

NMRA DCC Working Group in Wetzlar, Germany on 17 Mar 2000

- Meeting chair: Rutger Friberg
 - Meeting introductions
 - NMRA & NMRA DCC intro – Brian Barnt
 - NMRA Conformance testing process – Stan Ames
 - Discussion of various test tools available for conformance testing
 - Discussion on NMRA DCC approval process and voting with objections
 - Presentation of ATLplus by Urs Meyer (UMELEC)
 - Detection of and reaction to an asymmetric signal
 - Does not work with stretched zero usage on the layout
 - Comparison with Zimo proposal
 - ATLplus uses 4 diodes on the track (low cost), but requires hardware changes to decoders
 - Zimo proposal requires only software changes on the decoders, but a bit more expensive at the track level
 - Discussion on development tools & test tools, and should they be part of the standard.
 - Discussion of formation of a European testing center, common platform for testing, etc.
 - Presentation (on follow-on discussion) on the “Structure of Communication of the Digital Model Railroad Control System” by Claus Dahl (MOROP/BDF)
 - Three levels:
 - Human \leftrightarrow Machine
 - Central control system – stationary peripherals
 - Stationary peripherals – mobile and track bound accessories
 - See transparency graphic
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At this time the group stopped for a visit to the offices of Lenz Elektronik for a tour, and a demonstration of some preliminary work on an advanced feedback system that has been completed by the Lenz R&D team. See Appendix B for more information.

- Dr. Frank Grunig reminded the group about the value of standards to the customer, and the need to focus on the model railroaders’ needs, perhaps not the very specific detailed design
- Bill Ataras (The Signaling Solution) reviewed a current project of his company for a client to show how it fits with the “Structure of Communication” presentation given by Mr. Dahl earlier
- There was a follow-up discussion on Advanced Feedback
 - Bernd Lenz presented an overview of the development work undertaken to date, as well as some further thoughts for discussion
 - After the presentation and questions, the chair conducted a roundtable review of the feedback:

- Cost of detectors – concern that many may be required, potential high cost for the user
 - Will the concept work? The what use will we make of it? Answering BOTH questions will make a big step for the user.
 - Move quickly, window of opportunity, window of technology
 - Get more testing quickly
 - Detailed proposal for summer
 - Is this a step toward making DCC easier
 - For the future, feedback is important
 - Is this a step towards making DCC easier? If so, it is a big step? May make entry into DCC easier
 - Concern about high frequency applications – are their problems?
 - If idea works, will reduce data stream on the track, making bandwidth available for other uses
 - Concern that more systems engineering approach to flesh out issues that might exist with problem layouts, possible approaches to command sets and data returned (uses of data, amount returned) prior to development of a proposal
 - MR users have other problems as well – this topic may be worth continuing to work on, but also need to focus on other key problems such as very low cost solution to stop in front of signal
 - This technical approach would worth for accessory decoders as well as mobile decoders
 - Output of detector? How will it be used?
 - Can be combined with other technologies such as Zimo and ATLplus
 - Upside down technology
- Next topic up for discussion – Layout Control Bus (LCB)
 - Is it time?
 - Discussion about various options:
 - From Karl Kobel: leverage existing high volume standards such as USB
 - May over time be a transition from vendor busses to this standard bus
 - Bernd Lenz: Consider perhaps a “Universal Port” on each manufacturer’s system, instead of a new bus; a new bus would have a very difficult time being accepted by manufacturers
 - Continued on Sat AM
 - Roundtable feedback on LCB & Universal Port discussion from Friday:
 - Good idea, should consider high volume standards such as USB, need to do both hardware and application layers
 - Concern about whether we can really make progress in this area
 - Need to focus on application layers of protocol, not just the hardware interface
 - Good idea, will be difficult
 - Can be useful for manufacturer, but may be confusing for end user

