TC 97

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Data communication — HDLC unbalanced classes of procedures

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Foreword

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It has been approved by the member bodies of the following countries :

Australia	Hungary	South Africa, Rep. of
Belgium	Italy	Spain
Canada	Japan	Sweden
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Finland	Netherlands	United Kingdom
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No member body expressed disapproval of the document.

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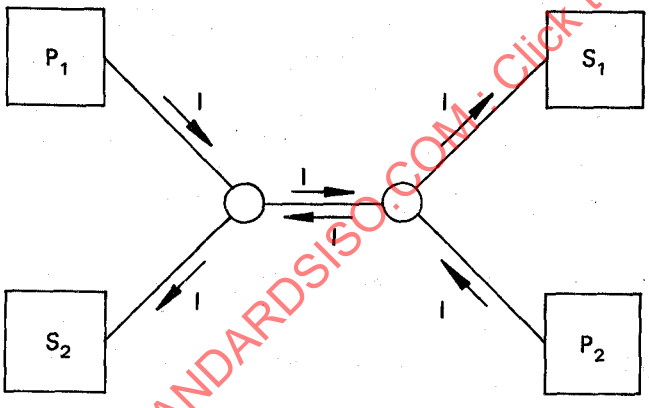
Data communication — HDLC unbalanced classes of procedures

0 Introduction

This International Standard deals with the unbalanced classes of procedures. It is also recognized that it is possible to construct symmetrical configurations for operation on a single data circuit from the unbalanced classes of procedures which are defined below. For example, the combination of two procedures (with I frame flow as commands only) in opposite directions would create a symmetrical point-to-point configuration as illustrated in the diagram below.



1 Scope and field of application

This International Standard describes the HDLC unbalanced classes of procedures for synchronous data transmission. It covers operation requirements in accordance with the overall HDLC architecture. It uses the frame structure as defined in ISO 3309 and elements of procedure described in ISO 4335 and its addendum ISO 4335/DAD 1.

The link consists of a primary station plus secondary stations, and operates in either the asynchronous or normal response mode. A basic repertoire of commands and responses is defined. The capability of the data link may be modified by the use of optional functions.

2 General description

2.1 Principles

2.1.1 Station types

Two types of stations are defined for the unbalanced classes of procedures (see figure 1) :

— Primary stations, which send commands, receive responses and are ultimately responsible for link level error recovery.

— Secondary stations, which receive commands, send responses and may initiate link level error recovery.

2.1.2 Operational modes

Any coupling of a primary station with secondary station(s) can be operated over various types of transmission facilities to build unbalanced point-to-point or multipoint configurations. These stations may be operated in the normal response mode (NRM) or the asynchronous response mode (ARM), two-way alternate or two-way simultaneous.

2.1.3 Addressing scheme

Commands are always sent by the primary station and always contain the destination secondary station(s) address. Responses are always sent by a secondary station and always contain its own station address.

2.1.4 Send and receive state variable

For each primary-to-secondary link, a separate pair of send and receive state variables is required in each station for each direction of transmission of I frames. Upon receipt and acceptance of a set mode command both the send and receive state variables of a secondary station shall be reset to ZERO.

2.2 Fundamental classes of procedures

These classes of procedures are composed of :

— two types of stations : primary stations and secondary stations

— two types of response modes : normal and asynchronous.

They are designated as :

UAC Unbalanced operation, Asynchronous response mode, Class

UNC Unbalanced operation, Normal response mode, Class.

In the above designations, the first letter U defines unbalanced operation and the second letter A or N defines asynchronous response mode or normal response mode.

The basic repertoire of commands and responses is :

Commands	Responses
I	I
RR	RR
RNR	RNR
SXRM*	UA
DISC	DM
	CMDR

* SXRM command is : SARM for UAC
SNRM for UNC

2.3 Optional functions

There are ten optional functions used to modify the fundamental classes of procedures. These oprtional functions are achieved by the addition or deletion of commands and responses to the basic repertoire.

