provided API calls.

Eth Debugger uses the API **SoAd_IfTransmit** from the SoAd module. It uses this API to send debug information .

5.1 GENERAL DEVELOPMENT CONSTRAINTS

Shall meet AUTOSAR standard;

UDP Send Streams shall support multi core service :

Since UDPDataLogger will be used in all cores, satellite concept is to be implemented using a OS interface to assign the right core number and core functionality (master/slave) to each UDPDataLogger instance .

●Queue of size QUEUE_SIZE is to be implemented for each core .
●Streams to be added into corresponding core queue in the order of their call to “send_stream” API.

6 SOFTWARE FEATURES

In GWM IFV410 project , Ethernet module should be cut down three parts as below:

1. UDP Stream Send Handler
2. Ethernet Debugger

6.1 UDP Stream Send Handler

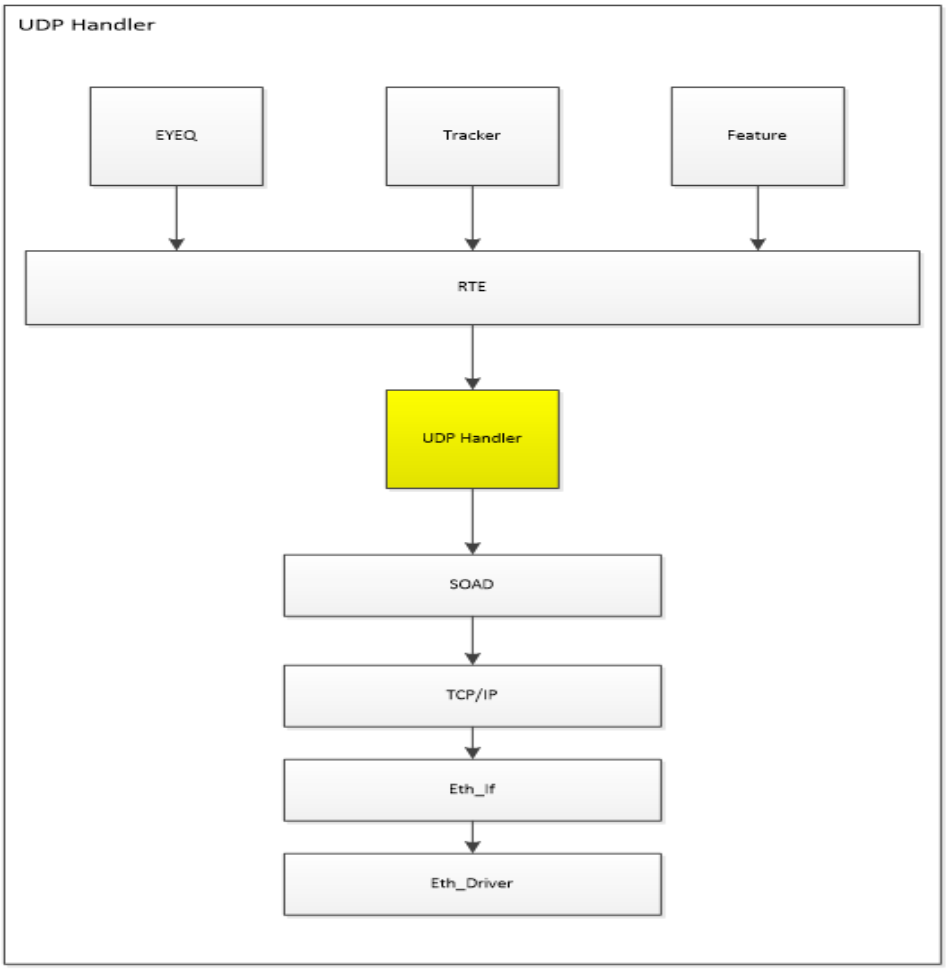


Figure 3 IFV410 UDP Stream Send Handler

6.1.1 Inputs

UDP Stream	Type	Source
EYEQ_BASE_DIAG_Stream	EYEQ_Base_Diag_Stream_T	CtCdd_EyeQIf
EYEQ_APP_DIAG_Stream	EYEQ_App_Diag_Stream_T	CtCdd_EyeQIf
EYEQ_VIS_FAILSAFE_Stream	EYEQ_Vis_Failsafe_Stream_T	CtCdd_EyeQIf
EYEQ_DIAG_Stream	EYEQ_DIAG_Stream_T	CtCdd_EyeQIf
EYEQ_VIS_SAFETY_Stream	EYEQ_Vis_Safety_Stream_T	CtCdd_EyeQIf
VIS_Stream	UDP_Vision_Stream_T	CtCdd_EyeQIf
UDP_Feature_Stream	UDP_Feature_Stream_T	Ctap_Feature_Stream
VEH_STATE_Stream	UDP_Vehicle_State_Stream_T	CtAp_VSE
VEH_CALS_Stream	UDP_Vehicle_Cals_Stream_T	CtAp_VSE
FUS_Stream	UDP_Fusion_Stream_T	CtAp_FEOS
ETSEL_Stream	UDP_ETSEL_Stream_T	CtAp_FEOS
SPP_Stream	UDP_SPP_Stream_T	CtAp_FEOS
OTP_Stream	UDP_OTP_Stream_T	CtAp_FEOS
TA_Stream	UDP_TA_Stream_T	CtAp_FEOS

