Generic Router Driver

NOTE that this document is for both the V4grd.exe and the V3grd.exe and obviously the V1 and V2 versions up to the appropriate version number.

The document was produced by pulling together all documentation for all the versions

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Contents

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1 Overview

1.1 Description

The Generic Router Driver (GRD.EXE) can drive many different types of router using a variety of protocols. Routers differ greatly in terms of the protocol they support, speed of response, inherent intelligence etc. The GRD can drive intelligent routers that have their own controller or simple routers with limited logic. The two basic commands that are common to most routers are 'Connect' to join a source to a destination and 'Interrogate' to request the identity of the source currently feeding a destination. When a serially controlled router fits this model then its protocol can be added to the GRD.

When a router has more complex functions, such as conferencing, subscriber ringing etc., this calls for a dedicated driver that can best exploit the features offered by the equipment.

- Each router and protocol has its own particular features. Here are just a few :-
- Some routers will break away a source and put it back if asked to make the same crosspoint.
- Some routers cannot accept more than one or two commands at a time.
- Some routers have two or more married levels.
- Some routers with very simple logic cannot be interrogated
- The GRD has evolved to cope with all these scenarios.

This document covers both version s 1 & 2 of the GRD. However all the protocols that are contained in version 2 also exist in version 1, so details about the protocol implementation and configuration are equally appropriate to version 1. A version history can be found at the end of this document.

In version 1.x it interfaces directly to the LAN. In V2.xx it interfaces to the LAN via CSI. The way in which the GRD is configured to drive routers is the same.

Version 3 grd.exe was based on V2.02.10 of the V2grd and V4grd.exe was based on V3.02.10 of the V3 GRD.

It is hoped in the future to create another 32 bit GRD (grd32.exe) to simplify support.

Throughout the document the term GRD.exe refers to V1 V2 V3 or V4 unless specifically stated.

2 Driver setup

First create a database profile (DEX_xxx.INI) for the device Id you intend to use with the GRD. This can be done by either cloning and existing DEV_xxx.INI file or making a new one using the ApplCore utility MDP.EXE. GRD.EXE takes a single command line parameter. This is the router driver number. It can be between 1 and 999. No two drivers may use the same number and it serves as the unique number by which a particular router is addressed from the ApplCore panels or other client applications.

A single router driver would normally be used per router. That router may consist of a number of crates each with a separate port controlling a range of destinations. GRD.EXE can manage a router whose destinations are spread across up to eight ports. Each port can have different communications parameters and protocols if required. Several router drivers can be used on the same PC providing there are sufficient com ports to support them.

The driver can be instructed, either locally at the driver application or from ApplCore to inhibit or lock out any destination or range of destinations on a router.

The configuration file or 'device profile' for the router driver is a called DEV_XXX.INI where XXX is the router driver number. MDP.EXE (Make Device Profile) will create this file for you .The first part of the INI file has the heading [Router] and deals with the global parameters of the driver.

2.1 Ini file settings

Item	Comment
[GRD]	
Name=Audio Switcher	The name for the router. This is for reference only and not used internally by the driver.
ParkSource=64	When the GRD receives a request to route source zero to a destination it will substitute this park source instead.
FirstVirtual=	1. Defines the first virtual destination 2. Matrix dimensioned to include virtuals; i.e., for 8x8 matrix with 8 additional virtuals it will be dimensioned as 16x16 3. V. Destinations loopback and appear as V. Sources with the same index number
FwdBuffDelay=	This defines the time out value for forward buffer timer. By default this value is set to 0. If a router command (RC/RP/RL/RF/RP) is to be issued on the network and forward buffer delay is set to non-zero positive value, then the incoming commands get stored into a forward buffer until the max forward buffer size is reached. When the timer expires, the stored buffer is read and the commands issued on the network resulting in revertives from device. Values are in milliseconds.
RevertiveDelay=	This has a default value of 0. On setting this parameter to non-zero positive value, the revertive will be issued with a delay as per the maximum set value. For example, if the delay has been set to 10 seconds, then a timer will start which will expire every 10 seconds. Now, if a revertive comes at a time when already 2 seconds are gone, the revertive will be issued 8 seconds after it was received. Values are in milliseconds.
DriverMode=	When an external driver connects to the GRD, the Driver Mode reflects as external. When no external driver is connected, the Driver Mode reflects as internal. This value has a default of Internal and should retain this value if no external driver is connected to GRD.
InitTallyDelay =	Default value is 200ms. This value is the duration during which the poll is made on each destination defined by destination size for the configured protocol. Values are in milliseconds. If the protocol type set is 'NETWORK' and *InitTallyDelay* is less than 10000, then value is set to 10000.
CommErrorLimit=	Whenever data command is sent through GRD, TxCom counter is incremented internally. On successfully receiving message (ack) this counter is initialized to zero. In case there is no response, the counter remains incremented. When the counter exceeds the *CommErrorLimit*, the port status is reflected as "Fail". By default this parameter has a value of 5.
Revertive Mode	This value has a default of Router. See section 2.3
NetUpdateOnStart=	Default value is 1. The permissible values are either 0 or 1. Once the initial tally count, which is non-zero positive number, exceeds the max destination, and if NetUpdateOnStart is set to 1, revertive will be sent across by GRD for all the destinations.
InhibitNetworkOnStart=	This value has a default of 1. Receiving of Commands is inhibited during the start up of GRD when this parameter is set to 1.Rx counter text reflects "Inhibit" on GRD GUI. When set to 0, Rx is enabled and Rx counter is incremented on every command sent to GRD. This function is applicable in V4GRD only.
ReAssert=	This value has a default of 1. This confirms one more time that router cross point is made. When set to 0, this will not send revertive.