Option	Functional description	Required change
1A	Provide the ability to — exchange identification and/or characteristics of stations	Add command : XID Add response : XID
1B	— request logical disconnection	Add response RD
2	Provides the ability for more time reporting of I frame sequence errors	Add command : REJ Add response : REJ
3	Provides the ability for more efficient recovery from I frame sequence errors by requesting retransmission of a single frame	Add command : SREJ Add response : SREJ
4	Provides the ability to exchange information fields without impacting the I frame sequence counts	Add command : UI Add response : UI
5	Provides primary ability to initialize remote stations, and secondary ability to request initialization	Add command : SIM Add response : RIM
6	Provides primary ability to perform unnumbered group polling as well as individual polling	Add command : UP
7	Provides for greater than single octer addressing	Use extended addressing format in lieu of basic addressing format
8	Limits the procedure to one-way I frame transfer using commands	Delete response : I
9	Limits the procedure to one-way I frame transfer using responses	Delete command : I
10	Provides the ability to use extended sequence numbering (modulo 128)	Use extended control field format in lieu of basic control field format. Use SXRME in lieu of SXRM

2.4 Consistency of classes of procedures

Figure 2 gives a summary of the basic command/response repertoire of the classes of procedures, and the commands/responses of the optional functions. The primary station command repertoire is listed on the left side of each class and the secondary station response repertoire is listed on the right side.

This figure shows the consistency in the classes of procedures obtained through the use of the concepts of modes of operation, basic command/response repertoire, and hierarchical structuring. This repertoire consistency facilitates the inclusion of multiple versions of the classes of procedures in a station that is configurable.

2.5 Conformance to the unbalanced classes of procedures

A station conforms to a given class of procedures (with optional functions) if it implements the basic repertoire of that class of procedures plus those specified in the selected optional functions, i.e.

— a primary station has the ability to receive all responses in the class of procedures basic repertoire plus those specified in the selected optional functions,

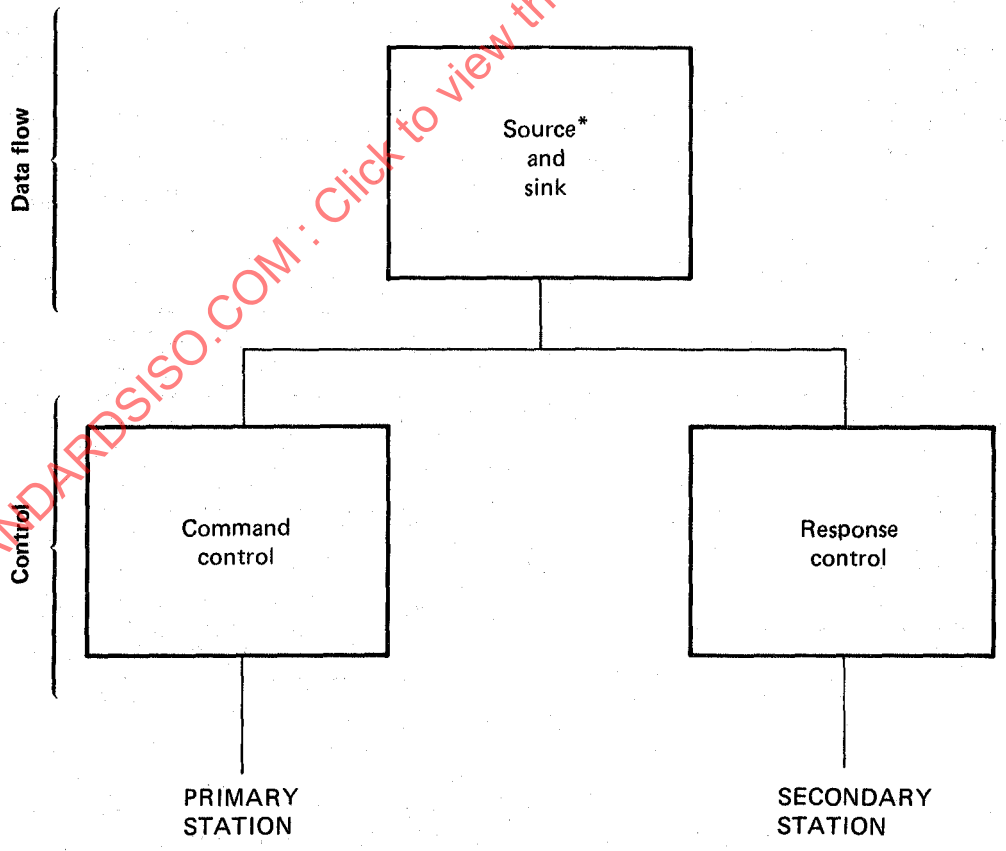
— a secondary station has the ability to receive all commands in the class of procedures basic repertoire plus those specified in the selected optional functions.

2.6 Method of indicating classes and optional functions

The classes of procedures and the optional functions are indicated by specifying the mnemonic designation of the class and the number(s) of the accompanying optional functions (see 2.2 and 2.3).

