 1 ohm per degree of movement. Once the user inputs the physical antenna direction the DTC-100-V6 computes the rotator End Points and plots position based on potentiometer resolution.

An alternate, debatably more accurate, is for the DTC-100 to conduct a full CW and CCW rotation measurement. This method still requires the user to enter antenna position prior to invoking Auto Calibration.

The direct method allows the user to set both the current antenna position and Soft Limits to prevent overtravel. These limits must be within the mechanical Hard Limit range. The Auto Calibrate method automatically finds the physical limit switches and sets the Soft Limits to the Hard Limit parameters. Either of these methods can be used to calibrate the system; however, unless specific Soft Limits are needed, the Auto Calibrate is recommended.



The center screen circle provides a means to input the Antenna Position. The DTC will compute the estimated End Points (CCW/CW limits) for display. Three ICONS, RED, BLUE, and GREEN, indicate the selected entry for CCW, ANT, and CW accordingly.

YAESU, G450DC, G800, G1000, G2800 (continued)

The "+1" button to the right numeric value will ADD an additional 360 degrees to the entered angular value. This allows a full rotation entry from the position ICON.

The GREEN CW ICON in the above example demonstrates the purpose of the "+1". As the antenna rotates clockwise it must pass 360 degrees to stop at 42 (402 degrees rotation).

During Auto Calibration a "Status" window is used to display user instructions/steps and general progress messages. Below represents messages and associated button presses needed to begin calibration.

Rotor Type OK?

User is allowed to change rotator type. When complete press OK to continue.

Ent Ant Position

Enter Current Antenna position by touching the outer portion of the circle, then fine adjust with "+/-" buttons. When satisfied, press the ANT button to save results. The "NEXT" button moves to the next guided step.

Enter Auto / Man Cal

CALIB will initiate Full CW/CCW rotation measuring end points. Status Window informs user of progress. Selecting "**Set LM**" instructs user to enter CCW and CW limits (End Points).

Guided Instructions for Setting Limits

BACK keypress used to re-enter previous value, NEXT advances to next entry. As an option the User is allowed to enter both CW/CCW limits at the same step.

YAESU, G450DC, G800, G1000, G2800 (continued)

Pressing the CALIB button will begin automatic calibration. A full CW rotation will begin, stopping when the hardware limit is reached, then likewise rotate full CCW. This will establish rotational “hard” limits.

During Auto Calibrate the status window will provide direction information as an indication of calibration progress.

Save Settings ?

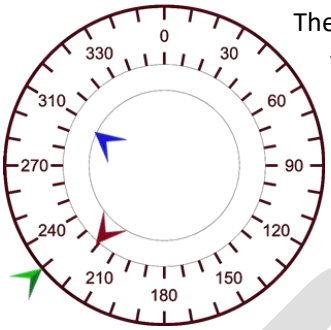
When the Auto Calibration has completed the user can save the calibrated values to permanent memory.

HyGain, Ham III, Ham IV, TailTwister, CDE models with 500 ohm sensors

HyGain rotators use a potentiometer to provide antenna position feedback with a resolution of approximately 1.4 ohms per degree of movement. Once the user inputs the physical antenna direction the DTC-100-V6 computes the rotator End Points based on potentiometer readings.

An alternate, debatably more accurate, is for the DTC-100 to conduct a full CW and CCW rotation measurement. This method still requires the user to enter antenna position prior to invoking Auto Calibration.

The direct method allows the user to set both the current antenna position and Soft Limits to prevent overtravel. These limits must be within the mechanical Hard Limit range. The Auto Calibrate method automatically finds the physical limit switches and sets the Soft Limits to the Hard Limit parameters. Either of these methods can be used to calibrate the system; however, unless specific Soft Limits are needed, the Auto Calibrate is recommended.



The center screen circle provides a means to input the Antenna Position. The DTC will then compute the estimated End Points (CCW/CW limits) for display. Three ICONS, RED, BLUE, and GREEN, indicate the selected entry for CCW, ANT, and CW accordingly.

The ICONS shown indicate the CCW limit is 220 degrees, antenna position is at 310 degrees, with a user limit set for CW rotation at 250 degrees.