Item	Comment
GoRxOnlyOnComFail=	This value has a default of -1 and should retain this value if it's not a Probel protocol router See section 2.25
Access=1,9,12-20	This driver will only accept commands from workstations 1, 9 and 12 through 20
TallyDelay=100	Delay in milliseconds between background interrogation commands. The router is interrogated continuously, 1 crosspoint per TallyDelay period.
DebugMode=0	For debugging purposes only.
NameLength=8	The maximum length of a source or destination name for this particular router. (Maximum is 16)
Simulation=0	If set to 1 the driver does not talk to the router but pretends it is. Revertives are returned from the drivers internal tally table and no router communications are attempted.
BBCRCP_Levels=1	If NTP or BBC Radio Capital Projects protocol is used it tells the driver the number of levels to switch in the matrix
LeitchLevels=OBSOLETE	This has a default value 0. This parameter is no longer used in v3 and v4 GRD.
LeitchLevel=0	This is the level as specified for LEITCH protocol. The value entered here would be used in sending the information to the device as: @ *X:Level*DestS*rc*\r (all in hexadecimal) during router connect.
QuartzLevels=VAB	This value has a default of VAB. The message comes from the com interface of the device in the form of .UVAB2,5<0d>, in which VAB is the level , 2 is the src and 5 is the dest. Hence, when forming a packet and sending the information to the device, the level is picked up as the value set for *QuartzLevels*.
NetworkRouterLvl=	The parameter is used when the device configured uses NETWORK protocol. The address of the router type (Audio (0x90)/Video (0xA0)) or status message (0xC0) is added to the *NetworkRouterLvl* to send appropriate message.
AdrienneAddress=	The address mentioned here is used when the protocol in consideration is ADRIENNE. The two digits mentioned as address are split into "HighByte" and "LowByte" and get sent on the com interface to the device during "Interrogate" and "Connect" calls. The valid values are between 00 and 99, both inclusive.
SaveDelay=10	Maximum delay between saving destination lock change status to disk
SourceToDest=1	If set routes Source to Destination
DestToSource=0	If set routes Destination to Source
RouterMode=ROUTER	Its not there in v3 and v4 GRD versions
IndexMapping=1	Cross-mapping for Probel only. It creates Dev_nnn.sourceMapping and Dev_nnn.destMapping files V4GRD ONLY See section 2.24
[Database]	
DatabaseSize_0=256	Maximum number of sources up to a limit of 1024
DatabaseSize_1=32	Maximum number of destinations up to a limit of 1024

The next section of the INI file is in a number of parts, one for each com port. The GRD supports large routers, the control of which may be spread across up to four or more ports. There is a section in the ini file for each.

[Com_1]	This is a logical comport number within the driver
MinDest=1	The minimum destination on this port
MaxDest=64	The maximum destination on this port

Protocol=PROBEL	Protocol type
Speed=38400	Data speed
DataBits=8	Data bits
StopBits=1	Stop bits
Parity=E	Parity bit
Port=1	Physical com port number assigned to this logical port

All the com ports may be configured in an entirely different manner enabling several diverse makes and type of physical unit to be driven as one logical unit. Care should be taken to ensure that the minimum and maximum destination ranges do not overlap between com ports.