- Concern about changes in technology, e.g., USB may be a good solution today, but will it be in 2-5 years; must be open to changes in technology
- Perhaps we are focused on a feature for higher end hobbyist
- May make it easier for the user
- Maybe bridges to the current buses
- Universal Port may be in a step in the direction of a universal bus, should that be desired in the future
- This may be a big challenge for a user to build a device on the universal port, manufacturers will need to help the user
- Difficulties to make gateways to current systems, first priority to build gateways
- USB may be expensive wiring (highly prescriptive) need to define hardware & software
- Lowest common denominator approach?
- Problems with need for multiple converter boxes if goal to connect handheld from manufacturer A to system from manufacturer B
- Cost effective solution required, must be easy to use, focus on plug 'n' play, not the do-it-yourself hobbyist
- No chance for a new bus, but a chance for a universal port available for each manufacturer
- Don't focus on link layer, focus on application layer
- Who will drive? Somebody must move from ideas & discussion to paper
- A "user" driven requirement, not a manufacturer driven requirement; talk to users about their requirements
- Based on another existing standard
- Can't ignore the physical layer, otherwise it will do the user no good (both link layer and mechanical connection)
- Window of opportunity exists
- Are there two different solutions? One for European and one for American?
- 1st task should be to define the requirements, 2nd task then should be to address solutions
- may end up with a situation where a single device with two sets of features – a universal set used on various systems, and a superset when used on the native manufacturer's systems
- one requirement is for a solution will be interchangeable, need to define other requirements
- another view is a mechanism to use system + handhelds from manufacturer A, and add a special function handheld from another manufacturer
- availability of "interchange" capability may actually increase the market
- need to address migration problems
- Next topic for discussion was on Testing in Europe

- Pres., MOROP – not a test group in MOROP today, could be considered at the MOROP Technical Commission meeting in May 2000.
- Bernd Lenz – MOROP does not have a MOROP Norm to test against, also would need an agreement between NMRA & MOROP to accept testing of the other party
- Roundtable feedback on value & needs of Testing Center in Europe
 - Is it needed?
 - Additional complexity of testing processes, communications
 - Would resolve language problems, time zone issues
 - Same tests, & Standards & RP's, being tested
 - Supports testing of European users' problems
 - Build good communications with worldwide standards organizations like the worldwide, European, and national testing organizations working in the electrical standards bodies
 - Given that MOROP does not represent everyone, perhaps a faster solution is to organize in the industry
 - May be a resource issue to establish in MOROP
 - A learning curve exists to establish a new group
 - Concern if different wording would exist in standards – e.g., a NMRA version of standard and European version of the standard – but having multiple testing centers
 - NMRA testing is done by volunteers – issues with growing volume of products to be tested; need to expanding the knowledge base and base of knowledgeable testers
 - MUST be the same tests, and same Standards & RPs, being used in all testing centers in order to assure both (1) manufacturer acceptance (not requiring a manufacturer to have testing performed in all the different testing centers) and (2) user acceptance (users want to insure that their combination of DCC products are interoperable, and thus as the number of DCC products in the market grows, the amount of testing required is growing)
 - Regarding manufacturers doing the testing, they should test in their labs (the tools are available), but there should also be testing independent of the manufacturers; manufacturers have been known to test relative to their specific interpretation of the standards & RPs
 - Issue of fairness, loading up the American colleagues, for testing the growing number of European DCC products
 - Must be neutral testing
- Next there was a general discussion of testing
- Pres, MOROP issued an invitation to all the manufacturers present, and to the NMRA, to attend the next meeting of the MOROP Technical Commission to be held 18-21 May, in Valkenburg (NL).
- Next topic for discussion was signaling decoders
 - After much discussion, recognition that between United States & Europe railroad signaling systems have a number of similarities and a number of differences exist

