3634–02/04/35 56/64KB X N SYNC-DP (Dataport) Channel Unit

Complies with UL Standard 1459 Second Edition*.

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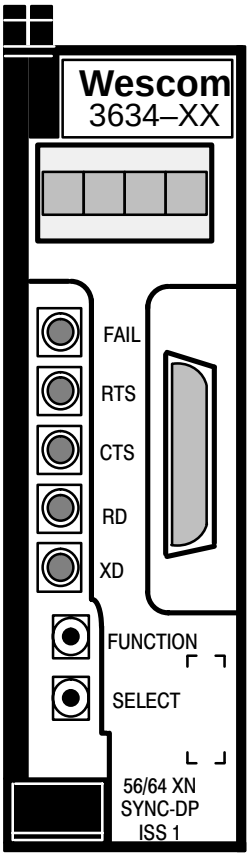

Figure 1. 3634 56/64 X N SYNC-DP

1. GENERAL

1.1 Document Purpose

The Charles Industries 3634–02/04/35 56/64 X N SYNC-DP, which will be referred to as the Dataport, is used in the Charles Industries 360/363 D4 Digital Carrier Terminal. The Dataport, depicted in Figure 1, is equipped with one of three interfaces as determined by model number:

- RS–232 (3634–02)
- RS–449/422 (3634–04)
- CCITT V.35 (3634–35)

***CAUTION**

Field repairs/modifications may void compliance with UL 1459 — Second Edition. 3634—02/04/35 compliance with UL 1459 — Second Edition is restricted to inside plant wiring.

1.2 Document Status

This document is reprinted to include a general editorial update.

1.3 Equipment Function

The Dataports provide a full-duplex synchronous data communications circuit capable of operating at switch selectable data speeds from 56KB/s to 1.536KB/s in multiples of 56 or 64KB/s.

The 3634–02 with RS–232 interface, part number B98–363402, consists of the following:

- One 3634–02 56/64 X N SYNC DP module
- One micro connector to 25-pin D-type cable assembly.

The 3634–04 with RS–449/422 interface, part number B98–363404, consists of the following:

- One 3634–04 56/64 X N SYNC-DP module
- One micro connector to 37-pin D-type cable assembly.

The 3634–35 with CCITT V.35 interface, part number B98–363435, consists of the following:

- One 3634–35 56/64 X N SYNC-DP module
- One micro connector to V.35 connector cable assembly.

An optional “Blank Panel,” for unused channel slots, is available as part number A91–368900.

1.4 Equipment Location/Mounting

The Dataport occupies one channel slot of a 360/363 D4 channel bank and provides a direct digital interface between the 360/363 D4 terminal common equipment.

1.5 Equipment Features

The Dataport features include the following:

- Complies with UL Standard 1459 Second Edition
- Supports clear channel at 64KB/s with ESF/B8ZS Mode 3E common equipment
- Supports 56/64 X N data rates (N=1 only for the 3634–02, N=1–24 for the 3634–04/35)
- Supports requirements for RS–232, RS–449/422 or CCITT V.35 interfaces
- Manually or interface initiated Loopback and Self Test features
- Response to DDS DSU, channel, or office channel unit (OCU) loopback codes from the network (optionable)

- On-board self test when initially inserted into channel unit slot
- Fully compatible with DDS network for 56kb/s rate

2. INSPECTION

2.1 Inspect for Damages

Inspect the equipment thoroughly upon delivery. If the equipment has been damaged in transit, immediately report the extent of damage to the transportation company.

2.2 Equipment Identification

Charles Industries' equipment is identified by a model and issue number imprinted on the front panel or located elsewhere on the equipment. Each time a major engineering design change is made on the equipment, the issue number is advanced by 1 and imprinted on subsequent units manufactured. Therefore, be sure to include both the model number and its issue number when making inquiries about the equipment.

2.3 Static Concerns

Each module is shipped in static-protective packaging to prevent electrostatic charges from damaging static-sensitive devices. Use approved static-preventive measures, such as static-conductive wrist straps and a static-dissipative mat, when handling modules outside of their protective packaging. A module intended for future use should be tested as soon as possible and returned to its original protective packaging for storage.

3. APPLICATION GUIDELINES

The Dataport provides Intermediate Bit Rate Service (IBRS). IBRS refers to the availability of services consisting of multiple DSO increments. AT&T currently offers IBRS at 64, 128, 384, 512 and 658 KB/s. The advantage of IBRS is found in treating all of the bandwidth as a single synchronous channel. This allows the use of the bandwidth for video conferencing and quick transfer of point-to-point data from large computer systems.

Figure 2 illustrates a typical application of the dataport.

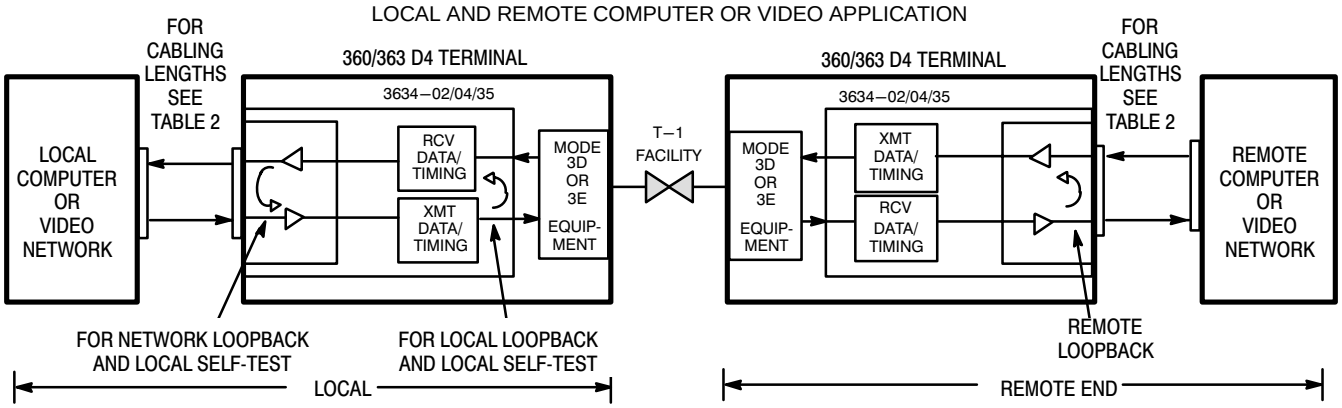

Figure 2. Communications Applications for 3634—02 with RS—232 Interface Low Speed 56/64kb/s X N (N = 1), 3634—04 with RS—449/422 Interface High Speed 56/64kb/s X N (N = 1—24) and 3634—35 with CCITT V.35 Interface High Speed 56/64kb/s X N (N = 1—24)

Refer to Table 3 for standard interface designations and pins that are supported by the various dataports. This interface connects to the data source (DTE) and controls the data transmitted over the data channel. All interface circuits meet the requirements defined in EIA recommendations RS–232D, RS–449/422 and CCITT Recommendation V.35. These recommendations define the electrical characteristics of the data, timing, and control leads. The interface connections is on the front panel and requires an adapter cable supplied with the unit. The adapter cable hass a 26-pin female micro connector at one end and the appropriate standard connector at the other end.