Note that the logical com ports within the driver can be set to any physical port on the PC

When a router driver starts up it begins to interrogate the router in order to build up an internal tally table. The driver will send out revertive information for all the destinations until its internal tally table matches the router. If any subsequent discrepancies occur the driver will immediately send the revertive for the destination in question to the network. If the driver loses communication with a router on one or all com ports no revertive information will be sent to the network. Panels will therefore reflect the last known state of the router. The making of crosspoints on the router is inhibited during this period

2.2 Sample Ini

[GRD]

Name=Default

ParkSource=0

FirstVirtual=0

SaveDelay=10

FwdBuffDelay=0

RevertiveDelay=0

DriverMode=INTERNAL

InitTallyDelay=200

TallyDelay=2000

CommErrorLimit=5

RevertiveMode=ROUTER

NetUpdateOnStart=1

InhibitNetworkOnStart=1

ReAssert=1

DebugMode=0

SourceToDest=1

DestToSource=0

NameLength=8

Simulation=0

BBCRCP_Levels=1

LeitchLevels=OBSOLETE

LeitchLevel=0

QuartzLevels=VAB

NetworkRouterType=VIDEO

NetworkRouterLvl=0

AdrienneAddress=0

GoRxOnlyOnComFail=-1

IndexMapping=0

Notes

2.3 Router Mode

This parameter governs how the GRD handles revertives. If set to ROUTER the driver will wait until the router returns tally information after a Router Crosspoint command has been received before sending revertive information to the network. If set to DRIVER the driver will return revertive information immediately on receipt of a valid Router Crosspoint command providing the driver is happy that its communications with the router are satisfactory. The latter will result in an improved revertive response time when the driver is used at slow baud rates.

2.4 Protocols

The following protocols are supported by the GRD. Each protocol has one or more unique features that needs to be taken into account when configuring the GRD. The 'Comms Parameters' listed are those specified in the documentation for the router as being the default. When establishing communications with a router it is a good starting point, but since many routers have configurable comms parameters it is wise to check that the defaults have not been changed.

2.5 Pro-Bel Simple

Protocol Keyword = SIMPLE

Comms parameters = 8 bits, Even parity, 1 Stop bit

This is a very simple hex protocol for driving small routers. It enables simple decoding within the router. There is no error correction. The GRD continuously interrogates the router for status of its destinations.

2.6 Pro-Bel General Switcher

Protocol Keyword=PROBEL

Comms parameters = 8 bits, Even parity, 1 Stop bit

This is the workhorse hex protocol for driving routers. Large routers up to 4096 can be accommodated.

2.7 NTP

Protocol Keyword=NTP

Comms parameters = 8 bits, No parity, 1 Stop bit

An ASCII based protocol for driving routers and controllers. The GRD can address several levels providing they are married together. In the INI file the 'BBCRCPLevels' parameter sets the number of levels. If set to 1 only router/level 'A' is switched. If set to '3' then levels 'A,B & C' would be switched. Interrogation is done on Level 'A'

only. If greater flexibility is required use the NTP controller driver GRD_NTP.EXE. If you want to bypass the controller altogether and speak to the frames directly you will the CTL_NTP.EXE driver and hardware PCB's designed by Willie Orr in Belfast.

2.8 Cox

Protocol Keyword=COX

2.9 Vistek

Protocol Keyword=VISTEK

2.10 NTP Equalizer

Protocol Keyword=NTPEQ

2.11 Simple Microcontroller Router Protocol

Protocol Keyword=SIMOSRTR

Comms parameters = 8 bits, No parity, 1 Stop bit

A protocol developed to communicate with the BNCS Vision Router prototype. At the time of writing no production versions exist.

2.12 Simple Microcontroller GPI

Protocol Keyword=SIMOSGPI

A protocol developed to communicate with the BNCS Microcontroller based GPI system.

2.13 BTS ASCII

Protocol Keyword=BTSASCII

2.14 BTS ESSwitch

Protocol Keyword=BTSESSWITCH

This allows switching via a VM3000 controller. Crosspoint connect requests as wildcards so all levels will switch. If you need individual control of the matrices and levels you need the CTL BTS controller driver.

2.15 Quartz

Protocol Keyword=QUARTZ

2.16 Network

Protocol Keyword=NETWORK

This allows control of Network Electronics or Nevion VikinX routers up to 128x128 using NCB protocol.

