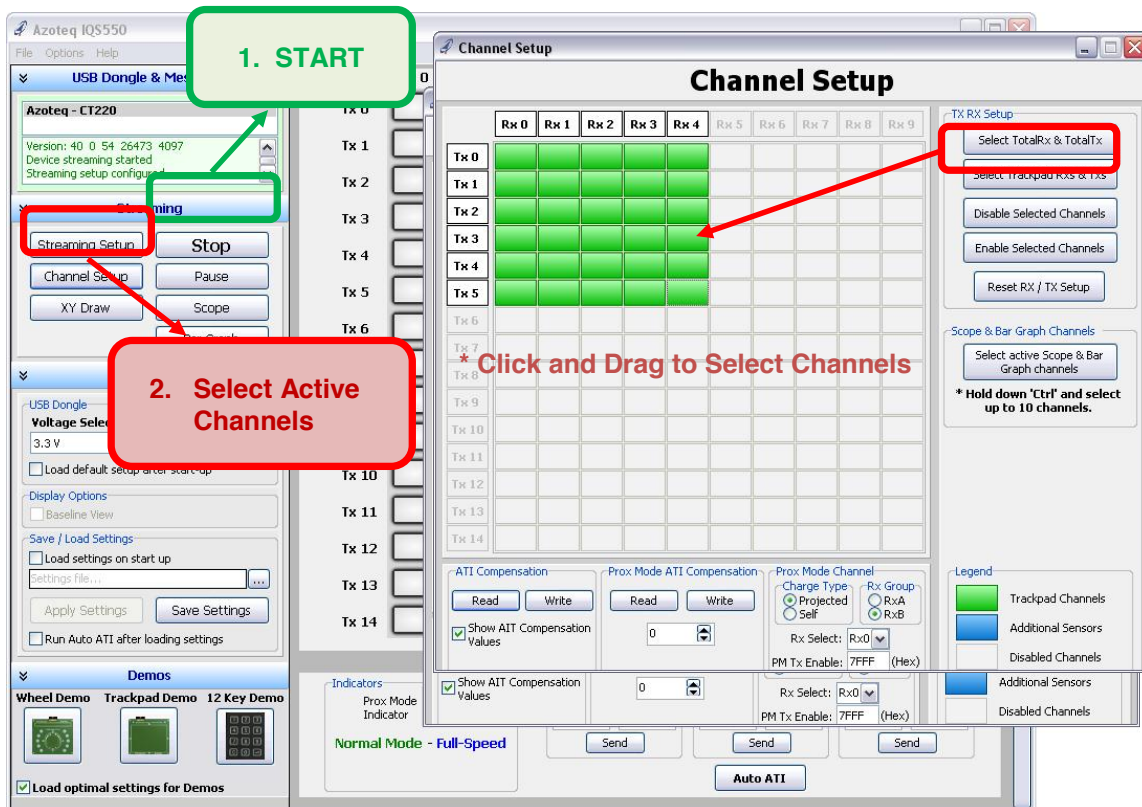




Quick-Start guide for the IQS5xx GUI

1.1 “Start” and “Channel Setup”



- **Normal GUI use:**
 - Click “Start”
 - You can touch the capacitive area after the Start button is clicked.
- **Running a Demo:**
 - Click “Start”
 - Click the picture of the demo used, follow prompts in additional pop-up windows.
- **Setting up Channels**
 - Select Total of Tx’s and Rx’s used for both the Trackpad and Additional sensors (if used).
 - If additional sensors are used outside the Trackpad area, the Trackpad area will also need to be selected. Note that the Trackpad area will remain green, while the Additional sensor channels are changed to a blue colour (see “Legend”).
 - To disable channels, first select the channels to disable then click the “Disable Selected Channels” button.
 - If a Prox channel is needed, it can be setup in the “Prox Mode Channel” text box area. Please refer to the IC specific datasheets to set up the channel(s).