The Dataport provides the following loopback and testing features. These features can be activated from the front panel FUNCTION push-button switch, interface control leads, or from received network codes. Refer to Figure 2.

- Local Loopback (LLB) transmits all ones (1) to the remote unit and loops the DCE on itself. This will test the data path drivers and receivers from the local end of the data path.
- Network Loopback (NLB) disconnects the DTE transmit data from the dataport and loops the dataport data path, including drivers and receivers of the channel unit, toward the network. This allows testing from the network.
- Remote Loopback (RLB) activates a latched Network Loopback at a similar unit at a remote site. This will allow testing from the local end of the data path through the network and remote dataport and back to the near end.
- Kill Remote Loopback (KRLB) sends a series of bytes toward the network will drop any latched loopbacks. This will allow the near end unit to insure that latched loopbacks in the network are not set. This feature is not to be used to terminate a loop that was initiated by RLB.
- A Local Self-Test (LST) feature allows the unit to loop on itself for confidence testing.
- Remote Self-Test (RST) feature can be used in conjunction with the remote unit to allow end-to-end testing of the T1 facility without a DTE or external test equipment (this test does not test the remote or local unit).

CAUTION

In applications when N=24, if the unit is optioned with PRTS ON and the interface to the DTE is not connected, the unit may transmit a Yellow Alarm toward the remote channel bank due to the transmitted bit 2 being in a constant low state.

The front panel alphanumeric display will indicate various modes of information. See Table 1 for a summary of displays. These modes can be divided into the following categories:

- The Power-Up will include messages displayed during the initial power up and initialization sequence. Refer to Paragraph 3.04 for details of these messages.
- The Function Mode will include messages displayed as a result of pressing the FUNCTION switch on the front panel. Refer to Paragraph 3.05 for additional information.
- The Status messages are displayed as a result of selecting one of the functions from the front panel or as an indication of a current status condition of the module. Refer to Paragraph 3.08 for additional information.

Activating a diagnostic (Local/Remote/Network Loopback, Kill Remote Loopback, Local/Remote self test) manually, with the use of the FUNCTION and SELECT switches, while the unit is in a network activated diagnostic mode (Latched or Non-Latched Loopbacks), will cause the network activated mode to be terminated.

4. INSTALLATION

4.1 Options

The options must be set before inserting the Dataport into its channel slot. Verify that all option settings are correct before the unit is inserted. Refer to Figure 3 for the location of all option switches and information for setting of the Physical Slot (S2) and Bandwidth Time Slot Assignment (S3) switches. Figure 3 also contains an option summary with descriptions of the S1 options.

Note: The front panel alphanumeric display can display the active options for the Dataport. Refer to Section 3 for unit operation.

4.1.1. Signal Grounding Options

The RS–232, RS–449/422, and V.35 DCE interfaces all are provided with an option switch for connecting the signal ground leads of the DCE interfaces to the circuit ground of the channel unit (48V Return). For proper operation, the circuit grounds of the DCE interfaces and the Dataport should be connected together. This can be done either through the signal ground leads in the cable or through frame grounds of the DCE and the 360/363 D4 Ter-

minal. When deciding the grounding arrangement, be careful that no high ground currents are formed due to ground potential differences between the DCE and the 360/363 D4 Terminal equipment.

4.2 Module Installation

The Dataport mounts in one channel unit slot of a 360/363 D4 terminal and is equipped with an insert/eject lever which facilitates removal and installation of the unit.

CAUTION

Removal and installation of modules should be done with care. Do not force a module into place. If excessive resistance is encountered while installing a module, remove the module and check the card guide and connector to verify proper alignment and the absence of foreign material.

1.	Align the channel unit with the appropriate card-guided slot of the terminal.
2.	Slide the unit into the slot with the front panel in a horizontal (up) position.
3.	When the top portion of the hinged front panel is under the front lip of the terminal, push down on the front panel until it is in the vertical position. The channel unit's card-edge connector will begin to make contact with the inner portion of the backplane connector.
4.	Continue applying light pressure to the bottom edge of the front panel until the unit snaps into place.

The Dataport occupies one card position in the 360/363 channel bank. When the Dataport is optioned for N=2 or more, it is recommended that the remaining time slots have A91–368900 blank units installed in those physical slots.

4.2.1. Installing Blank Front Panel Units

After installing the Dataport in the desired time slot, blank front panel units can be inserted, if desired, in the remaining time slots used by the Dataport. For example, if the Dataport is installed in slot 1 and is optioned for N=4, blank front panel units can be inserted in time slots 2, 3, and 4.

