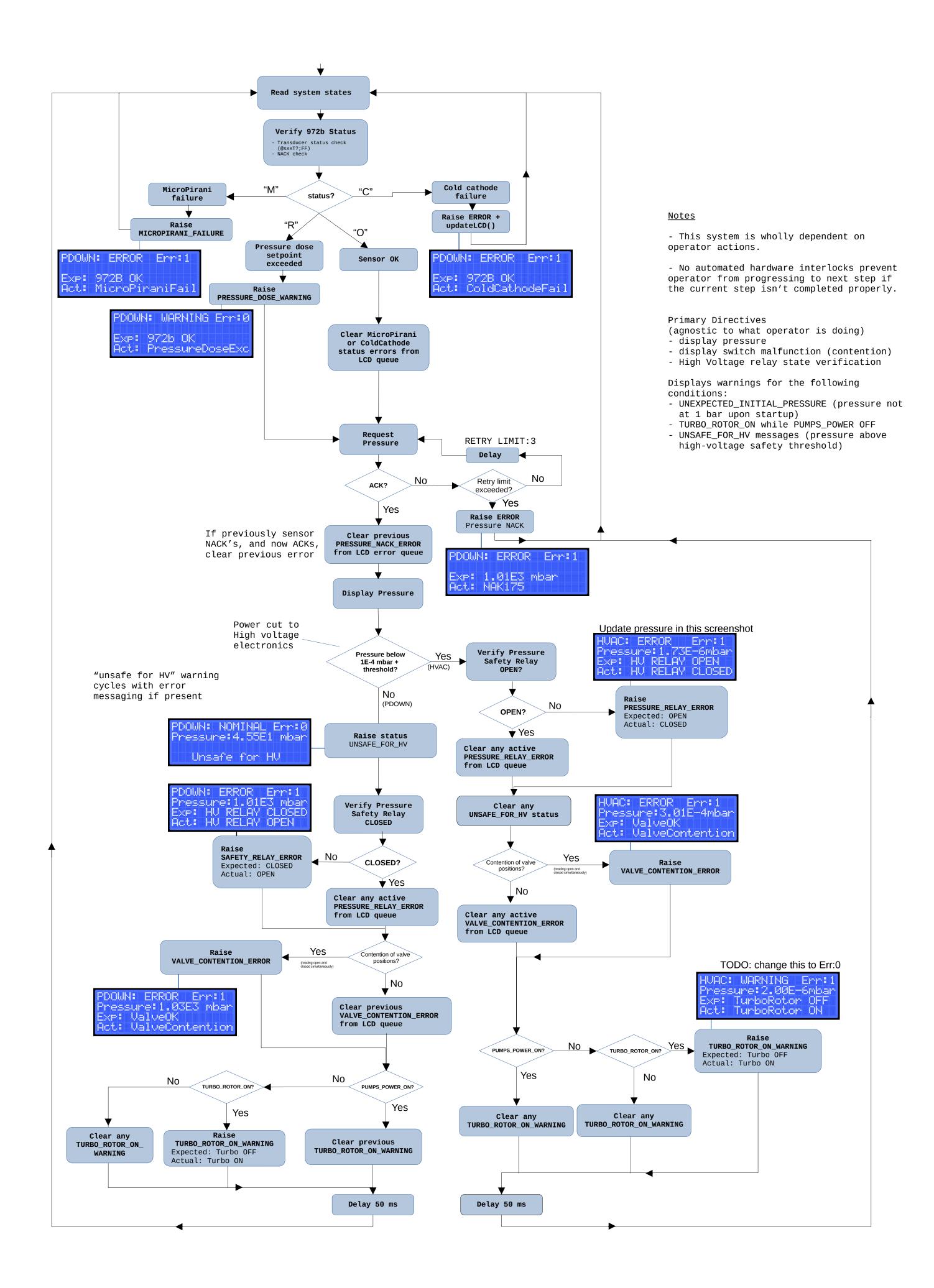
#### setup() **Initialize Comms** - Serial: program + log - Serial1: LabVIEW - Serial2: Pressure Gauge Input Pin initialization Read system states **Pressure Sensor** Configuration - Safety relay + setpoint - Verify output type, precision Set units to mbar Delay No No Retry limit ACK? exceeded? Yes Raise PRESSURE\_NACK\_ERROR Clear previous + updateLCD() PRESSURE\_NACK\_ERROR from LCD queue Set user tag Delay No No Retry limit ACK? exceeded? **▼** Yes Yes Raise PRESSURE\_NACK\_ERROR Clear previous PRESSURE\_NACK\_ERROR + updateLCD() from LCD queue Verify 972b Status - Transducer status check (@xxxT?;FF) Cold cathode "M" MicroPirani status? failure failure Raise ERROR + updateLCD() "O" MICROPIRANI\_FAILURE Pressure dose Init: ERROR Err:1 Init: ERROR Err:1 setpoint Sensor OK exceeded Exp: 972b OK Act: ColdCathodeFail Exp: 972b OK Act: MicroPiraniFail PRESSURE\_DOSE\_WARNING nit: WARNING Err:0 Clear any essure:1.00E3 mbar MicroPirani or xp: 972b OK ct: PressureDoseExc **ColdCathode status** errors from queue Set Safety relay setpoint: 1.00E-4 mbar BW says change this to Delay 1.00E-4 mbar No Retry limit No ACK? exceeded? **▼** Yes Yes Raise PRESSURE\_NACK\_ERROR Clear previous PRESSURE\_NACK\_ERROR from LCD queue Query Pressure safety relay enable status Delay **ENABLE** safety relay No No Retry limit ACK? No exceeded? **▼** Yes Yes Retry limit Raise **y**Yes PRESSURE\_RELAY\_ERROR exceeded? Raise Clear previous PRESSURE\_NACK\_ERROR Mo PRESSURE\_NACK\_ERROR from LCD queue Relay Enabled? Yes **Request Initial** Pressure reading No ACK? Delay ¥Yes No Retry limit exceeded? Clear previous PRESSURE\_NACK\_ERROR Yes from LCD queue Raise PRESSURE\_NACK\_ERROR Init: WARNING | Err:0 Pressure:3.44E-1mbar Exp: 1.01E3 mbar Act: 3.44E-1 mbar Verify initial pressure approx. ~1013 mbar 03/28: Raise No Within Deactivate this after UNEXPECTED\_PRESSURE\_WARNING Threshold? 10 minutes **yes** ★ Query setpoint relay direction: Exp: BELOW Delay No Command relay No Retry limit ACK? direction: BELOW exceeded? Yes Yes Raise PRESSURE\_NACK\_ERROR Clear previous PRESSURE\_NACK\_ERROR Init: ERROR Err:1 Pressure:1.00E3 mbar Exp: SetDir BELOW Act: NAK175 from LCD queue No No Yes Raise Retry limit direction PRESSURE\_RELAY\_ERROR BELOW? Yes errorcount == 0 Error? Log status SETUP COMPLETE Update LCD Transition to NORMAL OPERATION Loop VTRX-200 Software Flow 04-06-2024 Michael Laffin Setup (standard/argon pump-down) Brandon Walker