1.2 Channel Data (Streaming Setup)

The screenshot shows the Azoteq IQS550 software interface. On the left, there are panels for 'USB Dongle & Messages', 'Streaming', 'Setup', and 'Demos'. The 'Streaming' panel has a 'Streaming Setup' button highlighted with a red box. A red arrow points from this button to a 'Streaming Setup' dialog box. The dialog box contains the following options:

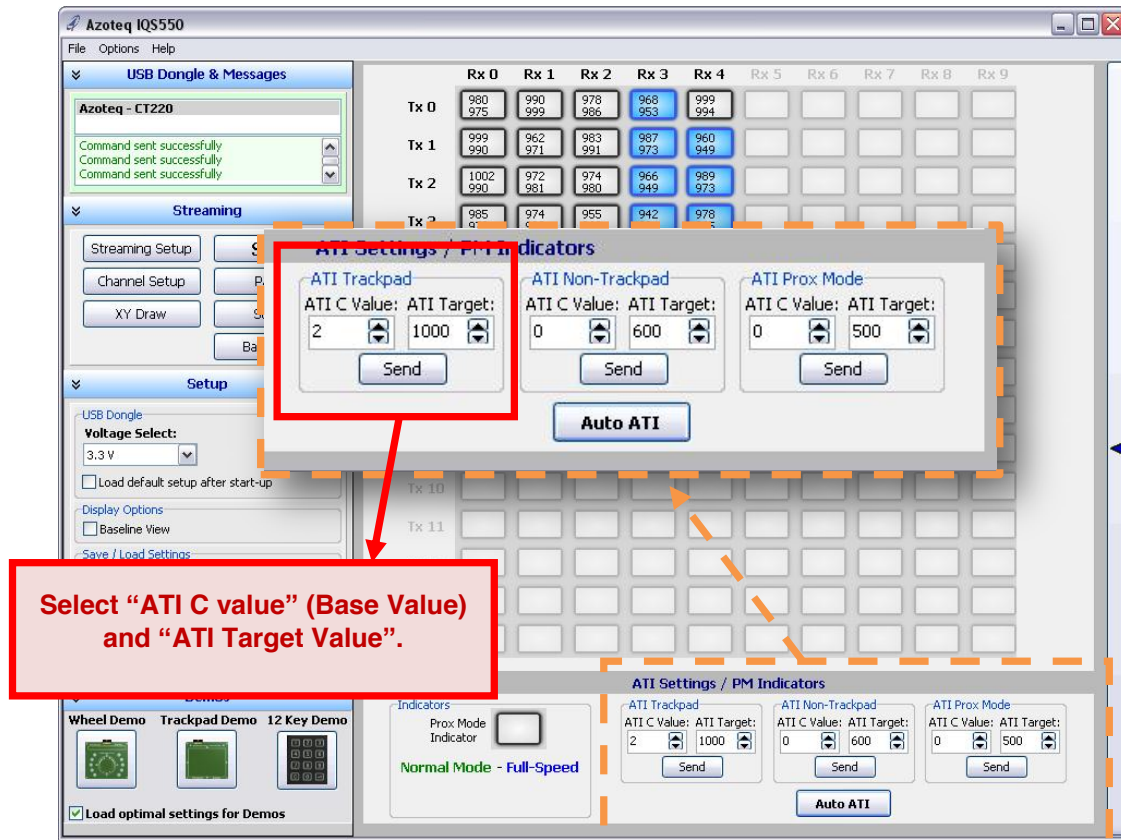
- XY Data
- Prox Status
- Touch Status
- Count Samples
- Long Term Averages (LTA)

A green callout box with a white background and a green border points to the 'Count Samples' and 'Long Term Averages (LTA)' checkboxes. The text inside the callout box reads: "Tick the desired boxes for required channel data." The background of the software shows a data grid with columns labeled Rx 0 to Rx 9 and rows labeled Tx 0 to Tx 14. The first four rows (Tx 0 to Tx 3) have data values in the first four columns (Rx 0 to Rx 3). A green dashed line highlights the data in the first four columns of the first four rows.

- CS (Count) and LTA (Long-Term Average) values are used for debugging and tuning of the Trackpad sensors.
- Take note that the response rate will be affected so streaming of CS and LTA data should be disabled when not needed.



1.3 “ATI Target” & “ATI C Value” (Base Value)



▪ Tuning the Trackpad for the first time:

- In the ATI Settings panel below the sensor display area, set the “ATI C” and “ATI Target” values to 0 for “ATI Trackpad”, then Click Send and then Auto ATI.
- Now an indication of the amount of parasitic capacitance present in the circuit can be obtained by looking at the CS value (Base Value when: ATI C = 0, ATI Target = 0).
- The sensors of a well designed trackpad will have a uniformly distributed CS count in a range of 10-15% of each other. The higher the base count the more parasitic capacitance there is present in the circuit.
- Select an “ATI C” value to obtain a CS value equal to approximately $\frac{1}{4}$ of the target value (Typical target for high sensitivity = 900-1000 counts).
- Higher target values induce slower response rates and vice versa (depending of number of active channels etc).
- Adjust the ATI C and Target values to get the desired response rate and sensitivity.