- An action plan was developed for acquiring knowledge about European railroad signal systems, and incorporating the information into the discussion about the plans for signal control instructions into the DCC instruction set.
- Next topic for discussion was Review of meeting minutes for the Chicago Oct 1999 meeting
 - Action plan to send all the minutes from the October 1999 meeting to all attendees of this meeting.
- Next topic for discussion: maximum time on basic acknowledgement – in Green Book, RP 9.2.3 Section D, line 39, sub-section Basic Acknowledgment.
 - Proposed change is to remove minimum time of 5ms, and replace it with acknowledgement time for basic acknowledgement is 6ms +/- 1ms, for all modes – consensus agreement from this meeting
- Next topic is various forms for programming mode in RP-9.2.3
 - Document that ALL decoders will be required to support Direct mode programming of CVs after March 2002
 - Requirement to abandon requirement for command station support of paging mode by Jan 2003 – unanimous vote of support by the meeting attendees, with one abstention (Ames). Also at least two attendees supported a much earlier date.
- Agreement on another European meeting in 1 year in March 2001. Significant coffee break discussion & consensus on the next meeting location being in Zurich, Switzerland.
- Formal meeting closing remarks (some attendees needed to leave)
- Next topic for discussion is the new single address accessory decoder mode support. Agreement for this text. Note the * note on CV29 needs to apply to CV541 as well. See separate file for the proposed change.
- Karl Kobel raised the possibility of including annotations on proposed changes in the PDF files distributed, when a reason for the change is documented. Brian agreed to research solutions to this request.
- Discussion regarding decoder rejection under 10ms. Problem can be resolved by deleting this sentence from the proposed S-9.1. This still does not fix the problem we were trying to correct, but also does not introduce a new problem. In addition it may be necessary to fix this problem differently to support Advanced Feedback.
- RP-9.2.2 – remove Default Value for starting voltage (CV2)
- RP-9.1.1 changes:
 - Remove paragraph 3 in Section C – this is the requirement that loose function leads have a pin on them
 - Re-title section B as “Locomotive” Color Code...
 - Add section E to define the wire color code for decoder wiring, and include Output 1 and Output 2 colors

Appendix A:

The following sections were collected from the various overhead and white board notes.

Future of DCC topics (collected on white board)

- UMELEC demonstration
- Two way communication
- Signaling decoders
- Layout control bus
- Common test tools

Notes from Rutger on summary of 2-Way communication discussion:

- Do it now (window of technology)
- Homework – test decoders, troubleshooting
- Frequency? 1 MHz
- Accuracy? +/- X%
- Next step: Broad test
- Output of detector?
- Digitrax -> Ack? Transponder
- Can be combined with other systems
- 8 bit word answer back
- Proposal this summer
- Also accessory decoders
- Upside down technology

Notes from Rutger's summary of the Layout Control Bus (Friday night)

- Info and command flow on the cab bus
- Interchangeability
- Basic port for all bus systems
- Universal use
- "Universal Port"

Notes from Rutger's summary of Layout Control Bus discussion

- "Control Bus" Port
- Function Level / hi-level
- Universal Bus is difficult
- Open to changes in technology
- Plug 'n' play
- Broad customer solutions
- Bus-no Port-yes
- Users need it – not for producers
- Standard important for users

- User profiles
- A DCC WG mission
 - Connection
 - Etc.

Notes from Rutger's summary of the European Testing Center discussion

- OK but NMRA rules
- Who will organize
- Who will pay? (where will resources come from?)
- How to resolve differences
- 1-Establish a center, 2-start testing
- Expand knowledge base

Appendix B:

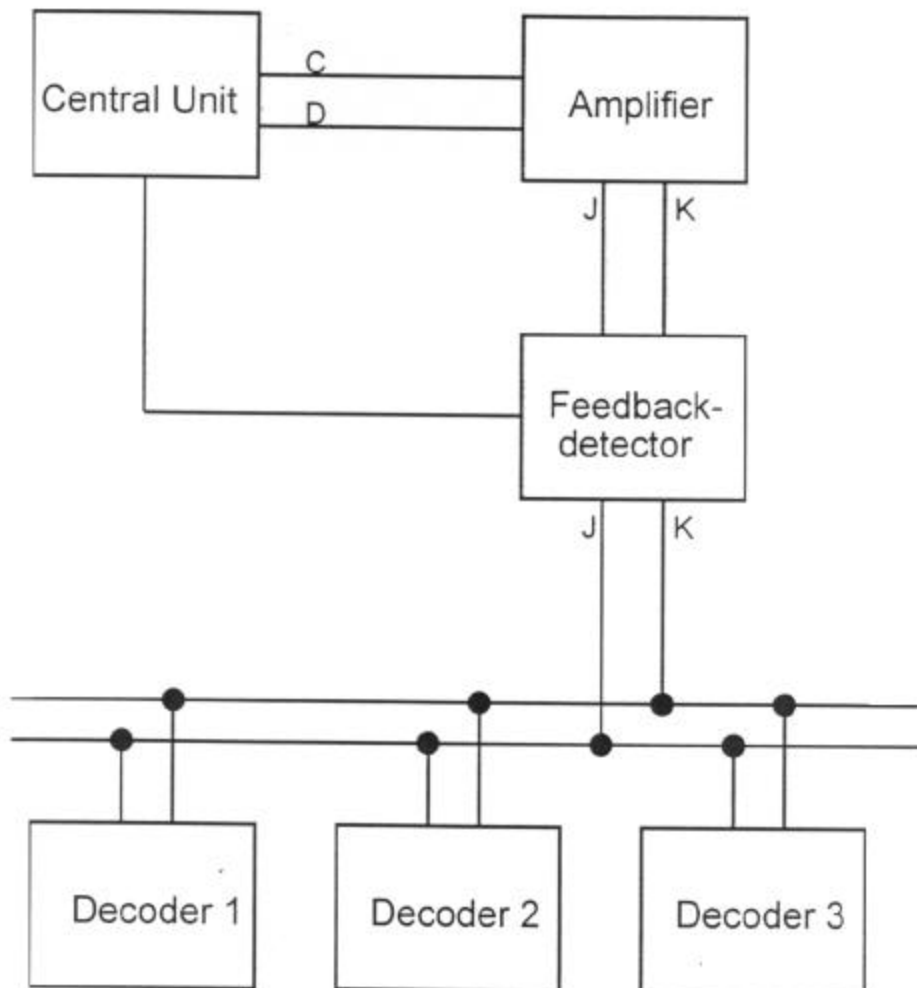
This section contains scans of Lenz's preliminary research. These were scanned from Bernd's handout at the meeting.