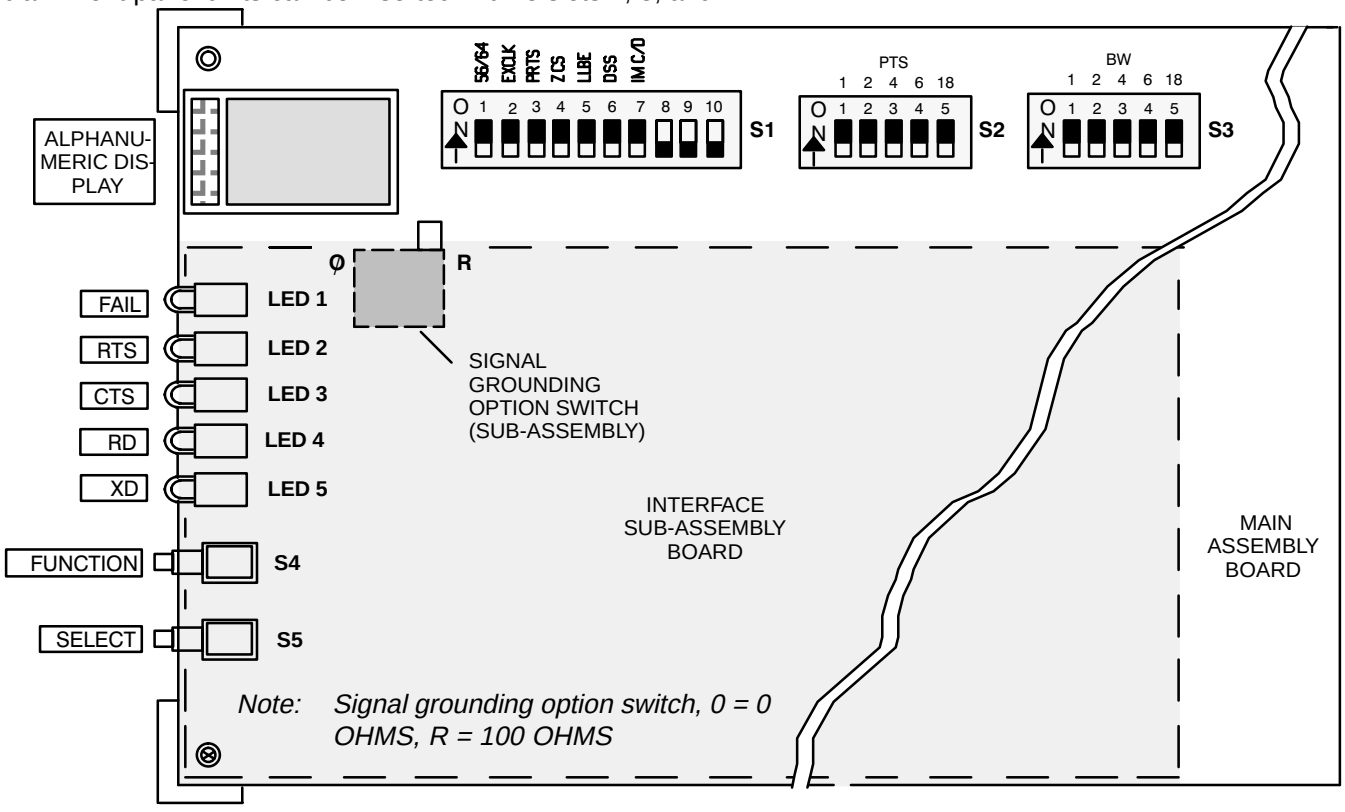

Figure 3. 3634–02/04/35 56/64 X N SYNC-DP Option Locations and Option Summary (Part 1 of 2)

Table 1. Option Summary

Option	Description/Function
S1–1 56/64	**KB/s Rate Provisioning.** Placing S1–1 in the On position sets the rate equal to a multiple of 64KB/s. The OFF position sets the rate to a multiple of 56KB/s.
S1–2 EXCLK	**External Clock.** Placing S1–2 in the ON position allows the 3634–02/04/35 to receive EXTERNAL CLOCK from the DTE *Note: If external clock is not available set S1–2 to OFF position (internal clock mode).*
S1–3 PRTS	**Permanent Request To Send.** Placing S1–3 in the ON position forces the unit to continuously output the DTE data from the DTE and therefore never enters the idle mode. This line is overridden during network loopback, remote DSU loopback, and self-test modes.
S1–4 ZCS	**Zero Code Suppression.** Placing S1–4 in the ON position suppresses any octet of 8-zeros by substituting this octet of zeros with 10011000 pattern. *Note: If this option is placed in the OFF position, the 360/363 terminal is required to have its zero suppression enabled (applicable in 64Kb/s rate only).*
S1–5 LLBE	**Latching.** Placing S1–5 in the ON position enables unit recognition of latch loopback sequence. With S1–5 in the OFF position, a remote unit will not be able to remote loopback or remote self test the local unit.
S1–6 DDS	**DDS Enable.** Placing S1–6 in the ON position enables unit to respond to DDS control codes. This option applies to the 56Kb X N mode only. DDS loopback codes are ignored in the 64Kb/s X N mode.
S1–7 IM C/D	**Idle Mode Code/Data.** Placing S1–7 in the ON position enables unit to transmit (ALL 1s) data to the 360/363 common equipment during idle. In the OFF position the unit transmits idle code pattern 11111110.
S1–8, S1–9 S1–10	S1–8, S1–9, and S1–10 must be in the OFF position for proper operation.
S2–1 THRU S2–5 PTS	**Physical Time Slot.** Placing S2 (1–5) in the ON position sets the physical time slot location the 3634–02/04/35 will be starting from. See Physical Time Slots part of Table 2. *Note: If the unit is not placed in the correct time slot as set by S2 (1–5), the unit will display (B, A, D), (S, L, O, T). It is up to the user to re-install the unit into the correct time slot.*
S3–1 THRU S3–5 BW	**Bandwidth.** Place S3 (1–5) in the ON position to correspond to the number of time slots that are required by the unit. This range or bandwidth is between 1 and 24 depending on application. See Bandwidth Time Slot Assignments part of Table 2. *Note: If the unit is placed in a time slot which cannot accommodate the bandwidth set by S3 (1–5), the unit will display (B, A, D), (B, A, N, D), (W, D, T, H). It is up to the user to re-install with the correct bandwidth setting.*

Table 2. S2 and S3 Optioning

Physical Time Slot (PTS)							Bandwidth Time Slot Assignment							
Time Slot	Channel Number (D3/D4)	S2 (1–5)					Number of Time Slots (N)	Data Rate		S3 (1–5)				
		1	2	4	8	16		56kb/s X N	64kb/s X N	1	2	4	8	16
1	1	1	0	0	0	0	1	56	64	1	0	0	0	0
2	2	0	1	0	0	0	2	112	128	0	1	0	0	0
3	3	1	1	0	0	0	3	168	192	1	1	0	0	0
4	4	0	0	1	0	0	4	224	256	0	0	1	0	0
5	5	1	0	1	0	0	5	280	320	1	0	1	0	0
6	6	0	1	1	0	0	6	336	384	0	1	1	0	0
7	7	1	1	1	0	0	7	392	448	1	1	1	0	0
8	8	0	0	0	1	0	8	448	512	0	0	0	1	0
9	9	1	0	0	1	0	9	504	575	1	0	0	1	0
10	10	0	1	0	1	0	10	560	640	0	1	0	1	0
11	11	1	1	0	1	0	11	616	704	1	1	0	1	0
12	12	0	0	1	1	0	12	672	768	0	0	1	1	0
13	13	1	0	1	1	0	13	728	832	1	0	1	1	0
14	14	0	1	1	1	0	14	784	896	0	1	1	1	0
15	15	1	1	1	1	0	15	840	960	1	1	1	1	0
16	16	0	0	0	0	1	16	896	1024	0	0	0	0	1
17	17	1	0	0	0	1	17	952	1088	1	0	0	0	1
18	18	0	1	0	0	1	18	1008	1152	0	1	0	0	1
19	19	1	1	0	0	1	19	1064	1216	1	1	0	0	1
20	20	0	0	1	0	1	20	1120	1280	0	0	1	0	1
21	21	1	0	1	0	1	21	1176	1344	1	0	1	0	1
22	22	0	1	1	0	1	22	1232	1408	0	1	1	0	1
23	23	1	1	1	0	1	23	1288	1472	1	1	1	0	1
24	24	0	0	0	1	1	24	1344	1536	0	0	0	1	1

4.3 Cabling

After attaching the cable to the DCE interface, the cable should be strain-relieved by anchoring the cable to the equipment frame to avoid accidental disconnection. The recommended maximum operating distances for the various interfaces depends on the data rate for which the Dataport module is optioned. Refer to Table 2 for more details about the maximum distance for the different interfaces at the desired data rate.