*Note: The response rate of the IQS5xx devices are influenced by several factors, including number of active channels, amount of streamed data, ATI Target Value, CS filtering and other processing options. Please contact Azoteq for assistance or more information at: ProxSenseSupport@azoteq.com



1.4 Proximity & Touch Thresholds

The screenshot shows the Azoteq IQS550 GUI with the following settings:

- Thresholds Panel:**
 - Touch Threshold (Fraction): 5 / 7
 - Trackpad: 10
 - Non-Trackpad: 5 / 7
 - Prox Thresholds Delta: 10
 - ProxMode: 10
- Timing Panel:**
 - Reseed Time: 80 = 40s
 - RC Timeout: 100 ms
 - Mode Timer: 8 = 4s
 - Power Time: 160ms
 - Sleep Time: 5ms
- Position Tracking & Filters Panel:**
 - Touch Filter: Dynamic Filter
 - Touch Point Filtering:
 - Hover Point Filtering:
 - ProxMode Count Filter:
 - NormalMode Count Filter:
 - Damping Value: 128 / 256
 - Touch XY: 38 / 256
 - Hover XY: 38 / 256
 - PM Count: 16 / 256
 - PM LP Count: 128 / 256
 - NM Count: 3 / 2
- Other Panel:**
 - Control: Event Mode Comms, Snap/Click Enable, Sleep Enable
 - Charging Mode: Normal Mode, Prox Mode, Auto
 - Debounce: Proximity: 4, Touch: 0, Click: 1
 - Events: Prox, Touch, Snap/Click, PM Prox

- Select the required Proximity and Touch Thresholds from the thresholds selection panel (the Settings panel is “activated” by the arrow on the right hand side of the GUI window).
- **Proximity Thresholds** are specified in Counts.
- **Touch Thresholds** are calculated as a fraction of the Long-Term Average (LTA) value, using the equation:

$$\text{Touch Threshold} = (x/2^y) \times \text{LTA}$$

- For this example the Proximity Thresholds will be $P_{TH} = 10$ counts, whereas the Touch Threshold will be $T_{TH} = 5/128 * \text{LTA} \approx 40$ counts ($x = 5$; $y = 7$; $\text{LTA} \approx 1000$).
- Note there are different touch thresholds for different touch areas, such as Trackpad and Non-Trackpad areas.



1.5 PROX Hardware Settings

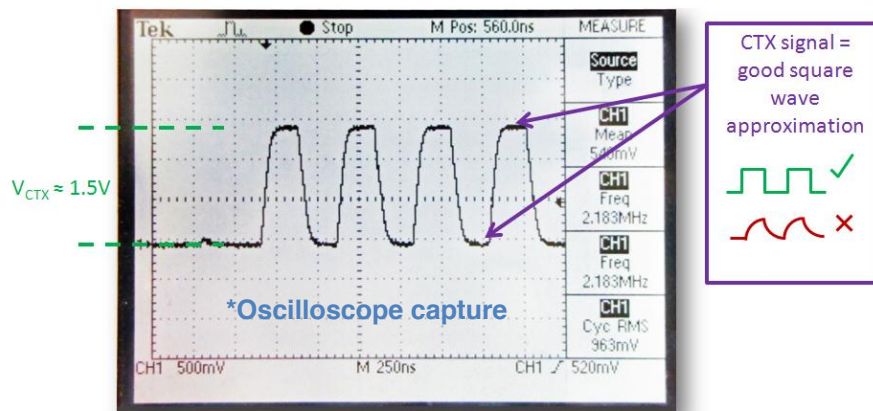
The screenshot displays the Azoteq IQS550 software interface. A central dialog box titled "Prox Hardware Settings" is highlighted with a red dashed border. This dialog includes several configuration options:

- Increment Up/Pass
- Analogue Dead-time
- CRx Coupling (Cx/Vss)
- Prox Module LowPower
- Noise Detect Enable
- SYNC Enable
- Sync Edge Select: Falling Edge
- Rising Edge
- Pass Length: 011
- UpLength: 100
- Vtrip: 0101
- Opamp Bias: 5.0 uA
- Stabilise Time: 1.7ms
- Prox Clock: 16MHz