## loop()

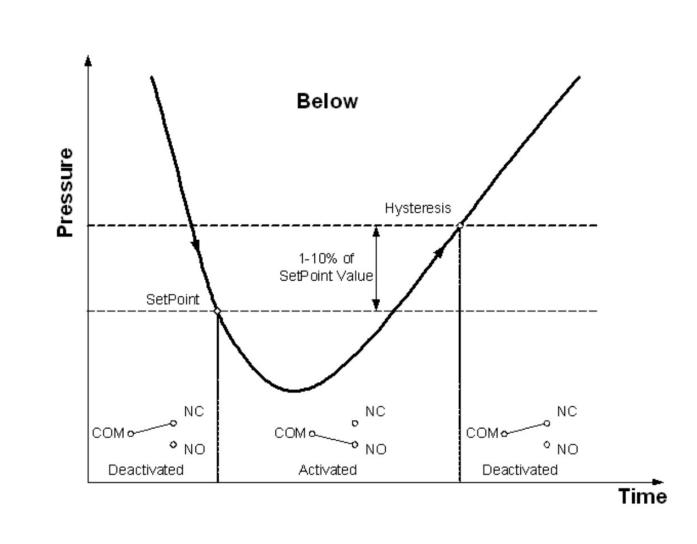


The transducer is per factory default delivered with parameters and setup as listed below. If the transducer is delivered with customer preconfigured parameters the values are different than listed below and the parameters will be locked per default.