VRU_Stream	UDP_VRU_Stream_T	CtAp_FEOS

6.1.2 Outputs

Udp Streams to DVtool

UDP Stream	Type	Source
EYEQ_BASE_DIAG_Stream	EYEQ_Base_Diag_Stream_T	CtCdd_EyeQIf
EYEQ_APP_DIAG_Stream	EYEQ_App_Diag_Stream_T	CtCdd_EyeQIf
EYEQ_VIS_FAILSAFE_Stream	EYEQ_Vis_Failsafe_Stream_T	CtCdd_EyeQIf
EYEQ_DIAG_Stream	EYEQ_DIAG_Stream_T	CtCdd_EyeQIf
EYEQ_VIS_SAFETY_Stream	EYEQ_Vis_Safety_Stream_T	CtCdd_EyeQIf
VIS_Stream	UDP_Vision_Stream_T	CtCdd_EyeQIf
UDP_Feature_Stream	UDP_Feature_Stream_T	Ctap_Feature_Stream
VEH_STATE_Stream	UDP_Vehicle_State_Stream_T	CtAp_VSE
VEH_CALS_Stream	UDP_Vehicle_Cals_Stream_T	CtAp_VSE
FUS_Stream	UDP_Fusion_Stream_T	CtAp_FEOS
ETSEL_Stream	UDP_ETSEL_Stream_T	CtAp_FEOS
SPP_Stream	UDP_SPP_Stream_T	CtAp_FEOS
OTP_Stream	UDP_OTP_Stream_T	CtAp_FEOS
TA_Stream	UDP_TA_Stream_T	CtAp_FEOS
VRU_Stream	UDP_VRU_Stream_T	CtAp_FEOS

6.1.3 Functional Requirements

6.1.3.1 Physical Layer and Data Link Layer

WI-23633 - The Host instrumentation shall communicates at BRR 100 Mbps Full-Duplex

Verification Criteria:

1. Check EthTrcv_30_Tja1100_LL_GetDuplexMode source code,Default DUplexMode for Trcv should be ETHTRCV_DUPLEX_MODE_FULL;

2. Check configuration of Ethernet Trcv in Configurator ,the speed of the Ethernet transceiver should be 100Mbit/s.

WI-23634 - The MAC address shall be 0A:0B:0C:00:00:07

Verification Criteria:

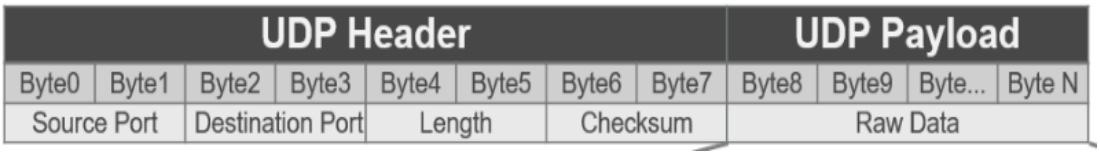
1. Battery ON && Ignition ON ;

2. Connect ethernet converter and start Wireshark;

3. observer the udp steam innformation for MAC Address and MAC Address should be 0A:0B:0C:00:00:07.

6.1.3.2 Transport Layer

WI-23636 - For the Streams defined in this document, The Host shall use the User Datagram Protocol Transport (UDP) for sends and receives, the frame format is shoed as below:



Source Port:

It is the port number of the host sending the data.

Destination Port:

It is the port number of the host receiving the data.

Length:

It is the length of the UDP header and data.

Checksum:

It contains a 16-bit Cyclic Redundancy Check (CRC) which allows detection of corrupted data.

Verification Criteria:

1. Battery ON && Ignition ON and "system ON

2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3. Observer the udp steam innformation,The Udp Datagram should be consist of: Source Port, Destination Port,Length,Checksum

WI-23637 - The IP address shall be fixed which is 192.168.1.7

Verification Criteria:

1.Battery ON && Ignition ON and "system ON"

2.Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3.observer the UDP steam information and the Source Ip Address should be 192.168.1.7

WI-23638 - Internet Protocol version shall be 4.

Verification Criteria:

1. Battery ON && Ignition ON and "system ON"

2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3. observer the udp steam innformation and Protocol version shall be 4

WI-23639 - Subnet mask for the network shall be 255.255.255.0.