NetworkRouterType must be set to either VIDEO for all video routers or AUDIO for all other types.
NetworkRouterLvl must be set to the routers NCB Address (which is 1 less than the level number)

2.17 Leitch

Protocol Keyword= Leitch

2.18 Adrienne

Protocol Keyword= Adrienne

2.19 Pesa

Protocol Keyword=PESA

2.20 Sony (V3GRD only)

Protocol Keyword=SONY

2.21 Diagnostics

The router driver application is normally iconised but can be restored to show diagnostic information and provide local control. The window is split into four parts :-

- The network message counters at the top showing the number of messages received and transmitted by the driver.
- The serial ports section shows the status of each active port and the destinations that they are configured for. The 'Status' box shows either OK or FAIL and indicates whether or not the driver is receiving data in response to its interrogation. It does not mean that the data being received is valid. Data validity is indicated by the 'Errors' box. In normal operation it should very rarely increment if at all.
- The 'Sources' section displays all available sources in a scrollable listbox. A source will be highlighted if it is routed to the destination selected in the 'Destination' section and is also used to select a source for subsequent routing to a destination.
- The 'Destination' section displays all available destinations is a scrollable listbox. Selecting a destination will highlight it and will also highlight the current source feeding that destination, if any, in the source listbox. Another source may be selected and routed by pressing the 'Take' button. If the destination is locked then it is necessary to unlock it first by pressing the 'Locked' button, which will enable the 'Take' button and the route can then be made.

Any destination can be locked and the lock status is periodically saved to disc in case of power failure.

2.22 Control

The commands for controlling a router via a GRD are detailed in the ApplCore documentation. The basic command for making a crosspoint is:

RC <Driver Number%< <Source%> <Destination%>

Example : RC 38 17 12

The above command would instruct GRD number 38 to route source 17 to destination 12. The ApplCore documentation makes reference to a 'mask' parameter for use with some routing modules, the Packager and Virtual Router Driver to name but two. The GRD ignores the mask parameter.

2.23 Local Control

If the PC on which the router driver is running is configured for mouse input then the mouse can be used to make crosspoints locally on the router driver itself. If a keyboard is available you can enable keyboard router control from the menu bar using <Alt> 'K' 'E'. Once enabled, the keyboard can be used to make crosspoints using <Alt> 'S', to select the source box, <Alt> 'D' to select the destination box and <Alt> 'T' to make the crosspoint. <Alt> 'L' enables the locking and unlocking of individual destinations. With the keyboard disabled on the main menu only monitoring is possible.

2.24 Cross Mapping

The ability to remap sources and destinations has been added in V4grd.exe version 4.2.0. This version of V4GRD can be used in place of V3GRD as it will check bncs_config.ini for paths if the environment variables are not set.

Note that this version only has mapping applied to the Probel protocol.

A new IndexMapping entry in the GRD section of the device ini file can be set to 1 causing new Dev_nnn.sourcemapping and Dev_nnn.destmapping files to be created the next time the driver is run. Any changes to the default one-to-one mappings are read after it is next run.

The entries are of the form:

Bncs=real

e.g. 0005=0022, where 22 on the router is bncs index 5

Note that you must take care to ensure that there is not more than one real destination mapped to a BNCS one.

Note that the opposite, i.e. real=bncs is used for indexMapping of Jupiter and Nexus routers

2.25 TXRX Switching

GoRxOnlyOnComFail

This value has a default of -1 and should retain this value if it's not a Probel protocol router.

Either zero or a positive port number can be configured. Zero is interpreted as any port. This value is used to decide whether to switch to RX Only operation if the com port fails. i.e. if Com 2 does not respond and this value is either 0 or 2 the driver will switch to RX Only. Only in the case of Probel protocol is it reverted to TXRX when data is again received on the port.

Introduction

This section refers to V3GRD version 3.05.05. It addresses issues regarding database updates and revertive options.

2.26 Additional switch option for Router Modify command

V3 GRD Only from Version 3.05.05

The RM command has an optional switch, which if set to '1', will signal the V3GRD to generate a complete tally table of revertives. This causes a flood of revertives for a single database change. There is a requirement to only generate a tally when either database 0 or database 2 have changed and only for those destinations that actually have the affected source routed to them.

For backwards compatibility the solution was to add a second option to the switch. If the value '2' is used then only revertives for the changed sources are sent.

Note : This has the following dependencies :-

V3CSI.EXE	V3.05.03
BBCNB32B.DLL	V3.00.05

Item 2 : When an RM command is processed the V3GRD source and dest list boxes do not update

Issue : When V3CSI processes an RM command the change details are notified to the V3GRD. The V3GRD does not currently use this information to refresh the listboxes.

Resolution : The list boxes are now refreshed whenever V3CSI signals that a database change has occurred.

