

Getting Started with the ENET-1553-EBR (Alta Data Technologies – 29 MAY 13)

The ENET-1553-EBR is very similar to the ENET-1553, but is used for EBR-1553 (10Mbit) rather than MIL-STD-1553 (1Mbit). Like the ENET-1553, the ENET-1553-EBR is dual-function (BC/BM or RT/BM) or full-function (BC and RT and BM). However, it is recommended to use the ENET-1553-EBR in a single mode at a given time because EBR1553 messages can occur at much faster rates and the device may not be able to keep up with high rate messages with multiple modes at the same time. With slow message rates the ENET-1553-EBR can be used in multiple modes simultaneously – for example you could run as both BC and BM at the same time.

Using the Alta Layer 1 API with the ENET-1553-EBR:

Support for the ENET-1553-EBR was added in **API version 2.6.0.3** – you must use this version (or later) with the ENET-1553-EBR. Use the following Device ID for the EBR-1553 channel on the ENET-1553-EBR:

```
#define DEVID (ADT_PRODUCT_ENET485 | ADT_DEVID_BOARDNUM_01 |  
ADT_DEVID_CHANNELTYPE_1553 | ADT_DEVID_CHANNELNUM_01)
```

In C# using the Layer 1 NET20 assembly, this would be:

```
private static UInt32 devid = ADT_L1.DEVID_PRODUCT_ENET485 |  
ADT_L1.DEVID_BOARDNUM_01 | ADT_L1.DEVID_CHANNELTYPE_1553 |  
ADT_L1.DEVID_CHANNELNUM_01;
```

If you are using multiple ENET-1553-EBR devices on the same network they will be differentiated by the board number (and will need to be configured with different IP addresses). For example, here are the Device IDs for three ENET-1553-EBR devices:

```
#define DEVID1 (ADT_PRODUCT_ENET485 | ADT_DEVID_BOARDNUM_01 |  
ADT_DEVID_CHANNELTYPE_1553 | ADT_DEVID_CHANNELNUM_01)  
#define DEVID2 (ADT_PRODUCT_ENET485 | ADT_DEVID_BOARDNUM_02 |  
ADT_DEVID_CHANNELTYPE_1553 | ADT_DEVID_CHANNELNUM_01)  
#define DEVID3 (ADT_PRODUCT_ENET485 | ADT_DEVID_BOARDNUM_03 |  
ADT_DEVID_CHANNELTYPE_1553 | ADT_DEVID_CHANNELNUM_01)
```

Your program will need to call the `ADT_L1_ENET_SetIpAddr` function prior to initializing the device, just as you would do with the ENET-1553. From here on, the ENET-1553-EBR operates just like the ENET-1553 (but of course is 10Mbit EBR-1553 rather than 1Mbit MIL-STD-1553).

The ENET-1553-EBR defaults to EBR-1553 “Specification Mode”. If you want to use “Link Mode” you must set bit 18 in the PE CSR. This can be done as follows:

```
status = ADT_L1_ReadDeviceMem32(DEVID, ADT_L1_1553_PE_ROOT_CSR, &peCsr, 1);  
peCsr |= ADT_L1_1553_PECSR_RS485_LINKSPEC;  
status = ADT_L1_WriteDeviceMem32(DEVID, ADT_L1_1553_PE_ROOT_CSR, &peCsr, 1);
```

In C# using the Layer 1 NET20 assembly, this would be:

```
status = api.ReadDeviceMem32(devid, ADT_L1.M1553_PE_ROOT_CSR, ref peCSR);  
peCSR |= ADT_L1.M1553_PECSR_RS485_LINKSPEC;  
status = api.WriteDeviceMem32(devid, ADT_L1.M1553_PE_ROOT_CSR, peCSR);
```

Configuring the ENET-1553-EBR IP Address

Both the ENET-1553-EBR and the ENET-1553 are shipped with the factory default IP address of 192.168.0.128. If you are using a single device you can just use this default IP Address. However, if you are using multiple devices on the same network you must give each device a unique IP address. The C example program **ADT_L1_1553_eNet_Set_IP.c** can be used to change the IP address for both ENET-1553-EBR and ENET-1553. This program is found under “ENET Examples” in the “M1553 Examples” folder. You can use the AltaView software (version 2.6.0.5 or later) to change the IP address (ENET Config tool on the Global tab).

Updating Firmware on the ENET-1553-EBR

The ENET-1553-EBR can update firmware through the AltaView software (version 2.6.0.5 or later) – Program FLASH tool on the Global tab. The example program **ADT_L1_1553_ex_progflash.c** can also be used to program a new firmware load onto the device. This program is found in the “M1553 Examples” folder.

Modes of EBR1553 Operation:

Spec Mode

Bus Controller (BC) - The BC transmits all commands to all RT lines simultaneously unless a particular RT line is shutdown through the RT Inhibit Register. The BC listens to all RT lines for response information. In spec mode all commands and status words transmitted on the RT lines have the appropriate RT address.

Remote Terminal (RT) – In single mode operation, RT Line 0 should be used. In multiple RT operation, the RT listens to all RT lines and responds simultaneously on all lines. This allows the BC to get the correct response regardless of how the RT lines are connected between the BC and RT units.

Composite Bus Monitor (cBM) – The cBM outputs all traffic seen by the BC. The command and status words will have the appropriate RT address.

Link Mode

Bus Controller (BC) - For non-broadcast commands the BC sends the command on the selected RT Line. The RT line is selected by the RT address in the command word. The RT address in the command word will be set to zero by hardware prior to being sent on the RT line. Note that the RT address in the status word will always be set to zero in the BC data buffer and will not match the RT address in the command word, except for RTO. For broadcast commands the RT address will remain RT31 and does not get set to zero by the hardware. Also for broadcast commands, the command is sent out on all RT lines.

Remote Terminal (RT) – In single mode operation, RT Line 0 should be used. In link mode the RT hardware determines which line the command came in on and changes the RT address in the command word to match the RT line number prior to storing the command word in the buffer. This is done so the firmware can track the appropriate RT address when operating in multiple RT mode. For non-broadcast commands the RT responds on all RT lines simultaneously with an RT address of zero.

Composite Bus Monitor (cBM) – The cBM outputs all traffic seen by the BC. All command and status words will have an RT address of zero unless it is a broadcast message.

Using the AltaView software with the ENET-1553-EBR

The AltaView software (v2.6.0.5 or later) uses the 1553 tools for EBR1553 operation with the ENET-1553-EBR. Note that there are some limitations resulting from the differences between 1553 and EBR1553.

EBR1553 does not allow RTRT messages. The AltaView BC Control Panel disables the “Add RTRT” button when using an ENET-1553-EBR device. AltaView disables the Signal Viewer and the Playback tools when using an ENET-1553-EBR device.

The AltaView Bus Monitor (and CDP File Viewer) assumes 1553 timing. EBR1553 timing is ten times faster – this results in differences in the BM timing information.

- Intermessage gap times and status response times are converted from “dead bus” time to “gap time” for 1553 by adding 2us for the mid-sync to mid-parity gap time measurement. For EBR1553 this conversion would add 0.2us rather than 2us. You can convert the displayed gap time or status response time by subtracting 1.8us.
- The message time can be converted by dividing by 10.

AltaView only operates in Link Mode with the ENET-1553-EBR. AltaView does not support Spec Mode.