When using the Dataports with the Charles Industries 360–34/35/36 channel banks, grounding of the interface cables is required for FCC Part 15 compliance. Figure 4 and Figure 5 show the cabling arrangement for the interface cables. Refer to these drawings when performing the following procedure to ground the interface cables.

Step	Action
1.	Route the interface cables along the sides of the front inner chassis (Figure 4) and then under the inner chassis to the rear of the assembly.
2.	Remove the lower rear panel to expose the unit.
3.	Remove the appropriate ground clip retaining screws and ground clip from the grounding bar (Figure 5). Each ground clip accommodates a set of four cables.
4.	Insert the exposed shield of each interface cable into the grounding bar receptacles as shown in Figure 5.
5.	Reinstall the ground clips and the ground clip retaining screws.
6.	Reinstall the lower rear panel.

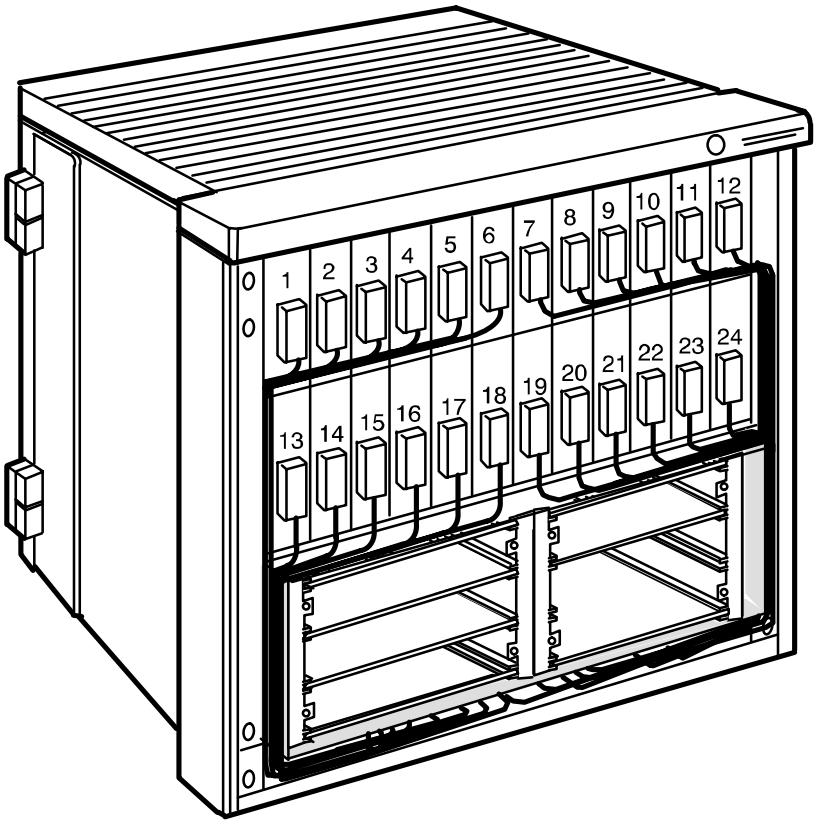

Figure 4. Cabling Arrangement for 360–34 T1 Termination System with 3634–02/04/35 (Front View)

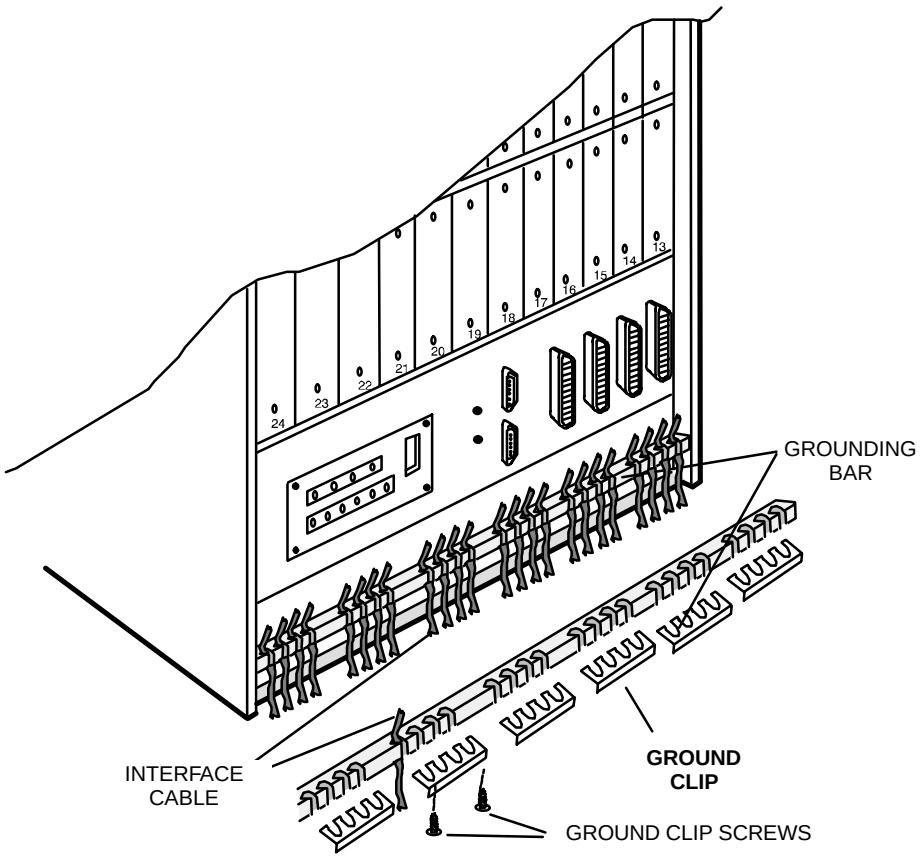

Figure 5. Cabling Ground for 360—34/35/36 with 3634—02/04/35 Interface Cable (Rear View)

5. DATAPORT OPERATION

5.1 Power-Up

After plugging the Dataport into the 360/363 D4 terminal, the unit will automatically go into a self-test mode. If the unit passes SELF TEST the front panel display will indicate the following:

S	E	L	F
T	E	S	T
P	A	S	S
3	6	3	4

If the unit fails self-test the alphanumeric display will indicate:

S	E	L	F
T	E	S	T
F	A	I	L

After displaying this message, the front panel FAIL LED (Red) will turn ON.