3 Version history

3.1 Version History

1.00	15/12/93	Commenced development
1.01	28/01/94	Added filtering of revertive messages
1.02	08/02/94	Put routines for different routers in separate modules. Added BBC Radio Capital Projects specification protocol
1.03	12/02/94	Added local lock facility
	22/02/94	Improved Pro-Bel tally decoder
1.04	24/02/94	Increased message queue
	01/03/94	Revertive from Router or Driver option
	28/03/94	Revertive sent even if source already routed
1.05	12/04/94	Access control added
1.06	04/06/94	Keyboard control added
1.07	19/07/94	Bug fix to received serial data handler
1.08	26/07/94	Bug fix for com port 4 working
1.09	20/09/94	Expanded to be able to drive 8 com ports
1.10	01/11/94	Added database commands

		Added support for CSLINK.EXE
		Added revertive delay mechanism
		Added Re-Assert option
		Added 'Clear Error' to menu
		Bug fix to com port error detection
1.11	10/12/94	Bug fix to allow min and max database entries to be changed Bug fix to local INI file database modification routine
1.12	03/01/95	Added COX protocol
	28/01/95	Tidied Pro-Bel protocol implementation
1.13	02/03/95	Added Pro-Bel Simple protocol
1.14	14/06/95	Changed revertive protocol
		Added workstation number to revertive messages
1.15	10/07/95	Added Vistek protocol
1.16	07/09/95	Added external driver interfacing
	29/09/95	No longer grabs com ports when in simulate
	06/10/95 11/10/95	Bug fix to revertive routine for routers with over 243 dests Router Modify bug fix allows all workstations to receive revertive
1.17	21/11/95	Bug fix to Cox protocol
1.18	18/12/95	Added NTP equalizer protocol
		Added BBC_GRDUSERSTR message for external drivers
		Default sources & destinations now 64
		Default tally delay now 500ms
		Added default source & destination names
		External disconnect now puts GRD back in mode box
		Destination change now immediately reflected in dialog box
	14/02/96	Pro-Bel Simple protocol delay increased to 20ms
		For the Vistek protocol a .E error message will no generate a .A
		Bug fix to Cox protocol for multiple com ports
1.19	27/02/96	Bug fix to source database change mechanism
	27/02/96	Added SIMOS-GPI protocol for PIC support
		Source and dest list boxes now only show max of each
	11/04/96	Added SIMOS-RTR protocol
		Bug fix to GRD external handler
	29/04/96	Bug fix to serial read handler in the Cox protocol
1.20	30/05/96	Added forward buffering
		Added 'InitialTallyDelay' mechanism
		Added Rx inhibit until initial tally cycle complete
		Added option to update network on after init tally cycle complete
		Increased max destinations to 1536
		Enabled revertives for reassert on SIMPLE protocol

1.21	17/09/96	Added BTS Ascii protocol
	12/09/96	Added Quartz protocol
1.22	15/11/96	Added System Logging functions
1.23	05/02/97	Rx disable on startup now configurable in INI file
	03/03/97	Bug fix to allow BBCRCP (NTP) protocol to talk to routers greater than 9x9 Added RRD capabilities Sends virtual dest info on startup
	13/03/97	Adds park source for virtual dests
	16/03/97	Mapping Tallytable to RRDTable does not happen for polls
	17/03/97	Closing Windows now save the DAT file
	19/03/97	Bug fix to assert park source when creating new DAT file.
	29/04/97	Increased max destinations to 1985
1.24.00	14/05/97	Added BTS ES Switch protocol
		Modified revertive delay routine to use Min and Max range
		Allows external driver to make routes on real router in INTERNAL mode
		When an external driver requests GRDs handle the router Id is returned in lParam
1.24.01	05/06/97	Fix to prevent BTS EsSwitch protocol handler generating double revertives in DRIVER mode
1.24.02	06/06/97	2nd fix to above
1.24.03	08/07/97	Bug fix to save delay timer routine
1.24.04	15/07/97	Bug RRCmd_Connect_VSRD() function to add access variable to RC command
1.25.00	20/07/97	Added 'Network' router protocol
1.25.01	16/09/97	Bug fix to restore 'OK' when comms restored using Network protocol
	19/09/97	Bug fix to allow virtual destinations with Network protocol
1.26.00	23/09/97	Added Leitch protocol
1.27.00	07/10/97	Added recursive RRD functions
		Added iClearTalliesOnStart parameter to INI file
		Added Pro-Bel protocol Exception 'A'
	16/10/97	Bug fix to GRMemory_GetDbaseName() to prevent corruption of 16 character dest names
1.27.01	24/10/97	Bug fix to Network router protocol
1.27.02	25/01/97	BBC_GRDGETDEST now returns source number as result
1.28.00	09/04/98	NTP protocol handler modified to allow router letter to be specified in INI file
1.28.01	20/04/98	Bug fix to park source and source zero is now valid
2.00.00	13/12/96	Development commenced based on version 1.22
		Added CSI device interface functions
		Reduced size of default database names
		Now allows oversize poll requests by reducing the max to the number of dests
2.00.01	18/02/97	Now always signals CSI to buffer change revertives
	21/02/97	Dialog box now updates on changes
	24/02/97	Source and destination lists now come from CSI