During Auto Calibration the "Status" window is used to display user instructions/steps and general progress messages. Below represents messages and associated button presses needed to begin calibration.

Message / Status

Rotor Type OK?

User is allowed to change rotator type. When complete press OK to continue.

Ent Ant Position

Enter Current Antenna position by touching the outer portion of the circle, then fine adjust with "+/-" buttons. When satisfied, press the ANT button to save results. The "NEXT" button moves to the next guided step.

HyGain (continued)

Enter Auto / Man Cal

CALIB will initiate Full CW/CCW rotation measuring end points. Status Window informs user of progress. Selecting "**Set LM**" instructs user to enter CCW and CW limits (End Points).

Guided Instructions for Setting Limits

BACK keypress used to re-enter previous value, NEXT advances to next entry. As an option the User is allowed to enter both CW/CCW limits at the same step.

Pressing the CALIB button will begin automatic calibration. A full CW rotation will begin, stopping when the hardware limit is reached, then likewise rotate full CCW. This will establish rotational "hard" limits.

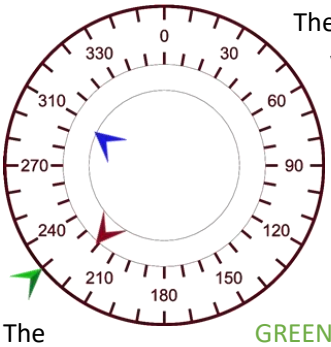
During Auto Calibrate the status window will provide direction information as an indication of calibration progress.

When the Calibration has completed the user can save the calibrated values to permanent memory.

HyGain, DCU-3 with Pulse Feedback

DCU-3 HyGain rotator generates pulse as it rotates to provide position information. In addition, there are two end of travel hardware limit switches to prevent over-rotation. Unlike absolute encoders, the reference point is established from the CCW and CW rotational limits. Until at least one of these points have been established, it is impossible to determine the position of the rotator.

.



The center screen circle provides a means to input the Antenna Position. The DTC will then compute the estimated End Points (CCW/CW limits) for display. Three ICONS, RED, BLUE, and GREEN, indicate the selected entry for CCW, ANT, and CW accordingly.

The ICONS shown indicate the CCW limit is 220 degrees, antenna position is at 310 degrees, with a user limit set for CW rotation at 250 degrees.

The GREEN CW ICON in the above example illustrates the purpose of the "+1". As the antenna rotates clockwise it must pass 360 degrees to stop at 42 (402 degrees rotation).

During Calibration the "Status" window is used to display user instructions/steps and general progress messages. Below represents messages and associated button presses needed to begin calibration.

Message / Status

Rotor Type OK?

User is allowed to change rotator type. When complete press OK to continue.

Ent Ant Position

Enter Current Antenna position by touching the outer portion of the circle, then fine adjust with "+/-" buttons. When satisfied, press the ANT button to save results.

Enter Auto / Man Cal

CALIB will initiate Full CW/CCW rotation measuring end points. Status Window informs user of progress. Selecting "**Set LM**" instructs user to enter CW Soft limit (End Points).

DCU-3 (continued)

Pulse Feedback rotators must initially establish a reference point. When "**Set LM"** is selected the rotator moves fully CCW in order to find the start point. Upon completion the user is allowed to enter the CW Soft limit.

Completion of the CCW rotation the user can set the CW Soft Limit. Press NEXT to advance to Save option.

Automatic Calibration

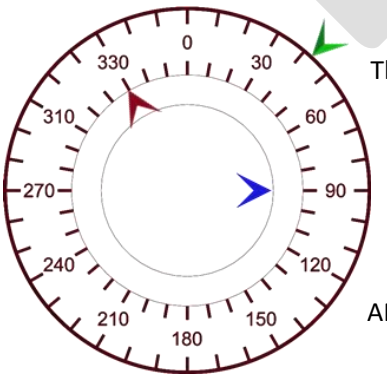
Pressing the CALIB button will begin automatic calibration. A full CW rotation will begin, stopping when the hardware limit is reached, then likewise rotate full CCW. This will establish rotational "hard" limits.

During Auto Calibrate the status window will provide direction information as an indication of calibration progress.