If the unit fails due to incorrect setting of the physical time slot, switch (S2 1–5), the front panel display will indicate:

	B	A	D
S	L	O	T

The unit will display various error codes when it fails Power-Up self-test and optioning. The front panel alphanumeric display will repeat the fail message. See Table 5 for more information.

5.2 Function Mode

The Function Mode is entered when the FUNCTION switch (S4) is pressed. Press the FUNCTION push-button switch to display the first Function Mode Menu selection. Press again to single-step through the selections. To scroll through the selections, press and hold the FUNCTION switch. To stop scrolling, release the switch. See Table 4 for complete menu.

Table 7 illustrates how to sequence through the Dataport Front Panel Display menu by using the Function switch (S4), and the Select switch (S5). The example assumes that the unit is inserted in the correct time slot and the unit has passed the power-up self-test operation.

5.3 Local Self Test

The Dataport has a built-in Local Self Test feature. This feature checks and verifies that the channel unit and the DCE interface timing and data paths are correct per the specified channel unit options. This test can be performed without requiring any external test equipment. See Table 9 to perform the Local Self Test procedure.

5.4 Status Mode

The Status Mode is entered if the unit is not in the Normal Mode or approximately 20 seconds after the last press of the FUNCTION or SELECT switch, if a function is active. See Table 6 for explanations of displays that are not necessarily caused by use of the FUNCTION and SELECT switches. If no Function or Status Active, display will go blank after approximately 5 minutes.

5.5 End-to-End Verification

To test the 3634–02/04/35 56/64 X N channel unit, both the Local (Near End) and the Remote (Far End) channel units should have their Latching Loopback options enabled (S1–5 ON).

Refer to Figure 6 for local and remote testing end-to-end of the Dataports with either RS–232, RS–449/422, or V.35 interfaces.

5.5.1. Remote Self Test

The Dataport has a built-in Remote Self Test feature. This feature checks and verifies that the channel unit data path path from the remote unit are correct per the specified channel unit options. In order to perform this test there must be another Dataport channel unit at the Remote (far) End. This test can be performed without requir-

ing any external test equipment. Latching Loopback must be enabled on the remote unit. See Table 10 to perform the Remote Self Test procedure.

5.5.2. Front Panel Display Function and Select Sequence for Remote Loopback

Based on the example in Table 7 which describes how to sequence through the Dataport Front Panel Display menu by using the Function switch and the Select switch. See the example in Table 8 on how to sequence through a remote loopback. The remote unit must be optioned for latching loopback. If the latching loopback is not enabled on the remote end, the the remote unit is inhibited from activating loopback.

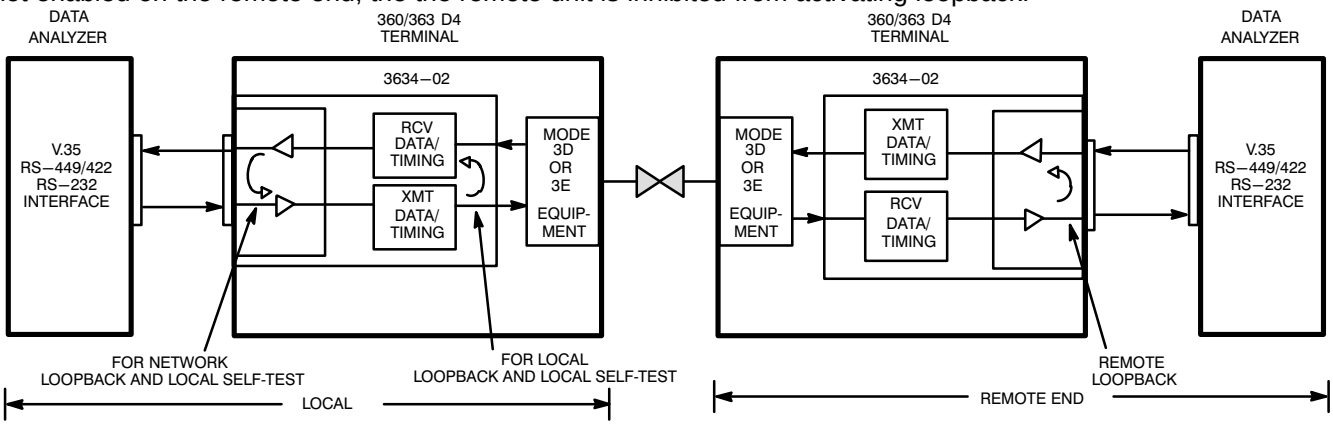

Figure 6. Typical Test Configuration For End-to-End Verification Of The 3634–02/04/35

6. TABLES

Table 1 shows Network Control Codes for Network Initiated modes, DTE Initiated modes, Manually Initiated modes, and Channel Bank Initiated modes.

Table 1. Network Control Codes

NETWORK INITIATED MODES

MODE	FRONT PANEL DISPLAY	FRONT PANEL LED DISPLAYS				DCE INTERFACE	CONTROL LEADS				CONTROL CODE DETECTED FROM NETWORK (1)			
		RTS	CTS	RD	XD		CTS	DSR	RLSD	TM	BIT	1234	5678	(DEFINITION)
DATA TRANSFER	BLANK	ON	ON	ON	ON		ON	ON	ON	OFF		....	...1	(DATA) (3)
NONTRANSMIT (IDLE)	BLANK	OFF	OFF	(3)	OFF		OFF	ON	OFF	OFF	OFF	.111	1110	(IDLE CODE)
LOOPBACK		(4)	OFF	(3)	(3)									
DSU (NETWORK)	*NLB CODE	(4)	OFF	(3)	(3)		OFF	OFF	OFF	ON		.010	1100	(DSU LOOPBACK)
CHANNEL (4)		(4)	OFF	(3)	(3)		OFF	OFF	OFF	ON		.010	1000	(CHANNEL LOOPBACK)
OCU (4)		(4)	OFF	(3)	(3)		OFF	OFF	OFF	ON		.010	1010	(OCU LOOPBACK)
LOOPBACK LATCHED (SEQUENCE)	*NLB LTCH	(4)	OFF	(3)	(3)		OFF	OFF	OFF	ON		.011	1010	(TRANSITION IN PROGRESS)
												.101	0101	(OCU SELECT) OR
												.011	0001	(CHANNEL SELECT)
												.101	0110	(LOOPBACK ENABLE)
												.101	1010	(FAR END VOICE)
OUT-OF-SERVICE (OOS)	OOS CODE	(4)	OFF	OFF	OFF		OFF	OFF	OFF	ON				ANY OTHER CODES