		Icon changed
		Removed direct NetBIOS support
		Now uses generic DEV_xxx.INI files
2.00.02	18/02/97	GRD_xxx.DAT and LCK files changed to DEV_xxx.DAT and LCK files
		Version information resource added
		Router Poll restored to be V1.0 compatible and Router Query added
2.00.03	28/04/97	Added 'ParkSource' entry in iNI file to map source 0 to real source
	06/07/97	Added RRD functions
2.00.04	13/05/97	'First Virtual' profile entry moved to [GRD] section
		Signals external driver to close when GRD is closing
04/06/97		GRD Id now sent in lParam of BBC_GRDHANDLE message
2.00.05	25/07/97	Bug fix to Router Query command
2.00.06	30/08/97	BTS ES Switch and Network protocol added
2.00.07	23/09/97	Added Leitch protocol
2.00.08	20/11/97	Simulation not inhibited in EXTERNAL driver mode
2.00.09	25/01/98	GRD_GETDESTMESSAGE now returns source as result
	28/01/98	Now validates driver Id supplied on command line
		No longer allows multiple instances with same id on same machine
2.00.10	16/02/98	In dialog box selecting and pressing take generarates correct revertive
	8/02/98	Name changed to V2GRD.EXE
2.00.11	15/05/98	Now allows source 0
2.00.12	24/08/98	Now responds to BBC_DATABASEPOLL message
	12/10/98	Bug fix to allow V2GRD to run on NT
2.00.13	01/03/99	Fix to prevent double revertives when using external drivers
2.00.14	26/04/99	RRD table now saved and reloaded
		Restoration of comms using Network Router protocol flags 'Ok'
2.00.15	01/06/99	Now supports BBC_IDGETTXRXMODE & BBC_IDSETTXRXMODE
2.00.16	07/07/99	Now sends BBC_GRDREVINFO to external drivers
2.01.00	20/09/99	Added external control hooks
2.01.01	30/03/00	Now reliabley saves DAT files
2.01.02	11/04/00	Leitch protocol driver now uses 'pass through' mode
2.01.03	28/09/00	Added GetCommEventMask() to renable WM_COMMNOTIFY for XEM boards under Win2000
2.01.04	03/10/00	Revertives now checked for the level identifier in the 'Network Router' protocol
2.02.00	22/12/00	Added BBC_REQDEVGOTXRX to complement Tx/Rx <> Rx Only switching in CSI 1.18.00 and later
2.02.01	29/05/01	Added Adrienne protocol
2.02.02	22/06/01	Ported virtual routing code from V1 GRD.EXE
2.02.03	27/06/01	Modification to allow re-entrent virtual routes
2.02.04	15/08/01	Bug fix to Adrienne protocol
2.02.05	31/10/01	Added Pesa protocol

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2.02.06 04/03/02	Bug fix to external control handler to allow crosspoints to be made
2.02.07 06/11/02	Modification to remove spaces from GRLeitch_Interrogate() function
2.02.08 21/11/02	Modification to GRLeitch_Interrogate() and GRLeitch_Connect() to turn hex into upper case
2.02.09 12/12/02	Bug fix to re-enable Client External commands
2.02.10 05/02/03	Bug fix to revertive decode in Quartz protocol when making crosspoints on more than one level

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At this Point the V3 and V4 GRDs were created based on the Version 2 GRD