When the Calibration has completed the user can save the calibrated values to permanent memory.

OR28, Orion 2800

The Orion 2800 generates pulse as it rotates to provide position information. In addition, there are two end of travel hardware limit switches to prevent over-rotation. Unlike absolute encoders, the reference point is established from the CCW and CW rotational limits. Until these points have been established, it is impossible to determine the position of the rotator.



The center screen circle provides a means to input CCW limit Antenna Position, and CW limit. Press the outer portion of the circle will set coarse angular value. The "+/-" buttons are used to fine tune the value. Once satisfied with angular entry, press the associated buttons to the right of the circle to save to memory.

Three ICONS, RED, BLUE, and GREEN, indicate the selected entry for CCW, ANT, and CW accordingly.

OR28, Orion 2800 (continued)

The "+1" button to the right numeric value will ADD an additional 360 degrees to the entered angular value. This allows a full rotation entry from the position ICON.

The GREEN CW ICON in the above example illustrates the purpose of the "+1". As the antenna rotates clockwise it must pass 360 degrees to stop at 42 (402 degrees rotation).

During Auto Calibration the "Status" window is used to display user instructions/steps and general progress messages. Below represents messages and associated button presses needed to begin calibration.

Message / Status

Rotor Type OK?

User is allowed to change rotator type. When complete press OK to continue.

Ent Ant Position

Enter Current Antenna position by touching the outer portion of the circle, then fine adjust with "+/-" buttons. When satisfied, press the ANT button to save results.

Enter Auto / Man Cal

CALIB will initiate Full CW/CCW rotation measuring end points. Status Window informs user of progress. Selecting "**Set LM**" instructs user to enter CW Soft limit (End Points).

Pulse Feedback rotators must initially establish a reference point. When "**Set LM"** is selected the rotator moves fully CCW in order to find the start point. Upon completion the user is allowed to enter the CW Soft limit.

Completion of the CCW rotation the user can set the CW Soft Limit. Press NEXT to advance to Save option.

Automatic Calibration

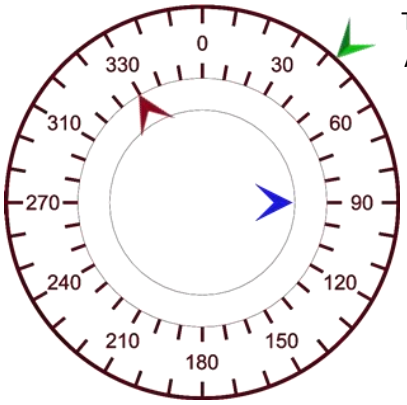
Pressing the CALIB button will begin automatic calibration. A full CW rotation will begin, stopping when the hardware limit is reached, then likewise rotate full CCW. This will establish rotational “hard” limits.

During Auto Calibrate the status window will provide direction information as an indication of calibration progress.

When the Calibration has completed the user can save the calibrated values to permanent memory.

RT45, RT4500HD, DX Engineering

The RT2800 generates pulse as it rotates to provide position information. Unlike other pulsed rotators with pulse feedback, there are no limit switches to restrict antenna movement positioning. This allows the user to immediately establish a starting point as well as setting Soft End Points. While the user is free to set these points as desired, the DTC-100 limits the maximum deviation to 540 degrees.



The circle at the center of the screen provides a means to input CCW limit, Antenna Position, and CW limit. Press the outer portion of the circle will set coarse angular value. The "+/-" buttons are used to fine tune the value. Once satisfied with angular entry, pressing the associated buttons to the right of the circle saves results to memory.

Three ICONS, RED, BLUE, and GREEN, indicate the selected entry for CCW, ANT, and CW accordingly.

The "+1" button to the right side of the numeric value will ADD an additional 360 degrees to the entered angular value. This allows a full rotation entry from the position ICON.

The GREEN CW ICON in the above example illustrates the purpose of the "+1". As the antenna rotates clockwise it must pass 360 degrees to stop at 42 (402 degrees rotation).

The below messages show the sequence of events during rotator setup. Once the rotor type has been selected the DTC-100 will guide the user through the various steps. The user is also free to enter all three parameters at once and merely pressing "NEXT" to advance to the next step. Upon completion the DTC-100 will verify settings and direct the user to modify settings in the event the entries are beyond rotational limits.