DTE INITIATED MODES (controlled through interface leads)

MODE	FRONT PANEL DISPLAY	LED DISPLAYS				DCE INTERFACE	CONTROL LEADS					
		RTS	CTS	RD	XD		CS	DSR	RLSD	TM	LL	RL
LOCAL LOOPBACK	*LLB,DTE	(4)	(2)	(3)	(3)		(2)	ON	(2)	ON	ON	OFF
REMOTE LOOPBACK	*RLB,DTE	(4)	(2)	(3)	(3)		(2)	(5)	(2)	ON	OFF	ON

MANUALLY INITIATED MODES (controlled through the front panel)

MODE	FRONT PANEL DISPLAY	LED DISPLAYS				DCE INTERFACE	CONTROL LEADS			
		RTS	CTS	RD	XD		CTS	DSR	RLSD	TM
NETWORK LOOPBACK	(6) NLB	(4)	OFF	(3)	(3)		OFF	OFF	OFF	ON
LOCAL LOOPBACK	(6) LLB	(4)	(2)	(3)	(3)		(2)	ON	(2)	ON
LOCAL SELF TEST	(6) LST	(4)	OFF	(3)	(3)		OFF	OFF	OFF	ON
REMOTE SELF TEST	(6) RST	(4)	OFF	(3)	(3)		OFF	OFF	OFF	ON
REMOTE DSU LOOPBACK	(6) RLB	(4)	(2)	(3)	(3)		(2)	(5)	(2)	ON

CHANNEL BANK INITIATED MODES

MODE	FRONT PANEL DISPLAY	LED DISPLAYS				DCE INTERFACE	CONTROL LEADS			
		RTS	CTS	RD	XD		CTS	DSR	RLSD	TM
CARRIER GROUP ALARM	CGA	(4)	OFF	OFF	(3)		OFF	OFF	OFF	OFF

NOTES:

(1) Bit 1 is first bit transmitted

(2) Follows RTS

(3) ON or OFF depending if data is present

(4) ON or OFF

(5) OFF until remote DSU loops back, then ON (lighted)

(6) *Indicates Function is active in Status Mode. The Display will alternate with 'MAN'.

Table 2 shows the maximum permissible cable length versus data rate for each interface. The 24-gauge cable has a capacitance of 50pF/meter.

Table 2. Maximum Cable Length (24-Gauge)

Rate		Cable			Rate		Cable		
		449/422	V.35	RS–232			449/422	V.35	RS–232
N	Kb/s	ft/m	ft/m	ft/m	N	Kb/s	ft/m	ft/m	ft/m
1	56	3900/1188	1300/396	50/15	13	728	560/171	190/58	N/A
	64	3900/1188	1300/396	50/15		832	490/149	160/49	N/A
2	112	3900/1188	1300/396	N/A	14	784	490/149	160/49	N/A
	128	3250/991	1080/329	N/A		896	420/128	140/43	N/A
3	168	2280/878	760/232	N/A	15	840	470/143	150/46	N/A
	192	1630/496	540/165	N/A		960	420/128	140/43	N/A
4	224	1630/496	540/165	N/A	16	896	420/128	140/43	N/A
	256	1460/455	490/149	N/A		1024	420/128	140/43	N/A
5	280	1300/396	430/128	N/A	17	952	420/128	140/43	N/A
	320	1300/396	430/128	N/A		1088	360/110	120/37	N/A
6	336	1250/381	400/122	N/A	18	1008	420/128	140/43	N/A
	384	1000/305	330/101	N/A		1152	330/101	110/34	N/A
7	392	950/289	320/98	N/A	19	1064	360/110	120/37	N/A
	448	820/250	270/82	N/A		1216	330/101	110/34	N/A
8	448	820/250	270/82	N/A	20	1120	330/101	110/34	N/A
	512	810/247	270/82	N/A		1280	300/90	100/30	N/A
9	504	810/247	270/82	N/A	21	1176	330/101	110/34	N/A
	576	750/229	230/70	N/A		1344	260/80	90/27	N/A
10	560	750/229	230/70	N/A	22	1232	330/101	110/34	N/A
	640	620/189	210/64	N/A		1408	250/76	80/24	N/A
11	616	620/189	210/64	N/A	23	1288	260/80	90/27	N/A
	704	570/174	190/58	N/A		1472	250/76	80/24	N/A
12	672	570/174	190/58	N/A	24	1344	260/80	90/27	N/A
	768	560/171	190/58	N/A		1536	250/76	80/24	N/A

Table 3 shows the standard interface pinouts and designations that are supported by the Dataports with V.35 (34 pin), RS–232D (25 pin), and RS–449/422 (37 pin) interface.

Table 3. Physical Connector Definitions (Pin Numbers)

Interface Type	V.35 (34 Pin)	RS–232D (25 Pin)	RS–449/422 (37 Pin)	Source
Protective ground	A	1	1,37	XXX
XMT Data (A/B)	P–(A), S– (B)	2	4–(A), 22– (B)	DTE
RCV Data (A/B)	R–(A), T– (B)	3	6–(A), 24– (B)	DCE
Request to Send	C	4	7–(A), 25– (B)	DTE
Clear To Send	D	5	9–(A), 27– (B)	DCE
Data Set Ready	E	6	11–(A), 29– (B)	DCE
Signal Ground	B	7	19	XXX
Receive Line Signal Detect	F	8	13–(A), 31– (B)	DCE
Local Loopback		18	10	DTE
Remote Loopback		21	14	DTE
XMT Clock (A/B)	Y–(A), a– (B)	15	5–(A), 23– (B)	DCE
RCV Clock (A/B)	V–(A), X– (B)	17	8–(A), 26– (B)	DCE
Test Mode		25	18–(A)	DCE
Transmit Timing (EXT CLK)	U–(A), W– (B)	24	17–(A), 35– (B)	DTE

Table 4 shows the unit Function Menu. Press the FUNCTION pushbutton on the front panel to display the menu.

Table 4. Unit Functions

Function	Alphanumeric Display MSD LSD
Local Loopback	[ ][L][L][B]
Remote Latching Loopback	[ ][R][L][B]
Network Loopback	[ ][N][L][B]
Remote Latching Loopback Take Down (Kill)	[K][R][L][B]
Local Self Test	[ ][L][S][T]
Remote Self Test	[ ][R][S][T]
Show Rate (Frequency in kHz)	[R][A][T][E]
Show Time Slots Used (TS #)	[S][L][O][T]
Show Unit Optioning (S1 1–7, S2 1–5, S3 1–5)	[ ][O][P][T]
Show DTE Interface	[I][N][T][F]
Firmware Version	[V][R][S][N]
Default Display	[3][6][3][4]

Note: The display turns off 5 minutes after the last function select

Table 5 shows the Error Codes that may be displayed from the unit at power up.