Verification Criteria:

Check configuration of Ethernet TCP/IP in Configurator and The netmask should be 24 (sub net is 255.255.255.0)

WI-23640 - For the Streams shall be send by board cast whit remote address 192.168.1.255

Verification Criteria:

1. Battery ON && Ignition ON and "system ON"

2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3. Observer the udp steam innformation and the Remote IP Address should be 192.168.1.255

WI-23641 - The Port address shall be as below:

Port Name	Port Address
Host Port	49152
External Port(Server)	5003

Verification Criteria:

1. Battery ON && Ignition ON then "system ON"

2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3. observer the upd Datagram innformation and the Source port Number shoud be 49152 and Destination port Number should be 5003

6.1.3.3 Application Layer

WI-23643 - The content of the UDP data payload shall have two parts, header block and the data block.
The payload header block contains the message ID (Byte19 and Byte20) Stream Number and Stream Version and the data block contains the message signals.

Verification Criteria:

1. Battery ON && Ignition ON and "system ON"

2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3. Observer the payload header block should contain the message ID (Byte19 and Byte20) Stream Number and Stream Version

WI-23644 - All data stored in the header shall be in little Endian format

Verification Criteria:

1. Battery ON && Ignition ON and "system ON"

2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3. Observer the data should be little Endian format

WI-23645 - All signals data in the messages shall be in little Endian format

Verification Criteria:

1. Battery ON && Ignition ON and "system ON"
2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark
3. Observer the signals data should be little Endian format

WI-23702 - Payload Header shall follow below format:

Layer	Byte Offset	Size (Bits)	Signal	Description
Application	0	16	versionInfo	Version of this header specification. The lower byte contains the size the message header. The upper byte contains the record version number.
	2	16	sourceTxCnt	Source Transmit Counter. Incremented on every transmission from the source Application.
	4	32	sourceTxTime	Source Transmit Time. Timestamp (ms) when packed was queued for transmission.
	8	8	sourceInfo	A constant identifying the sending application [0:63].
	9	8	reservedSrc1	Reserved for future use. Set to 0.
	10	8	reservedSrc2	Reserved for future use. Set to 0.
	11	8	reservedSrc3	Reserved for future use. Set to 0.
Process	12	32	streamRefIndex	Stream-specific index used for data retrieval (e.g. Look Index for radar).
	16	16	streamDataLen	Stream data payload size (bytes). Size for each stream must be constant.
	18	8	streamTxCnt	Stream Transmit Counter. Increments on each transmission of associated stream number.
	19	8	streamNumber	Stream number. One source may transmit multiple, asynchronous streams.
	20	8	streamVersion	Stream data structure format/version (how to interpret data).
	21	8	streamChunks	A Stream may be transmitted from the process layer as M equal-size chunks that can be reconstructed on the receive side. Set to 0 if the transmission is not part of a series of chunks (normal mode). Set to M (>=2) to indicate strea is sent as a series of M chunks.
	22	8	streamChunkIdx	Set to 0 when streamChuns is 0; otherwise, represents this chnk’ s position in the reconstruction queue [0:(streamChunks-1)].
	23	8	reservedStr3	Reserved for future use. Set to 0.

Verification Criteria:

1. Battery ON && Ignition ON and "system ON"

2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3. Observer payload header shall follow above format

WI-23648 - If the NVM parameter KAM_Instrumentation_Ethernet_Enable is TRUE, the host software shall transmit the UDP logging frames on the BRR PHY specified rates when it detects the presence of the 100Mbps Ethernet PHY

Verification Criteria:

1. Battery ON && Ignition ON and "system ON"

2. Connect ethernet converter and start Wireshark and UDP stream are received by Wireshark

3.set the NVM parameter KAM_Instrumentation_Ethernet_Enable is False,check the UDP stream is not working.

6.1.4 Non Functional Requirements

- UDP Handler Main function cycle:

WI-23650 -

The main function of UDP Handler shall be executed every 5ms.

The data in the buffer of each core is processed in 5ms

Verification Criteria:

Test the running time of this function in debug mode

- Multi core design:

WI-23703 - UDP Handler shall be used in all cores .
To handle overload (when the amount of bytes to be sent in one cycle is larger than the allocated Eth Tx buffers)
●Queue of size QUEUE_SIZE is to be implemented for each core .
●Streams to be added into corresponding core queue in the order of their call to "send_stream" API.

Verification Criteria:code review

- Spinlocks :

WI-23652 -

Spinlocks are used to assure that the Queue is atomic , adding new element and removing element after sending it won't overlap this way. Every core shall have one spinlocks.

Verification Criteria:code review

- Interface:

WI-23653 - All interfaces from other SWC Modules shall be used by RTE.

Verification Criteria:code review