Communication parameters:				
Description	Command	Parameter	FD!	FD!ALL
Address:	AD!	253	-	×
Baud rate:	BR!	9600	-	×
Communication delay:	RSD!	ON	-	×
Transducer parameters:				
Description	Command	Parameter	FD!	FD!ALL
Test mode (LED flash):	TST!	OFF	×	×
User tag:	UT!	MKS	-	×
Setpoint 1 value:	SP1!	1.00E0	-	×
Setpoint 1 hysteresis value:	SH1!	1.10E0	-	×
Setpoint 1 direction:	SD1!	BELOW	-	×
Setpoint 1 enable:	EN1!	OFF	-	×
Setpoint 2 value:	SP1!	1.00E0	-	×
Setpoint 2 hysteresis value:	SH1!	1.10E0	-	×
Setpoint 2 direction:	SD1!	BELOW	-	×
Setpoint 2 enable:	EN1!	OFF	-	×
Setpoint 3 value:	SP1!	1.00E0	-	×
Setpoint 3 hysteresis value:	SH1!	1.10E0	-	×
Setpoint 3 direction:	SD1!	BELOW	-	×
Setpoint 3 enable:	EN1!	OFF	-	×
Switch enable:	SW!	ON	-	×
Analog out 1:	AO1!	30 <sup>(1)</sup>	-	×
Analog out 2:	AO2!	30	-	×
Cold Cathode turn on setpoint	SLC!	5.00E-4	-	×
Cold Cathode turn off setpoint	SHC!	8.00E-4	-	×
Cold Cathode control setpoint	ENC!	ON	-	×
Cold Cathode protect setpoint	PRO!	OFF	-	×
MP/CC Smoothing low limit	SLP!	1.00E-4	-	×
MP/CC Smoothing high limit	SHP!	4.00E-4	-	×
MicroPirani auto Zero limit	MZL!	1.00E-4	×	×

(1) If the transducer is delivered with other analog output than standardKJLC (part number specified), then the factory default value will be specified by the specials part number.

Description	Command	Parameter	FD!	FD!ALL
Gas calibration:	GT!	NITROGEN	×	×
MP Vacuum adjustment:	VAC!	Factory adjustment value	×	×
MP Span atmospheric adjustment:	ATM!	Factory adjustment value	×	×
CC Vacuum adjustment:	VAC3!	Factory adjustment value	×	×
CC full scale adjustment:	CFS!	Factory adjustment value	×	×
Pressure unit:	U!	TORR	-	×



- Sequence of venting actions to ATM (for operator)
- 1. turbo rotor off 2. PUMPS\_POWER\_OFF
- 3. Vent valve switch open (wait for
- turbomolecular pump to decelerate)
- 4. Gate valves closed (Argon and Turbo) 5. Once completed, verify pressure within 1
- atm threshold