Other visible panels in the software include:

- USB Dongle & Messages:** Shows "Azoteq - CT220" and status messages like "Streaming setup configured".
- Streaming:** Contains buttons for Streaming Setup, Stop, Channel Setup, Pause, XY Draw, Scope, and Bar Graph.
- Setup:** Includes Voltage Select (3.3 V), Load default setup after start-up, Display Options (Baseline View), and Save / Load Settings.
- Demos:** Features Wheel Demo, Trackpad Demo, and 12 Key Demo, with a checkbox for "Load optimal settings for Demos".
- Thresholds:** Configures Touch Thresholds (Fraction), TrackPad, Non-Trackpad, and Snap/Click Threshold (Delta).
- Timing:** Sets Reseed Time, I²C Timeout, Mode Timer, Low Power Time, and Sleep Time.
- Position Tracking & Filters:** Adjusts Damping Value, Touch XY, Hover XY, PM Count, PM LP Count, and NM Count.
- Other:** Controls Event Mode Comms, Snap/Click Enable, Sleep Enable, Charging Mode (Normal, Prox, Auto), and I/O's.

- PROX Hardware Settings may be adjusted to obtain the required Transmit (TX) signal, so as to acquire sufficient charge transfer.



- Please note that changing these settings is not advised without sufficient knowledge of the device's sensing mechanisms. Please contact Azoteq at ProxSenseSupport@azoteq.com



1.6 Timings, Filters & Debounce

The screenshot shows the Azoteq IQS550 software interface. The main window is titled "Azoteq IQS550" and contains several panels:

- USB Dongle & Messages:** Shows "Azoteq - CT220" and "Command sent successfully" messages.
- Streaming:** Includes buttons for "Streaming Setup", "Stop", "Channel Setup", "Pause", "XY Draw", "Scope", and "Bar Graph".
- Setup:** Includes "USB Dongle" settings (Voltage Select: 3.3 V), "Display Options" (Baseline View), and "Save / Load Settings" (Load settings on start up, Settings file...).
- Demos:** Includes "Wheel Demo", "Trackpad Demo", and "12 Key Demo".
- Thresholds:** Includes "Touch Thresholds" (Fraction, TrackPad, Non-Trackpad, Snap/Click Threshold) and "Prox Thresholds Delta" (Trackpad, Non-Trackpad, ProxMode).
- Timing:** (Highlighted with a red box) Includes "Reseed Time: 80 = 40s", "I²C Timeout: 100 ms", "Mode Timer: 8 = 4s", "Low Power Time: 160ms", and "Sleep Time: 5ms".
- Position Tracking & Filters:** Includes "Touch Filter" (Dynamic/Static), "Damping Value" (Touch XY, Hover XY, PM Count, PM LP Count, NM Count), and checkboxes for "Touch Point Filtering", "Hover Point Filtering", "ProxMode Count Filter", and "NormalMode Count Filter".
- Other:** Includes "Control" (Event Mode Comms, Snap/Click Enable, Sleep Enable), "Charging Mode" (Normal Mode, Prox Mode, Auto), "Prox Hardware Settings" (Low Power Mode, PM Reverse), and "Debounce" (Proximity, Touch, Click) with "Set" and "Clear" buttons. The "Debounce" sub-panel is also highlighted with a red box.

- Timing values may be set according to the requirements of the application.
- Typical filtering of the CS count data is performed by the “NormalMode Count Filter” and “NM Count” filter value.
- Debouncing of Proximity and Touch events are configured by the number of “Set” and “Clear” samples.
- Please refer to device specific datasheets for more information on these settings.



1.7 Save Settings & “Auto ATI”

The screenshot shows the Azoteq IQS550 software interface. The left sidebar contains several sections: 'USB Dongle & Messages', 'Streaming', 'Setup', and 'Demos'. The 'Setup' section is highlighted with a red box, and a red arrow points from a text box '1. Save Settings' to the 'Save Settings' button. The 'Demos' section has a 'Load optimal settings for Demos' checkbox checked. The main area displays a grid of Tx and Rx values for channels 0-14. A red box labeled '2. Click “Auto ATI”' has an arrow pointing to the 'Auto ATI' button in the 'ATI Settings / PM Indicators' section at the bottom.