Table 5. Power Up Error Codes

Alphanumeric Display MSD LSD	Probable Cause/Solution
S E L F T E S T F A I L	Red fail LED ”ON” for failure of local self test at power-up. Replace card.
B A D S L O T	Bad time slot. The card is not optioned for the slot where it was inserted.
B A D B A N D W D T H	Bad bandwidth. Selection of bandwidth using switches is not allowed due to physical slot location.
I N T F F A I L	Interface fail. Replace the card.
C O M M E Q M T F A I L	Replace/check common equipment.
C G A	Common equipment detecting carrier alarm.

Table 6 lists messages displayed when unit is not in normal operating mode.

Table 6. Loopback/Test Status Indications

Cause	Alphanumeric Display MSD LSD	Cause	Alphanumeric Display MSD LSD	Cause	Alphanumeric Display MSD LSD
Manually initiated network loopback	* N L B M A N	Unit was in loopback mode	3 6 3 4	External Clock Fail	E C L K F A I L
Network initiated latching network loopback	* N L B L T C H	Manually initiated local loopback	* L L B M A N	Test/unknown codes from network	O O S C O D E
Manually initiated remote loopback	* R L B M A N	DTE initiated local loopback	* L L B D T E	Common equipment detecting carrier alarm	C G A
DTE initiated remote loopback	* R L B D T E	Remote initiated remote self test	* R S T C O D E		

Table 7 shows Function and Select Sequence Examples.

Table 7. Example of Function and Select Sequence

Step	Function (S4)	Select (S5)	Alphanumeric Display MSD LSD	Action
1.	Press release or scroll 		[ ][L][L][B]	
2.			[ ][R][L][B]	
3.			[ ][N][L][B]	
4.			[K][R][L][B]	
5.			[ ][L][S][T]	
6.			[ ][R][S][T]	
7.			[R][A][T][E]	Display rate function
8.		Press release After 3 seconds, display returns to ➧	[ ][2][5][6] [R][A][T][E]	Display rate in KHz
9.	Press release		[S][L][O][T]	Display channel slot function
10.		Press release Starts 0.5 second sequencing through all active timeslots After sequencing is completed, display returns to ➧	[C][H][0][1] [ ][T][O][ ] [C][H][0][4] [S][L][O][T]	Sequence channel 01 to channel 04
11.	Press release		[ ][O][P][T]	Display option function
12.		Press release. Sequence all the S1–1 through S1–7 options set to the ON position in 1-second increments. After sequencing is completed, the display returns to ➧	[6][4][K][B] [E][C][L][K] [ ][Z][C][S] [L][L][B][E] [ ][I][M][D] [ ][O][P][T]	Display all active (ON) positions of S1–1 through S1–7
13.	Press release		[I][N][T][F]	Display interface function
14.		Press release. After 3 seconds, the display returns to ➧	[ ][4][2][2] [I][N][T][F]	Display interface unit
15.	Press release. Step 14 returns the test sequence back to step 1. Any step may be skipped over to advance to a specific step by pressing and holding the Function Switch to enable scrolling. If there is no action for 20 seconds the Alphanumeric Display will return to Module/Network status indications.			

Table 8 shows both near-end and far-end displays during a remote loopback at the near-end.

Table 8. Far End/Near End 3634–02/04/35

Local (Near End) 3634–02/04/35					Remote (Far End) 3634–02/04/35	
Step	**Function (S4)**	**Select (S5)**	**Alphanumeric Display** MSD LSD	**Action**	**Alphanumeric Display** MSD LSD	**Action**
1.	Press release		[ ][R][L][B]		[ ][ ][ ][ ]	Display is blank or shows module # or status mode
2.		Press release	[W][A][I][T]	Transmit remote loopback to far end unit	[*][N][L][B] [L][T][C][H]	Latching loopback enabled
3.			[*][R][L][B]	Received remote loopback verification (See note)	[*][N][L][B] [L][T][C][H]	
4.		Press release	[ ][R][L][B]	Transmit remote takedown (KILL) to far end unit	[3][6][3][4]	Module # After 5 min. display will go blank
Note: If remote unit does not respond, local unit will display					[ ][ ][N][O] [ ][R][E][M] [L][O][O][P]	

Table 9 shows Local Self Test sequence.

Table 9. Local Self Test

Local (Near End) 3634–02/04/35				
Step	**Function (S4)**	**Select (S5)**	**Alphanumeric Display** MSD LSD	**Action**
1.	Press release or scroll		[ ][L][L][B]	
2.			[ ][R][L][B]	
3.			[ ][N][L][B]	
4.			[K][L][B][R]	
5.			[ ][L][S][T]	Display Local Self Test function
6.		Press release	[W][A][I][T]	Activate Local Self Test
7.			[P][A][S][S] OR [F][A][I][L]	Unit passes local self test Unit fails local self test
8.			[ ][L][S][T]	Display Local Self Test report function

Table 10 shows Remote Self Test Procedure.

Table 10. Remote Self Test

Local (Near End) 3634–02/04/35					Remote (Far End) 3634–02/04/35	
Step	**Function (S4)**	**Select (S5)**	**Alphanumeric Display** MSD LSD	**Action**	**Alphanumeric Display** MSD LSD	**Action**
1.	Press release or scroll ↓		[ ][L][L][B]		[ ][ ][ ][ ] ↓	*Note: Remote display can be blank, show module number, or show status mode.*
2.		Press release	[ ][R][L][B]			
3.			[ ][N][L][B]			
4.		Press release	[K][R][L][B]			
5.			[ ][L][S][T]			
6.		Press release	[ ][R][S][T]	Display remote self test function		
7.			[W][A][I][T]	Activate remote self test (See NOTE)	[*][R][S][T] / [C][O][D][E]	Remote Initiated. Remote self test detected
8.		Press release	[P][A][S][S] OR [F][A][I][L]	Unit passes remote self test Unit fails remote self test *Note: Failed channels will appear on the alphanumeric display*	[3][6][3][4]	Module # After 5 min. display will go blank
9.			[ ][R][S][T]	Display remote self test function		

Note: If remote unit does not respond, local unit will display [ ][ ][N][O] / [ ][R][E][M] / [L][O][O][P]

7. TECHNICAL ASSISTANCE

If technical assistance is required, contact Charles Industries' Technical Services Center at:

847–806–8500
847–806–8556 (FAX)
800–607–8500
techserv@charlesindustries.com (e-mail)

8. WARRANTY & CUSTOMER SERVICE

8.1 Warranty

Charles Industries, Ltd. offers an industry-leading, 5-year warranty on products manufactured by Charles Industries. Contact your local Sales Representative at the address or telephone numbers below for warranty details. The warranty provisions are subject to change without notice. The terms and conditions applicable to any specific sale of product shall be defined in the resulting sales contract.