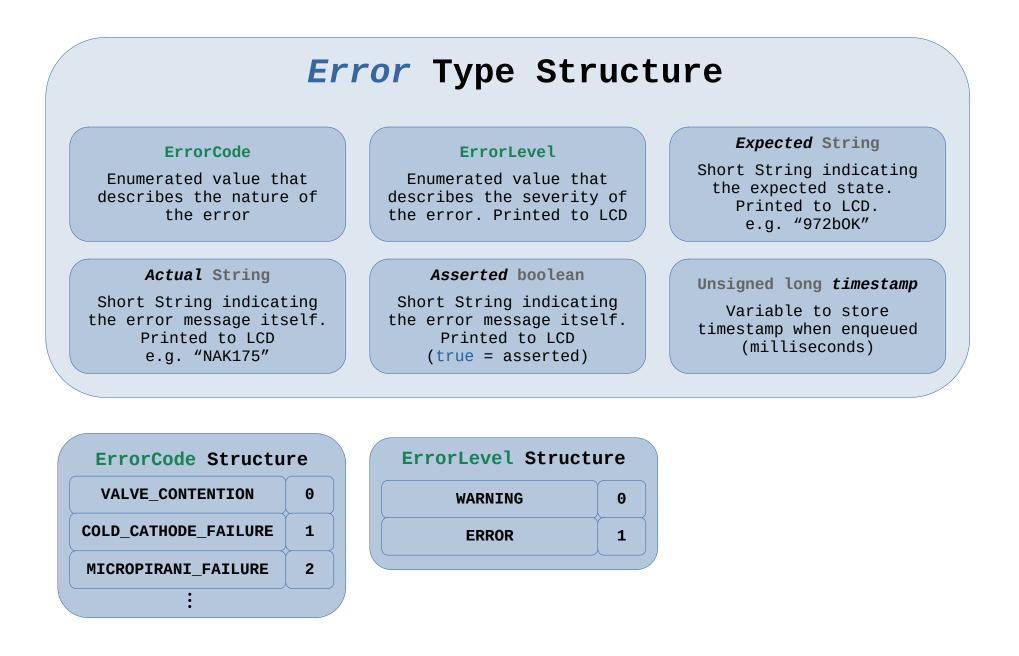
VTRX-200 Software Flow

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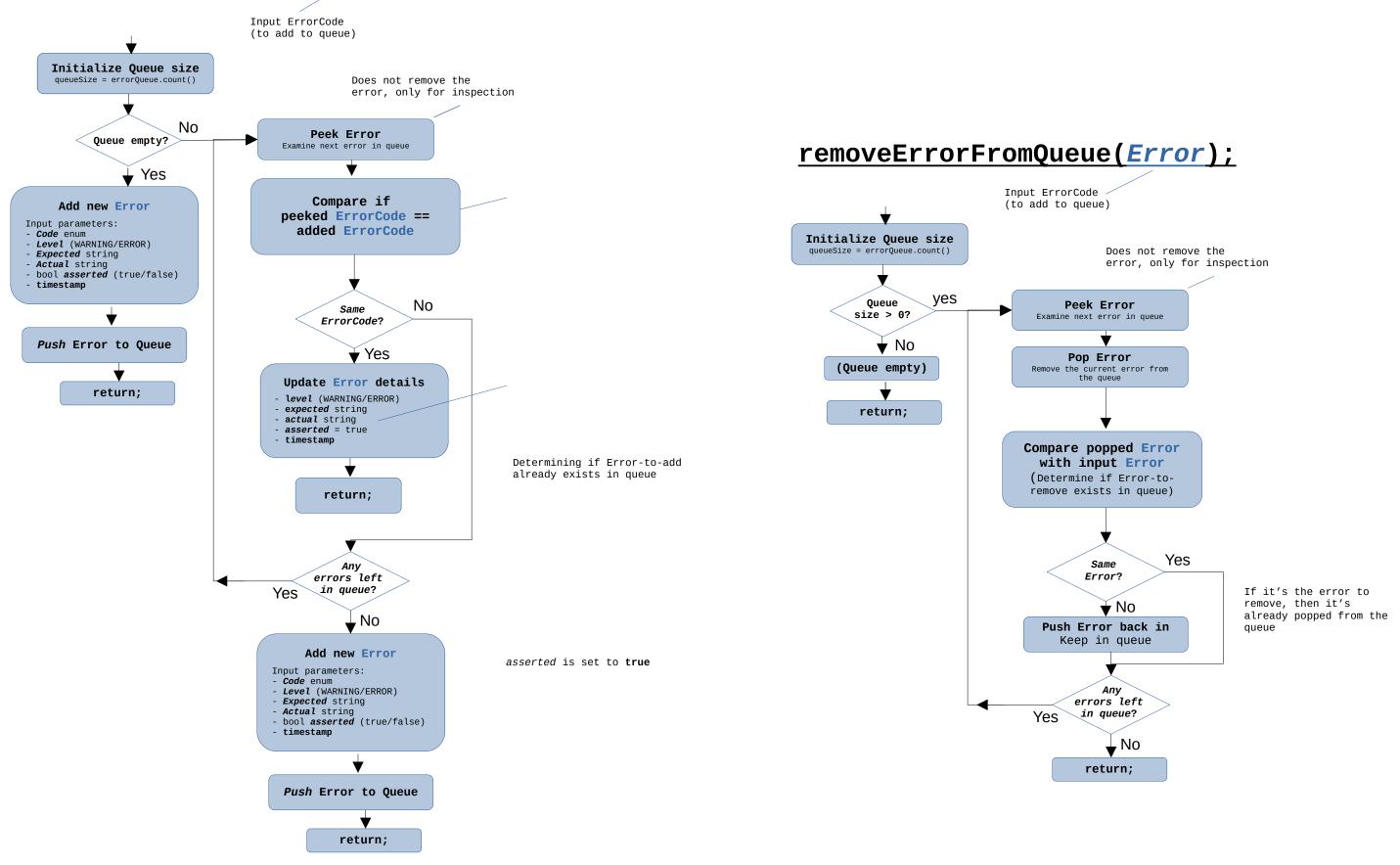
Main loop (standard/argon pump-down)