Message / Status

Rotor Type OK?

User is allowed to change rotator type. When complete press OK to continue.

Ent Ant Position

Enter Current Antenna position by touching the outer portion of the circle, then fine adjust with "+/-" buttons. When satisfied, press the ANT button to save results.

Enter CCW Limit

The CCW Limit is the counter-clockwise travel from the Antenna position entered above. Press the "NEXT" button to advance to next entry.

Enter CW Limit

Enter CW limit, the clockwise rotational limit. For rotation beyond 360 degrees the "+1" button can be used. Press once to add 360 degrees, press again to subtract 360 degrees.

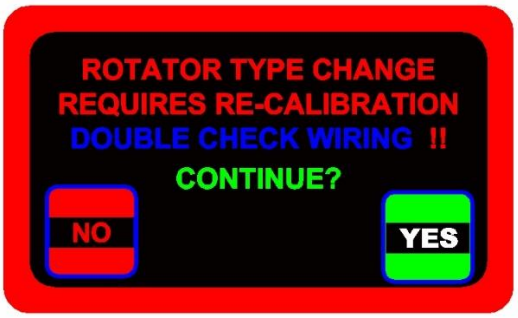
NOTE: The "BACK" button decrements the entry position.

After antenna position and limits have been entered the DTC-100 checks the validity of the entry and signals the user with "Decrease Limits" if beyond acceptable rotational limit of 540 degrees.

Save Settings ?

When the Auto Calibration has completed the user can save the calibrated values to permanent memory.

Rotator Type Change



- Rotator Type POP-UP window
  - This screen is a warning which is only visible when trying to change rotator types. This reminds the user to double check wiring and confirm motor type before proceeding. Selecting the incorrect setting could possibly damage your rotator. DO NOT EXIT or SAVE settings on CFG screen unless certain of rotator type and correct connections.

Configure

- The user configuration screen can be accessed from the “Power-UP” or “MAIN” screen.

- LCD Screen Brightness
  - Press “SEL” below the vertical bar graph, then UP/DWN arrows to set desired brightness during the active time of the Controller. (See CAL screen for LCD dimmer functions)
- Start/Stop Delay Time
  - Press “SEL” to activate. These controls provided a means to control when motor power is applied after release of the brake, and how long after motor power is removed before brake is again engaged.

- COAST
  - Due to momentum of the antenna in certain cases it is desired to release motor power prior to reaching the target direction. As an example: If the target is set to 90 degrees, the motor power will be terminated before reaching target by this setting.
- YAESU Speed Control
  - Yaesu motors do not have separate brake control line. The DTC-100 will slowly begin rotation before ramping up to full speed. Likewise, when approaching target direction the motor speed will be reduced. The settings SLOW/FAST selects the voltage level sent to the motor during Start/Run and Run/Stop periods.
- Next Screen
  - Selects second configure screen, Sleep Timer.

Sleep Timer

A sleep timer can be used to decrease screen illumination after a period of time. Adjusting intensity will set the intensity from max brightness to completely OFF. Time interval from last touch adjustment to dim level is also adjustable To disable the timer function select “Time Out” and decrease setting until no cyan bars are shown.

Memory

The 6 memory slots can be accessed by pressing the “MEM” button on the main screen.

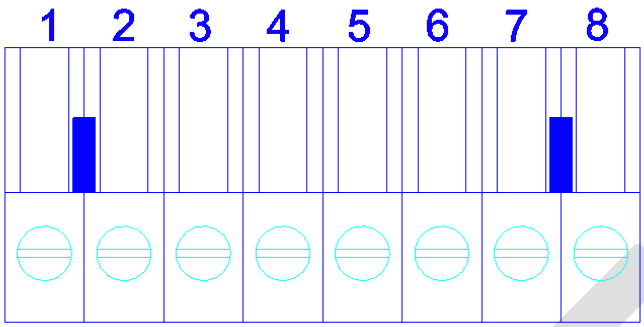
- Left Circular Dial
  - Analog Indicator for desired antenna azimuth.
    - Touching the steering DOT will allow coarse setting of azimuth
    - (+)/(-) buttons can be used for fine adjust.
- Large numeric indication of desired memory input
- M1-M6 Copies azimuth indication into associated memory location.
- SAVE - saves all memory slots in non-volatile memory
- EXIT - Exits ***without*** saving in permanent memory