Advanced Feedback

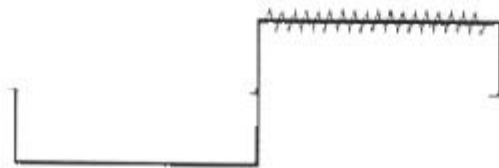


Block Diagram

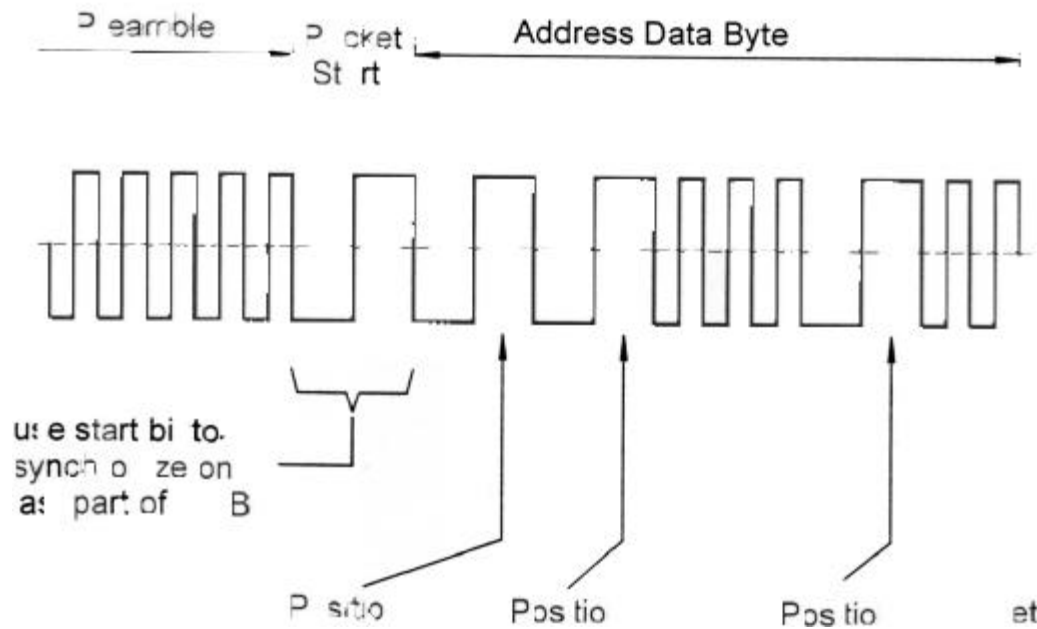


Advanced Feedback

Generating Bi information by current modulation on line part of a 0' Bi

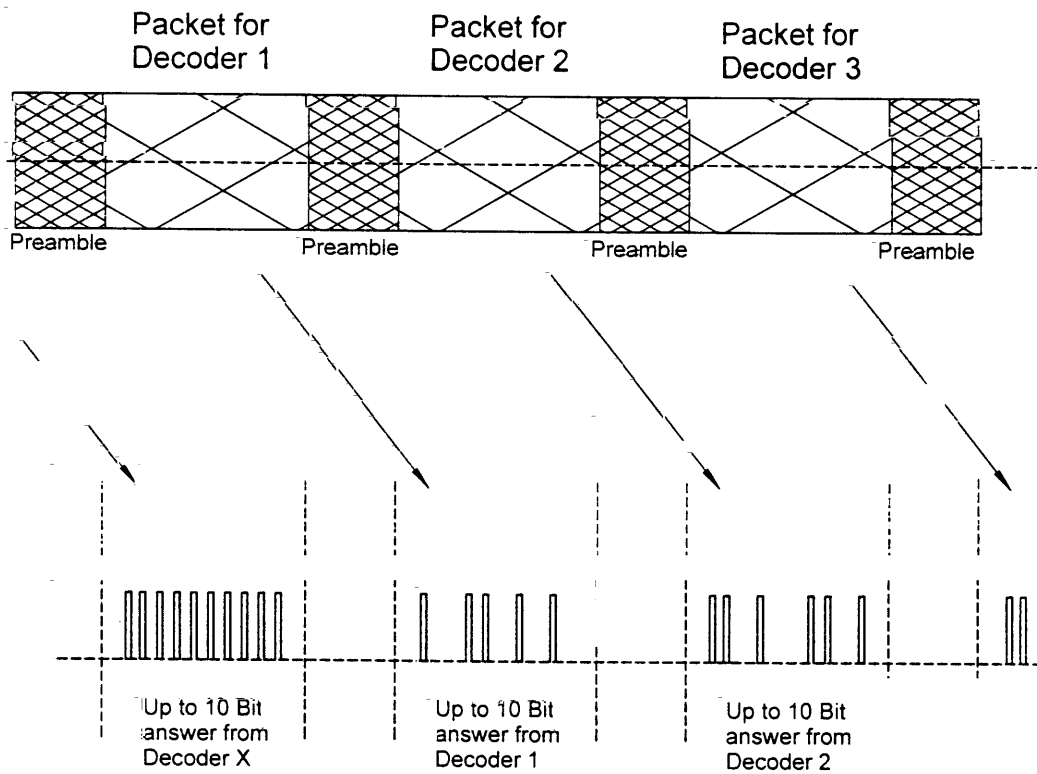


Allowed positions of feedback bits



Advanced Feedback

Decoderaddressing and feedback



Advanced Feedback



Vorteile

Advantages

1. Befehlsquittierung

- *höhere Übertragungsbandbreite*
- *höhere Übertragungssicherheit*
(z.B. *Programming on Main*)

1. Acknowledge

- *higher transmission bandwidth*
- *higher transmission safety*
(e.g. *Programming on Main*)

2. Übertragung zusätzlicher Informationen

- *tatsächliche Fahrgeschwindigkeit*
- *Übertemperatur des Empfängers*

2. Transmission of additional information

- *real locomotive speed*
- *overheat condition of decoder*

3. Lokalisierung von Lokomotiven

- *Lok Nr. 03 fährt in Abschnitt 2*

3. Localisation of locomotives

- *locomotive no. 03 enters section 2*

4. Plug & Play von Lokempfängern

- *Ermittlung der Konfiguration*
- *Vergabe frei wählbarer Empfänger-
bezeichnungen*

4. Plug & play of locomotive decoders

- *detection of decoder configuration*
- *assignment of individual names to
locomotives*

Advanced Feedback



Nächste Schritte

Next steps

1. Rücksendeprotokoll definieren

- *Befehlsquittierung*
- *Datenübertragung*
- *Timing*

1. Definition of a feedback protocol

- *command acknowledge*
- *data transmission*
- *timing*

2. Sichern der Rückwärtskompatibilität

- *Definition der Impedanz eines Decoders für die Sendefrequenz*
- *Definition von Meßverfahren*