Michael Laffin Brandon Walker

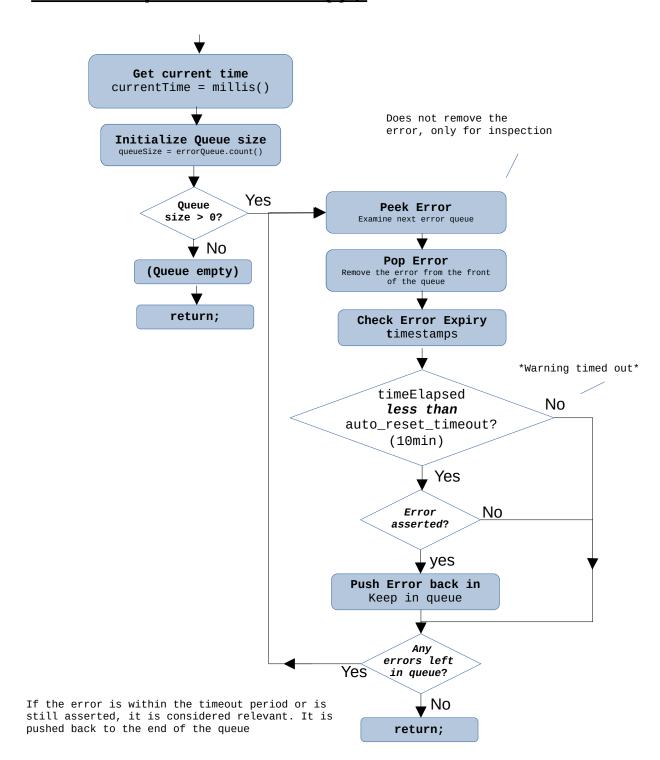
# Detailed Flow: Error Handling



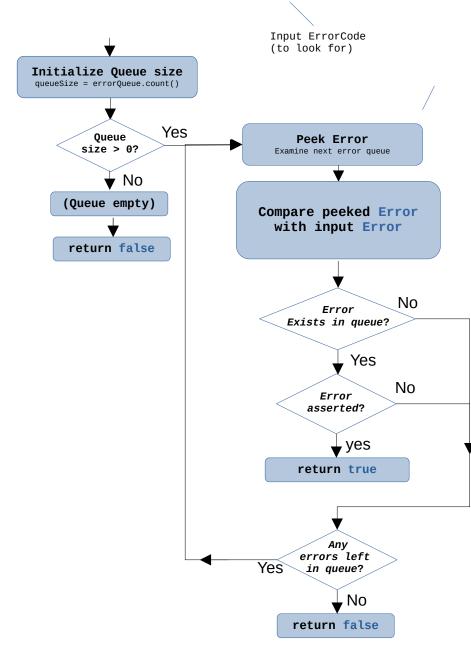
### addErrorToQueue(Error);



## cleanExpiredErrors();



## bool isErrorPresent(Error);



VTRX-200 Software Flow

Michael Laffin

04-16-2024