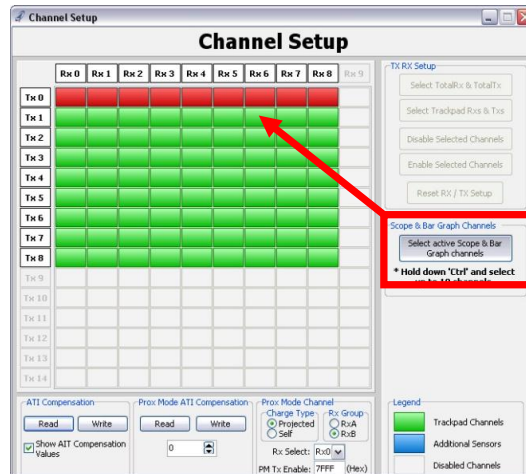
	Rx 0	Rx 1	Rx 2	Rx 3	Rx 4	Rx 5	Rx 6	Rx 7	Rx 8	Rx 9
Tx 0	980 975	990 999	978 986	968 953	999 994					
Tx 1	999 990	962 971	983 991	987 973	960 949					
Tx 2	1002 990	972 981	974 980	966 949	989 973					
Tx 3	985 979	974 983	955 960	942 924	978 965					
Tx 4	988 980	990 995	992 997	990 972	984 966					
Tx 5	970 959	975 978	970 970	976 956	965 946					
Tx 6										
Tx 7										
Tx 8										
Tx 9										
Tx 10										
Tx 11										
Tx 12										
Tx 13										
Tx 14										

- The configured settings can be saved as a “.ini” file, which can be loaded on start-up.
- Click the “Auto ATI” button to redo the ATI (Antenna Tuning Implementation) algorithm.
- The device should now be fully set-up and ready for use.