Charles Industries, Ltd.
5600 Apollo Drive
Rolling Meadows, Illinois 60008–4049
847–806–6300 (Main Office)
847–806–6231 (FAX)

8.2 Field Repairs (In-Warranty Units)

Field repairs involving the replacement of components within a unit are not recommended and may void the warranty and compatibility with any applicable regulatory or agency requirements. If a unit needs repair, contact Charles Industries, Ltd. for replacement or repair instructions, or follow the *Repair Service Procedure* below.

8.3 Advanced Replacement Service (In-Warranty Units)

Charles Industries, Ltd. offers an “advanced replacement” service if a replacement unit is required as soon as possible. With this service, the unit will be shipped in the fastest manner consistent with the urgency of the situation. In most cases, there are no charges for in-warranty repairs, except for the transportation charges of the unit and for a testing and handling charge for units returned with no trouble found. Upon receipt of the advanced replacement unit, return the out-of-service unit in the carton in which the replacement was shipped, using the preaddressed shipping label provided. Call your customer service representative at the telephone number above for more details.

8.4 Standard Repair and Replacement Service (Both In-Warranty and Out-Of-Warranty Units)

Charles Industries, Ltd. offers a standard repair or exchange service for units either in- or out-of-warranty. With this service, units may be shipped to Charles Industries for either repair and quality testing or exchanged for a replacement unit, as determined by Charles Industries. Follow the *Repair Service Procedure* below to return units and to secure a repair or replacement. A handling charge applies for equipment returned with no trouble found. To obtain more details of this service and a schedule of prices, contact the CI Service Center at 217–932–5288 (FAX 217–932–2943).

Repair Service Procedure

1. Prepare, complete, and enclose a purchase order in the box with the equipment to be returned.

2. Include the following information:

   – Company name and address
   – Contact name and phone number
   – Inventory of equipment being shipped
   – Particulars as to the nature of the failure
   – Return shipping address

3. Ship the equipment, purchase order, and above-listed information, transportation prepaid, to the service center address shown below.

   CI Service Center
   503 N.E. 15th St., P.O. Box 339
   Casey, IL 62420–2054

4. Most repaired or replaced units will be returned within 30 or 45 days, depending on the product type and availability of repair parts. Repaired units are warranted for either 90 days from the date of repair or for the remaining unexpired portion of the original warranty, whichever is longer.

9. SPECIFICATIONS

9.1 Electrical

9.1.1. 3634–02/ 04/35

(a) DATA RATE: 56/64kb X N. (N=1 only for the 3634–02, N=1–24 for the 3634–04/35.)

(b) TRANSMISSION TYPE: Synchronous.

(c) OPERATING MODE: Full or half duplex.

(d) CURRENT SPECIFICATIONS @ 48Vdc:
Normal Mode: 70mA
Network Loopback: 80mA.

(e) BANDWIDTH: Uses (N) number of time slots in Charles Industries 360/363 D4 Digital Carrier Terminal. (N=1 only for the 3634–02, N=1 to 24 for the 3536–04/35.)

9.1.2. RS–232 DCE Driver Interface

(a) GENERATOR OUTPUT IMPEDANCE (OHMS): Short, < 0.5 AMP; no power, > 300.

(b) GENERATOR OUTPUT LEVELS (VOLTS): ±5–12V loaded; ±13V max. no load.

(c) TRANSITION TIMES (SLEW RATE): < 4% of pulse width, 30V/uS maximum, < lms maximum.

(d) MAXIMUM CABLE LENGTH: See Table 3.

9.1.3. RS–232 DCE Receiver Interface

(a) INPUT IMPEDANCE: 3–7K.

(b) MAXIMUM INPUT VOLTAGE: ±25.

(c) ZERO/ON: > +3V.

(d) ONE/OFF: < –3V.

(e) DATA TRANSFER RATE: 0–(56/64)Kb/s

9.1.4. RS–449/422 DCE Driver Interface

(a) GENERATOR OUTPUT IMPEDANCE (OHMS): < 100 ohms, short < 150 mA.

(b) GENERATOR OUTPUT LEVELS (VOLTS): ±4 to 6V, 2 to 3 differential w/100 load, 6 maximum differential, 3 max. offset.

(c) TRANSITION TIMES (SLEW RATE): < 10% of pulse width, 20 NS minimum.

(d) MAXIMUM CABLE LENGTH: See Table 2.

9.1.5. RS–449/422 DCE Receiver Interface

(e) INPUT IMPEDANCE: 4K to 7K ohms.

(f) MAXIMUM INPUT VOLTAGE: ±10V (12 max. differential).

(g) ZERO/ON: > +200mV.

(h) ONE/OFF: < –200mV.

(i) DATA TRANSFER RATE: 56Kb–1.536Mb/s.

9.1.6. V.35 DCE Driver Interface

(a) GENERATOR OUTPUT IMPEDANCE (OHMS): 50–150 ohms, 150 ohms to ground.

(b) GENERATOR OUTPUT LEVELS (VOLTS): 0.44–0.66V differential with load, 0.6 maximum offset.

(c) TRANSITION TIMES (SLEW RATE):< 1% of pulse width, 40 NS minimum.

(d) MAXIMUM CABLE LENGTH: See Table 2.

9.1.7. V.35 DCE Receiver Interface

(a) INPUT IMPEDANCE: 100 ohms.

(b) ZERO/ON: 0 = A>B, 1 = B<A

(c) DATA TRANSFER RATE: 56Kb–1.536Mb/s.

9.2 Physical

Physical specifications for the **3634–02/ 04/35** are shown in Table 11.

Table 11. Physical Specifications

Feature	U.S.	Metric
Height	4.3 inches	10.9 centimeters
Width	1.36 inches	3.5 centimeters
Depth	10.4 inches	26.4 centimeters
Weight	13.5 ounces	382.725 grams
Operating Temperature	32 to 122°F	0 to 50°C

10. ORDERING INFORMATION

The Part Numbers listed provide complete kits consisting of 56/64 X N SYNC-DP and Interface cable.

Description	Order Part Number
Complete Kits: Channel Card And Interface Cable	
56/64 X N (RS232D) 56/64 X N (RS449/422) 56/64 X N (V.35)	B98–363402 B98–363404 B98–363435
Replacement: Channel Card	
56/64 X N (RS232D) 56/64 X N (RS449/422) 56/64 X N (V.35)	A91–363402 A91–363404 A91–363435
Replacement: Interface Cable	
RS232D (3634–02) RS449/422 (3634–04) V.35 (3634–35)	003–211966 003–211967 003–211965