Example 1 : Class UNC 1, 2, 6, 9 is the unbalanced operation, normal response mode class of procedures with the optional functions for identification (XID), request disconnect (RD) improved performance, (REJ), unnumbered polling (UP), and one-way data flow from the secondary station(s) to the primary station.

Example 2 : Class UAC, 1, 5, 10 is the unbalanced operation, asynchronous response mode class of procedures with the optional functions for identification (XID), request disconnect (RD), initialization (SIM, RIM) and extended sequence numbering (modulo 128).



* For send-only I frame stations or receive-only I frame stations, remove source or sink capability, as appropriate.

Figure 1 — HDLC unbalanced stations — Building blocks

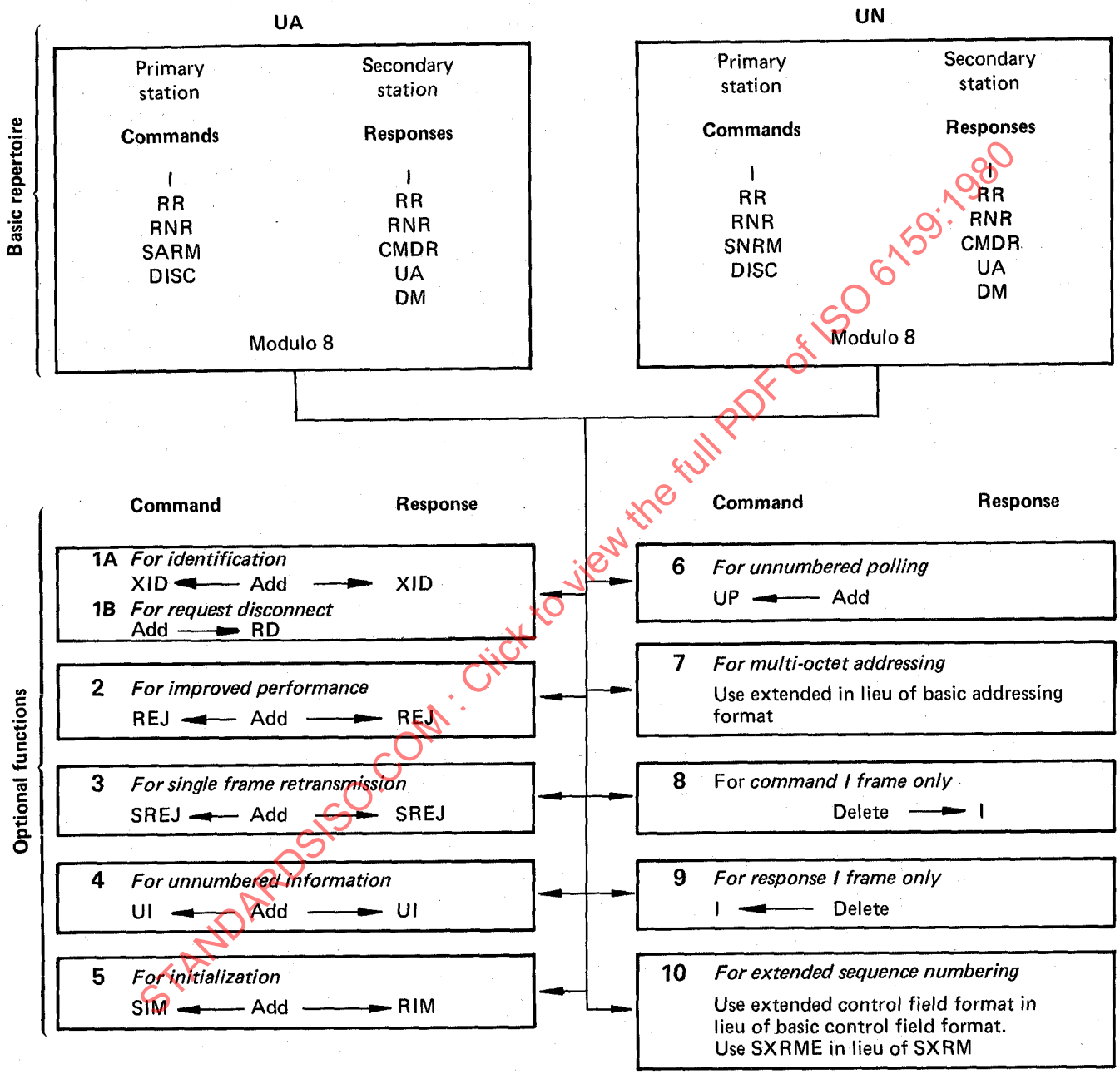


Figure 2 — HDLC unbalanced classes of procedures