2. Ensure backward compatibility

- *definition of decoder impedance at sending frequency*
- *definition of measurement methods*

3. Vorschlag für einen Standard

3. Definition of a proposal

4. EMV-Kriterien gewährleisten

4. Ensure EMC criteria

Advanced Feedback

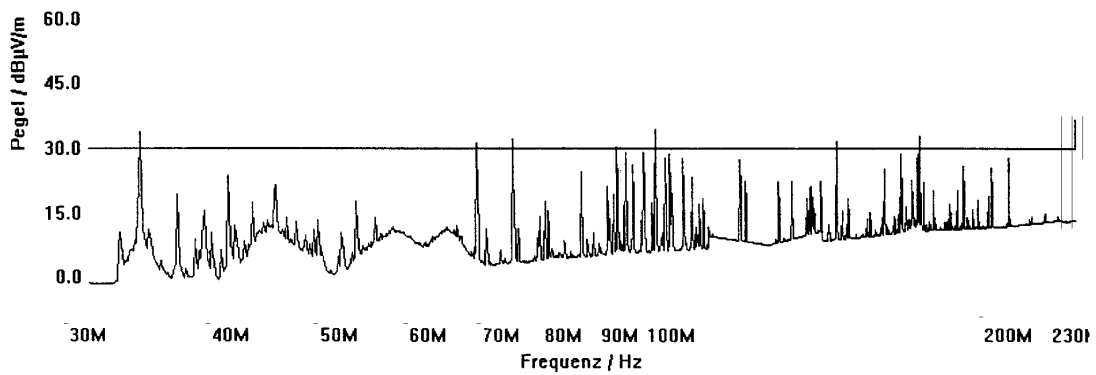


Funkstörspannung

Radio interference

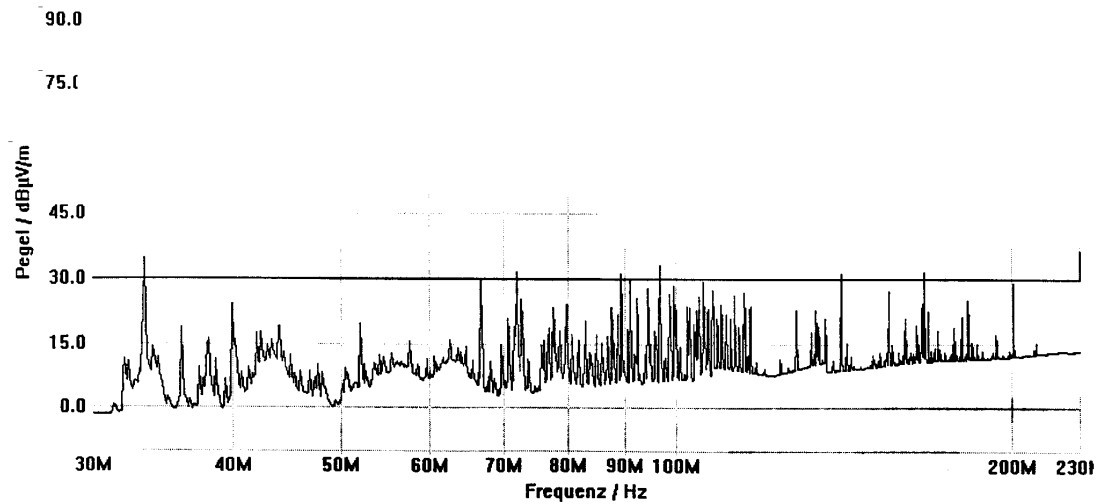
Referenz ohne Digitalsystem

Reference without digital system



Rücksendung aktiv

Feedback sender active