V3 GRD	V4 GRD
3.02.10 17/04/03 32 bit version based on 2.02.10	4.00.00 22/01/04 Commenced development based on 3.02.10
3.02.11 26/11/04 Now implements BBC_INQDEVGOTXRX to generate NI messages from CSI	4.00.01 17/03/04 Now intercepts BBC_GRCONNECT32 message
3.02.12 17/01/05 Fix to BBC_CLIENTMSG message handler	4.00.02 10/06/04 Now responds to BBC_GRCONNECT32 with direct SendMessage()
3.03.00 06/07/05 Expanded to give access to com ports above 8	4.00.03 11/06/04 Recompiled to use V4 paths
3.03.01 27/05/09 Now accepts BBC_GRDCONNECT32	4.00.04 23/11/04 Bug fix for external driver TxRx switching
3.03.02 08/11/05 Bug fix to send terminating zero in GRExt_SendUserStr()	4.00.05 26/11/04 Now implements BBC_INQDEVGOTXRX to generate NI messages from CSI
3.03.03 07/12/05 Removed faulty RRD table mapping Park source used in RRD commands rather than zero	4.1.1.0 20/05/05 Remigrate into synergy and remove 111 compile warnings
3.03.04 30/01/06 BBC_DEVICEIDINUSE message now passed to external Changed external messaging to be direct for numeric lParams. GRBtsEs_Init() now called in GRDialog_InitDialog()	4.1.1.1 24/05/05 Removed remaining 2 compile warnings Added BBC_DEVCOMMANDMSG, BBC_DEVSTATUSMSG & BBC_EXTCOMMANDMSG handlers Added GRNetCmd.cpp
3.03.05 01/02/06 CSISup_AssertTxRxMode() & CSISup_DisplayTxRxMode() added Range checking added to GRExt_SetDest()	4.1.1.2 27/05/05 Implemented '?' handler in device status message
3.04.00 17/02/06 Now uses GetConfigDirectory in bncs_gcd.cpp/h Added 'Go RxOnly On Com Fail' menchanism Added GRMain_InquireGoTxRx() to check for TxRx capability Bug fix to the opeing of com ports above 9	4.1.1.3 22/06/05 Added 'GoRxOnlyOnComFail' mechanism
3.04.01 13/03/06 GetConfigDirectory() changed to GetBNCSConfigDirectory() GetBNCSSystemDirectory() added for LoadLibrary() calls	4.1.1.4 27/06/05 Added GRMain_InquireGoTxRx() to check for TxRx capability
3.04.02 20/06/06 Bug fix to GetCCommError() in pro-Bel SIMPLE protocol	4.1.1.5 11/07/05 Expanded to give access to com ports above 8
3.04.03 14/11/06 Bug fix to stop repeated sending of BBC_DEVGORXONLY messages during comms fail	4.1.1.6 21/09/05 Mod to BBC_REQDEVGOTXRX & BBC_REQDEVGORXONLY handlers to use direct messaging
3.04.04 21/11/06 Bug fix to comms fail fix above.	4.1.1.6 22/09/05 Now correctly displays GRD in title bar instead of ID.

3.04.05 29/12/06 Added BBC_CTRLCONNECT32 and BBC_CTRLDISCONNECT32 Added WM_COPYDATA support for ApplCore control externals	4.1.1.7 08/12/05 Bug fix to BBC_DEVCOMMANDMSG handler
3.04.06 02/01/07 BBC_CLIENTMSG handler now uses WM_COPYDATA	4.1.1.8 21/12/05 BBC_IDSETTXRXMODE no longer deregisters 22/12/05 Caption bar reflects broken state
3.04.07 15/01/07 Bug fix to com port mapping for when ComId=0, GRD.iPortId[i] now intialised to -1 instead of zero	4.1.1.9 13/01/06 Range checking added to GRExt_SetDest()
3.04.07 16/01/07 Made COMMERRORLIMIT a configurable parameter	4.1.1.10 17/01/06 Will now send revertives for all modes other than RXONLY
3.05.00 06/03/07 Build from CVS	4.1.1.11 18/01/06 IFMODE_RXONLYBROKEN no longer displayed on caption bar
3.05.01 22/03/07 Fix to add range checking when there is a Virtual part of the router	4.1.1.12 06/02/06 Added InhibitNetworkOnStart option to INI file 22/02/06 BBC_DEVCOMMANDMSG copied to local variable before being passed to external
3.05.02 15/05/07 Fix to SIMOSRTR protocol to use correct port/destination.	4.1.1.13 19/06/06 Built from CVS
3.05.03 25/06/07 Fix to prevent LEITCH protocol interpreting system status messages as switch status	4.1.1.14 03/10/06 Update title when going to TxRx mode
3.05.04 11/09/07 Minor fix to update the rx count when the initial poll is complete	4.1.1.15 15/01/07 Fix to allow comm ports greater than 8 to be used
3.05.05 09/07/08 If BBC_DATABASEPOLL is received with lParam==2 then only destinations equal to the changed source are reverted Now refreshes the source and destination list boxes when a BBC_DATABASECHANGE message is received	4.1.1.16 22/01/07 Added the ability to allow the user to define how many comms messages missed constitutes comms fail.
3.05.06 10/03/09 Adds remote Tx/Rx query and switching using BBC_DEVCOMMANDMSG (NS) as in V4 - SL	4.1.1.17 22/03/07 Fix to add range checking when there is a Virtual part of the router CB
3.06.00 03/04/09 Adds SONY router protocol taken from V2GRD	4.1.1.18 14/04/09 Long-standing fix to a few instances of CSISup_TxRevertive where the parameters were the wrong way round this led to a start-up problem where it would try and send a tally dump to workstation 1 on a session
3.06.01 14/04/09 CSISup_TxRevertive had a couple of instances with the last two parameters the wrong way around. This meant it tried to send a tally dump on a session to workstation 1 (even if there wasn't one....). Also adds map file.	4.1.1.19 30/04/09 Uses timer to defer reloading of dialog listboxes on database change
3.06.02 21/04/09 Sony added to GRPROF.C and PESA fixes from 2.16	4.2.0.0 08/06/09 Added index mapping to Probel protocol