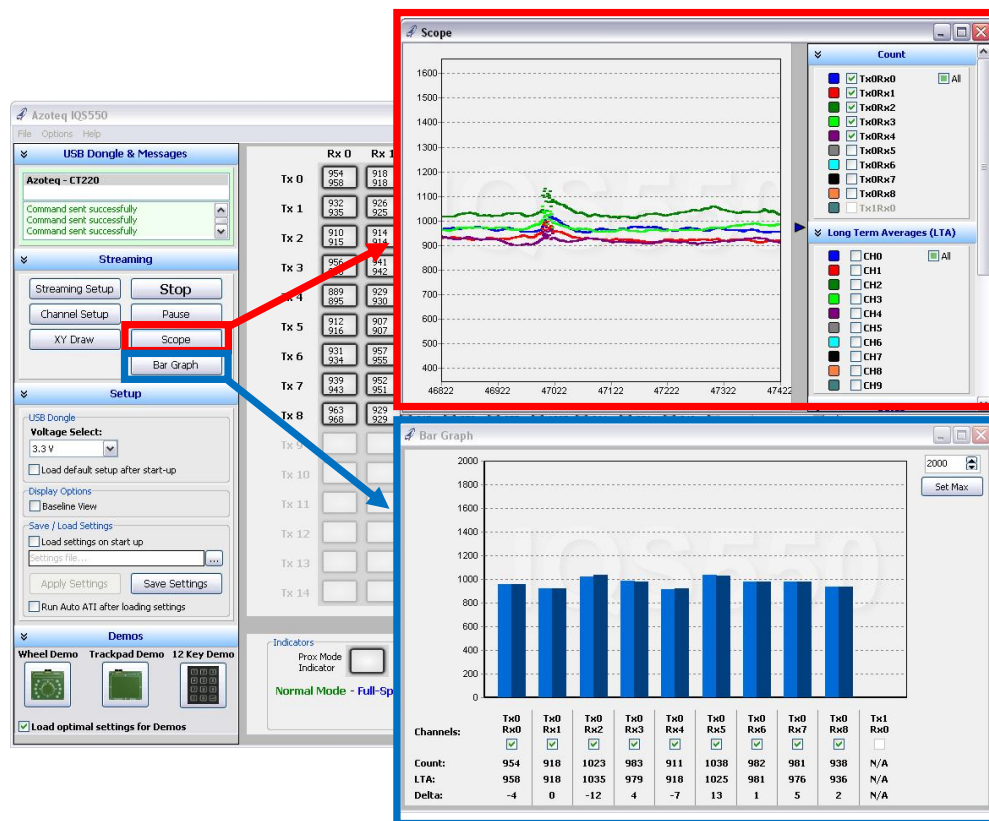


2 IQS5xx GUI Features

2.1 Bar Graph and Scope View



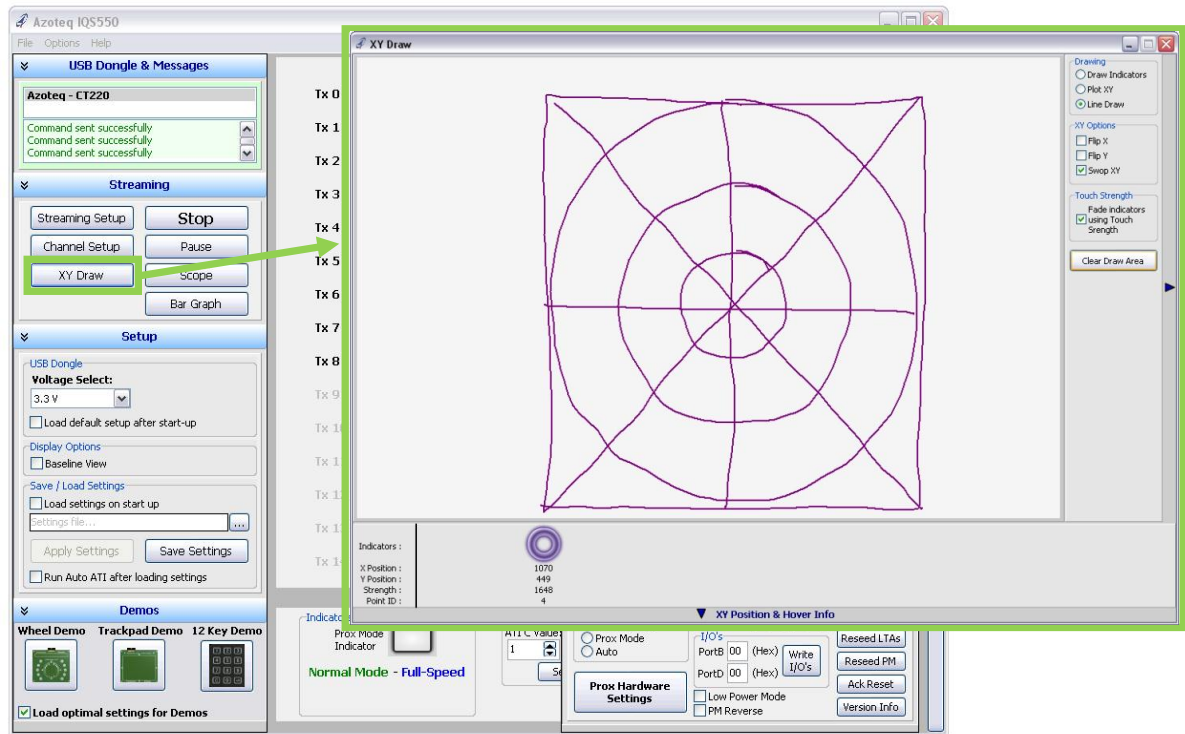
- In the Channel Setup Window, click “Select active Scope & Bar Graph channels”.
- Hold “ctrl” key and click the desired channels to be viewed.



- Click the “Bar Graph” or “Scope” buttons to view channel data in the respective formats.



2.2 XY Draw



- Click the “XY Draw” button to enable the XY Draw window.
- Select the appropriate “Drawing” and “XY Options” in the panel on the right.
- Multi-touch/-draw functionality allowed on most **IQS5xx** devices.



***IQ Switch®
ProxSense® Series***



**For more information on ProxSense® IQS5xx Series devices, please contact
Azoteq or your local distributor of Azoteq ProxSense® devices.**

The following patents relate to the device or usage of the device: US 6,249,089 B1, US 6,621,225 B2, US 6,650,066 B2, US 6,952,084 B2, US 6,984,900 B1, US 7,084,526 B2, US 7,084,531 B2, US 7,119,459 B2, US 7,265,494 B2, US 7,291,940 B2, US 7,329,970 B2, US 7,336,037 B2, US 7,443,101 B2, US 7,466,040 B2, US 7,498,749 B2, US 7,528,508 B2, US 7,755,219 B2, US 7,772,781, US 7,781,980 B2, US 7,915,765 B2, EP 1 120 018 B1, EP 1 206 168 B1, EP 1 308 913 B1, EP 1 530 178 B1, ZL 99 8 14357.X, AUS 761094

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