Main User Screen

- Single Touch Circular Dial
  - Large Analog Indicator displays antenna azimuth.
    - Touching the circle spokes at the desired destination initiates rotation
  - Large numeric indicators display destination input and antenna position
  - Press and hold CCW / CW for manual operation.
- STOP
  - Begins the halt sequence as set on CFG screen.
- CFG
  - Shortcut to the configuration screen.
- MEM
  - Shortcut to memory setup screen
- Memory Keys
  - Shortcut to preset memory location as defined on the memory setup screen
  - Numeric indications show memorized settings
  - Single touch action. Automatically starts rotation.
- RMT Indicator
  - Illuminated during rotation initiated by PC command. If the PC application used is set to quarry the DTC for azimuth changes this LED will flash to indicator active connection.
- OVR
  - Indicates rotation beyond 360 degree reference point

Terminal Block Connections

REAR PANEL TERMINAL BLOCK



YAESU G450, G800, G1000, G2800:

1.) NC
2.) NC
3.) Motor, Yaesu, Pin 4
4.) Motor, Yaesu, Pin 5 & Potentiometer, GND pin 3
5.) NC
6.) NC
7.) TB-7 to TB-8
8.) Potentiometer, wiper pin 2

HyGain, HAMIV, TailTwister, CDE

1.) Brake
2.) Motor, CCW
3.) Motor, CW
4.) Motor, Return (COM)
5.) Left Motor (CAP_A)
6.) Right Motor (CAP_B)
7.)) TB-7 to TB-8
8.) Potentiometer (VSRC)

Hy_3P, DCU-3

1.) Brake
2.) Motor, CCW
3.) Motor, CW
4.) Motor, Return (COM)
5.) Left Motor (CAP_A)
6.) Right Motor (CAP_B)
7.) TB-7 to TB-8
8.) Pulse Switch High Side

RT 45 / OR28 / SPID, RT4500HD, Orion 2800, Alpha SPID:

1.) NC
2.) NC
3.) Motor, Positive (+)
4.) Motor, Negative (-)
5.) NC
6.) NC
7.) Pulse Input, High Side
8.) Pulse Input, Low Side

InterConnect Table

DTC-100 TB	HyGain CinchJones 8 Pin	Yaesu 6 Pin
TB-1	Pin 2, Brake	Not Connected
TB-2	Pin 6, Left Limit (CCW)	Not Connected
TB-3	Pin 5, Right Limit (CW)	Pin 4, Motor Right
TB-4	Pin 1, Motor Common	Pin 5, Motor Left
TB-5	Pin 4, Motor Left	Not Connected
TB-6	Pin 8, Motor Right (CW)	Not Connected
TB-7	Pin 7, POT End	Pin2, POT Wiper
TB-8	Not Connected	Pin 3, POT Ground

Specifications:

Power: 110/220Vac
110VAC @ 3A
Serial Interface Control:
9600 Baud 8N1
Rotator Control Voltage
Yaesu: 11-25Vdc
HyGain: 24-30Vac
OR2800: 20-34Vdc
RT4500: 12-26Vdc
SPID 12-28Vdc
Dimensions:
6.7W x 3.8H x 6.7D inches
Enclosure:
Black Anodized Aluminum

Warranty

The DTC-100 is warranted against defects in materials and workmanship for a period of one year from the date of purchase. Contact your local sales representative or the manufacturer for a Return Authorization (RA) number and instructions on returning the product for service. Products cannot be processed unless accompanied by an RA number.

The user is responsible for determining the applicability of the product for any application. The manufacturer is not responsible for any damages, direct or consequential, resulting from the use of its products. Damages due to impact or normal wear are excluded.

The manufacturer will determine, exclusively at its own discretion, where repairs or replacement of the product is required for any warranty claim. In no case will the liability of the manufacturer exceed the original purchase price of the product.