3.06.03 30/04/09 Uses timer to defer reloading of dialog listboxes on database change also fixes long-standing not enough memory allocated bug with getting database names for listbox	4.2.1.0 12/06/09 Fixed source and destination listbox cursor key control
3.06.04 02/10/09 ReAssert=0 will now work in conjunction with Simulation=1. ie not sending a revertive if the (simulated) tally doesn't change. This copied from v4grd version 4.2.5.0 - 22/9/09.	15/06/09 Added selected source and destination number to label above listboxes Also added V3 compatibility to V4GRD
3.06.05 18/03/10 Fix to allow BTS protocol to route sources above 128 (wrong mask used on splitting word to byte)	4.2.3.0 02/07/09 index mapping class bug fix to allow device numbers below 100 be read
3.06.06 17/05/10 Fix for bug 1572. The network router control protocol responds to now all different NetworkRouterLvl. Earlier it was just responding to NetworkRouterLvl=0.	4.2.5.14 10/07/09 Inverted mapping so that ini file entries are bncs=real This was requested by BUG members.
3.06.07 17/08/2010 The max number of sources for QUARTZ protocol is 1024 now. The field has been made 4-digit wide to reflect proper revertive messages in the Caplog.	4.2.7 17/08/2010 The max number of sources for QUARTZ protocol is 1024 now. The field has been made 4-digit wide to reflect proper revertive messages in the Caplog.
3.06.08 16/10/10 BTSESSWITCH protocol – added test for device startup message (ie hardware reset) and re-registers for revertive updates.	4.2.8 19/10/10 Adds device name (from [GRD]->Name or [Device]->Name) to the title bar
3.06.09 Debug string increased beyond 256 to deal with long strings generated for eg RM commands	4.2.9 22/12/10 BTSESSWITCH protocol fixes, adds test for device startup message (ie hardware reset) and re-registers for revertive updates.
	4.3.0 08/03/11 Resized so that listbox horizontal cursors are fully visible, plus column widths set to 16 characters.
	4.4.0 16/05/11 Adds WM_CopyData processing and client message handling (BBC_CTRLCONNECT32 & BBC_CTRLDISCONNECT32) for Applcore External Client compatibility.
	4.4.1 Modifications to build settings
	4.4.2 Changes message type used with External Connect
	4.4.3 Debug string increased beyond 256 to deal with long strings generated for eg RM commands

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3.2 Document version

Version No	Date	Details	Name
	Feb 09	Updated template	A Atkin
	June 09	Updated document	JDW
	July 09	Updated document	JDW
	March 10	Updated document	JDW
	18th May 2010	Added the V3 GRD version history	ADP
	19th May 2010	Formatted and added place holders for undocumented ini file settings remove this comment before release.	ADP
1.1	2/6/2010	Added version number to last change in V4GRD	ADP
1.2	21/7/2010	Clarification of the meaning and options available for ini file settings	Ravi Bhatt, Kunal Dutta
1.3	17/08/2010	Updated with the changes made to the driver up Kunal Dutta	Simon Armstrong
1.4	22/12/2010	Updated with BTSESSWITCH mods to V3 and V4 GRD. Corrects spelling of the Protocol Keyword in 2.14	Steve Lowe
1.5	16/05/2011	Updated V4 version history	Steve Lowe
1.6	25/11/2011	Updated V4 version history	Steve Lowe
1.7	25/11/2011	Updates section 2.16 – NETWORK section, with further detail	DMR
1.8	8/03/2012	Updates version information for V3 and V4 GRD releases	DMR