measured not in reference surrounding

Advanced Feedback

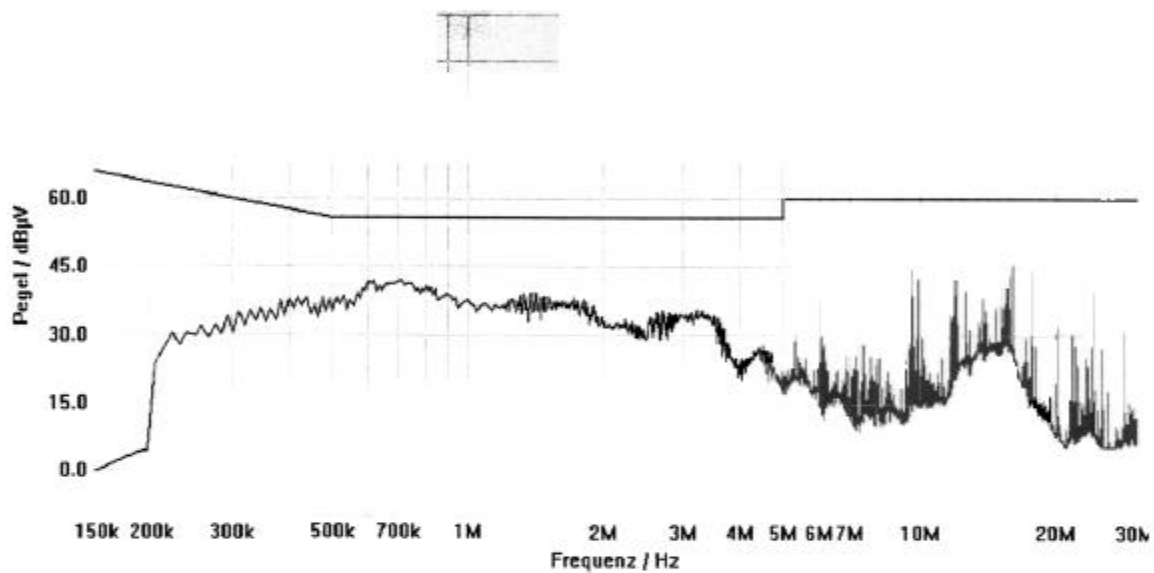


Leitungsgebundene Funkstörspannung

Line conducted radio interference

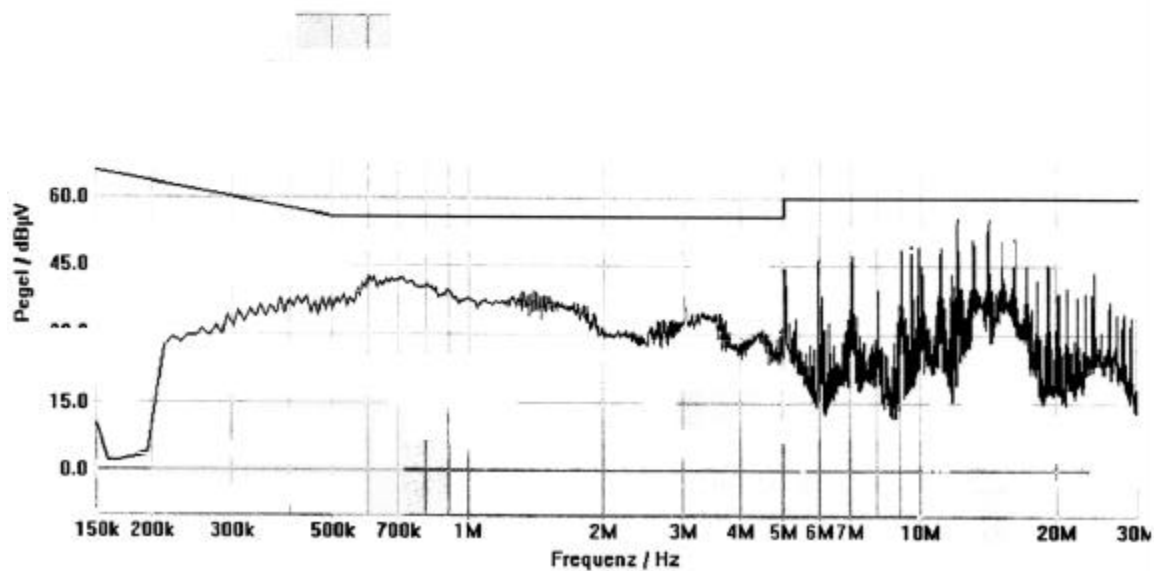
Rücksendung nicht aktiv

Feedback not active



Rücksendung aktiv

Feedback active



measured not in reference surrounding

Appendix C: (From Presentation by Claus Dahl)

Structure of communication of the digital model railroad-control system

level of communication

scheme

